U.S. Dept. of Energy
Oak Ridge Operations Office
P. O. Box 2001
Oak Ridge, TN 37831-8600

KNOXVILLE TN CMF 37830 16:14 06-28-93

William Paty, Chairman
Department of Land and Natural Resources (DLNR)
State of Hawaii
1151 Punchbowl Street
Honolulu, HI 96813

To help facilitate communications, the Department of Energy has established a toll-free telephone line for the Hawaii Geothermal Project Environmental Impact Statement. The phone, which will be answered by voice mail, will be accessed regularly for messages. The toll-free number is:

1+800-HGP-EIS6
(1+800-447-3476)

JOHN WAIHEE
Governor
MUFI HANNEMANN
Director
BARBARA KIM STANTON
Deputy Director
RICK EGGED
Deputy Director
TAKESHI YOSHIHARA
Deputy Director

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

Central Pacific Plaza, 220 South King Street, 11th Floor, Honolulu, Hawaii
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804 Telephone: (808) 586-2406 Fax: (808) 586-2377

January 8, 1993

MEMORANDUM

TO: The Honorable William W. Paty
Chairman, Board of Land & Natural Resources

The Honorable John C. Lewin, M.D.
Director, Department of Health

FROM: Mufi Hannemann

SUBJECT: GOVERNOR'S POLICY ON GEOTHERMAL DEVELOPMENT

From 1987 through early 1990, the State of Hawaii actively supported a 500-megawatt geothermal/inter-island cable project. However, since January 1990, the State's focus has been on commercial geothermal development to first serve the energy needs of the Island of Hawaii. Any future support of a geothermal/cable project would be dependent upon our experience with the smaller scale projects that satisfy the energy needs of the Big Island, and the acceptable resolution of geothermal resource availability and social, economic, and environmental concerns.

As of 1992, the State further refocussed its support and adopted a revised Geothermal Energy Policy. This refocussed policy limits State support for geothermal development to currently permitted projects on the Big Island and establishes that the State is no longer pursuing a large-scale geothermal/cable project for export of electrical energy to the other islands.

In December 1992, the Governor again reaffirmed this policy clarifying the State's position on geothermal development. This geothermal energy policy is described in the attached memorandum for your information and guidance.

The State of Hawaii, as a cooperating agency, has been providing information to the U.S. Department of Energy in their preparation of a federal National Environmental Policy Act (NEPA) Environmental Impact Statement (EIS) for a conceptual 500-MW geothermal/inter-island cable project identified as the "Hawaii Geothermal Project". Notwithstanding this participation, it

should be clearly recognized that the State of Hawaii is not proposing a large-scale geothermal project for the export of electrical energy to the other islands. In addition, the federal EIS document will be prepared exclusively to fulfill federal EIS requirements.

MH/DAN:js:472

Attachment

JOHN WAIHEE
Governor
MUFI HANNEMANN
Director
BARBARA KIM STANTON
Deputy Director
RICK EGGED
Deputy Director
TAKESHI YOSHIHARA
Deputy Director

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

Central Pacific Plaza, 220 South King Street, 11th Floor, Honolulu, Hawaii
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November 27, 1992

MEMORANDUM

TO: The Honorable John Waihee
Governor, State of Hawaii

FROM: Mufi Hannemann

SUBJECT: GEOTHERMAL PROGRAM REVIEW AND POLICY STATEMENT

Since assuming my appointment as the Director of the Department of Business, Economic Development & Tourism and Energy Resources Coordinator for the State of Hawaii, I have been reviewing our energy programs, especially those relating to geothermal development.

This review has been conducted for all programs and is consistent with the current State objective to downsize and limit government spending to those high priority areas meeting the largest needs with demonstrated returns.

In keeping with this objective, I intend to issue a geothermal policy (copy attached) that focuses and clarifies the State's current policy to first develop geothermal to serve the Island of Hawaii.

This policy limits State support for geothermal development to currently permitted geothermal projects on the Big Island and establishes that the State is no longer pursuing a large-scale geothermal/cable project.

Our basis for this geothermal energy policy statement is further supported by the results of a recent Geothermal Resources Assessment Report prepared by GeothermEx, Inc. for DBED. The Assessment Report which was based on currently available information concluded that the probable estimated reserve (i.e. geothermal capacity) for the Kilauea East Rift Zone was on the order of 300 megawatts (MW). At a 90% level of probability, this estimate of reserve capacity is further reduced to below 200 MW.

This level of estimated geothermal capacity within the Kilauea East Rift Zone cannot support the development of an interisland geothermal/cable system. In addition, the economic climate precludes further government or private support to undertake such a large project. It is our understanding that Hawaiian Electric Company is no longer engaged in project development activities as well.

Consistent with this policy to limit State support to currently permitted activities to develop geothermal for the Big Island, DBED will take the following actions:

- Allow the existing contract with OGDEN Environmental and Energy Services Company to expire without completion effective December 31, 1992. OGDEN was originally contracted to prepare a Master Plan, Environmental Impact Statement, and an analysis of overland transmission systems for a 500 MW geothermal/cable project. The planning services for the Geothermal/Cable Project provided by the consultant will no longer be needed, and their activities have been on hold for over a year.

- Allow the lapsing of additional CIP funds appropriated for the preparation of a Geothermal/Transmission System Master Plan and State EIS for an Interisland Geothermal/Cable System. These unallotted funds of $400,000 will be returned to the State Treasury.

- Allow the lapsing of CIP funds amounting to $750,000 for Geothermal Resource Assessment related to development of geothermal energy for export to the other islands. These unallotted funds will also be returned to the State Treasury.

- Disband and officially conclude the services of the Governor's Advisory Board on Geothermal Development chaired by former Governor William Quinn.

DBED will initiate the steps to complete these actions. We believe that this clarified geothermal policy will help to focus our attention and more effectively utilize to State's limited resources.

APPROVED/~~DISAPPROVED~~:

DEC 08 1992

John Waihee, Governor of Hawaii Date

December 1, 1992

GEOTHERMAL ENERGY POLICY STATEMENT

The State of Hawaii currently supports geothermal energy as a potential energy source exclusively for the Island of Hawaii. As such, the State supports the efforts of Puna Geothermal Venture and True/Mid-Pacific Geothermal Venture to explore, develop and generate geothermal electricity in a safe and environmentally acceptable manner limited for use to the Big Island.

The State of Hawaii is not taking any action to support a large-scale geothermal and undersea cable transmission project to export electrical energy to the other islands, and is not aware of any present efforts, public or private, to undertake such a project.

The Federal government has been mandated by the Federal Court to prepare an EIS for a conceptual "Hawaii Geothermal Project (HGP)" consisting of a large-scale (i.e., 500 megawatts) development of geothermal power on the Island of Hawaii for transmission to Oahu and one or more of the other islands in the State.

While the State will continue to provide information and cooperate with the Federal government in the preparation of the EIS, the State's position is that there is no such project under consideration at the present time.

3112

JOHN WAIHEE
Governor
MUFI HANNEMANN
Director
BARBARA KIM STANTON
Deputy Director
RICK EGGED
Deputy Director
TAKESHI YOSHIHARA
Deputy Director

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

Central Pacific Plaza, 220 South King Street, 11th Floor, Honolulu, Hawaii
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804 Telephone: (808) 586-2406 Fax: (808) 586-2377

June 10, 1993

MEMORANDUM

TO: The Honorable Keith Ahue, Chairman
Board of Land and Natural Resources

The Honorable Clayton Hee, Chairman
Office of Hawaiian Affairs

The Honorable Yukio Kitagawa, Chairman
Board of Agriculture

The Honorable John C. Lewin, Director
Department of Health

The Honorable Harold Masumoto, Director
Office of State Planning

The Honorable Yukio Naito, Chairman
Public Utilities Commission

The Honorable Dayton Nakanelua, Director
Department of Labor and Industrial Relations

The Honorable Winona Rubin, Director
Department of Human Services

FROM: Mufi Hannemann MH

SUBJECT: U.S. Department of Energy Environmental Impact Statement
Meeting on July 26, 1993

As you are aware, the U.S. Department of Energy (DOE) has initiated the preparation of a National Environmental Policy Act environmental impact statement (EIS) for a conceptual large-scale geothermal/inter-island cable project identified as the Hawaii Geothermal Project.

The scope of the Hawaii Geothermal Project's EIS, as defined by the U.S. District Court of Hawaii, is intended to assess the potential impacts related to the verification

and characterization of the geothermal resource and the construction/operation of commercial geothermal power production facilities on the Big Island with overland and submarine transmission of electricity from the Big Island to Oahu and possibly other islands.

The State of Hawaii, with the Department of Business, Economic Development & Tourism (DBEDT) designated as the lead agency, is currently cooperating in the EIS preparation together with Maui County, Hawaii County, and several federal agencies. Toward that end, the DOE has requested a meeting with affected state agencies to provide an update and status report on the progress of the Hawaii Geothermal Project EIS preparation. The DOE meeting is scheduled for Monday, July 26, 1993, at 10:30 a.m., in the DBEDT Large Conference Room, located on the 11th floor of the Central Pacific Bank Building, 220 South King Street.

I am requesting that each invited state agency be appropriately represented at this meeting. The afternoon immediately following the meeting has been set aside for those wishing to meet separately with DOE personnel. I would appreciate your cooperation in calling our Geothermal Project Office, at 586-2353, as to who will be representing your agency, and if they wish to meet in the afternoon with DOE staff to follow-up on specific components of the EIS which pertain to areas under your purview.

The State of Hawaii will continue to work closely with the DOE to assist in defining the issues and concerns to be addressed in the EIS. With the assistance of your agency, we will be able to provide information in those areas where the state has regulatory authority and technical expertise.

Notwithstanding your participation, it should be clearly recognized that the state is not proposing any large-scale geothermal project for the export of electrical energy to the other islands. The State of Hawaii currently supports geothermal energy as a potential resource exclusively for the Big Island and is not aware of any present efforts, public or private, to undertake a project such as the Hawaii Geothermal Project.

Thank you for your continued cooperation. Should you have any questions, please contact Energy Program Administrator Maurice Kaya at 587-3807.

cc: Ms. Eileen Yoshinaka, DOE-Pacific Site Office

JOHN WAIHEE
GOVERNOR OF HAWAII

KEITH AHUE, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCE

DEPUTIES

JOHN P. KEPPELER II
DONA L. HANAIKE

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

STATE OF HAWAII

REF:HP:JT

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

Ms. Lillian Trettin
Cultural Resource Specialist
Oak Ridge National Laboratory
U.S. Department of Energy
P.O. Box 2008
Oak Ridge, Tennessee 37831

OCT 14 1993

LOG: 9692
DOC: 9308hm05

Dear Ms. Trettin:

SUBJECT: **State Historic Preservation Review (Section 106 Compliance, NHPA), Native Hawaiian Ethnographic Survey Prepared for Hawaii Geothermal Project Environmental Impact Statement (U.S. Department of Energy).**
Puna, Hawaii Island; Makawao and Hana, Maui
TMK: 3-1-1, 2, 3, 4; 2-1-7, 8, 9; and 2-2-1: various parcels

Thank you for submitting for our review and comment the various documents required under Phase I of the Native Hawaiian Ethnographic Survey which was prepared by Community Action Network Developing Options (CANDO). As we understand it, the ethnographic survey is designed to gather information that will allow the Hawaii Geothermal Project Environmental Impact Statement to identify and evaluate potential impacts on traditional cultural properties and Native Hawaiian customary and traditional values, practices and beliefs. This information should be sufficient to assist the Department of Energy in complying with Federal and State legislation that deals with cultural properties and native rights. The Ethnographic Survey subcontract focuses on two major areas where potential impacts and mitigation measures must be addressed: the three Geothermal Resource Zones on Hawaii Island and the transmission line corridor running between Kaupo and Makena on Maui's south shore.

This letter reviews the following four groups of documents or "deliverables": (1) a letter report discussing Native Hawaiian concerns about archaeological investigations and the preservation process; (2) an interim ethnographic and ethnohistorical background review of available literature; (3) a review of efforts to identify and establish contacts with pertinent Native Hawaiian groups; (4) and a draft research design study plan.

Our comments are guided, in part, by the Survey's scope of work (Statement of Work, Native Hawaiian Ethnographic Survey, Hawaii Geothermal Project, Oak Ridge Laboratory) and the cultural and historic preservation issues identified in the Hawaii Geothermal Project Implementation Plan (1993). As we discussed during your recent visit, our comments will not address editorial concerns about the organization of the documents or their need for integration. As some of the submitted documents may not be revised, our comments address general

concerns that can be taken into consideration during on-going consultations with the sub-contractor, in monthly reports or in drafts of the final report. Our review begins with some general points that apply to more than one document and then focuses on concerns with the specific submissions.

First, however, we would like to stress that we believe this is a very important survey because few major projects in Hawaii have subcontracted an ethnographic survey designed to come to terms with how Hawaiian concerns can be effectively incorporated in the review and compliance process. As is evident in recent legislation at the State and National levels, there is a growing need to seriously consider Hawaiian concerns but we have few good precedents to demonstrate how this can be done. We hope this study will prove to be such a precedent but realize that different approaches need to be tried before any of us will know which are the most effective. It may be some time before these kinds of studies are as routine as many archaeological and architectural reports. Your working through the University also contributes to training professionals who may be able to continue with this much needed work in the future. We appreciate the effort you have made in trying to come to terms with these issues in the scope of work and your continued attention to them.

General Comments

Use of the Term Practitioner to Designate Individuals Warranting Consideration - We feel that the terms "practitioner" does not adequately imply the spectrum of individuals who warrant consideration in the EIS or under the range of State and Federal laws that need to be addressed in the EIS. The term and the author's use of it relies too heavily on concepts used to argue cases for the American Indian Religious Freedom Act and native gathering rights laws in Hawaii. Both laws tend to emphasize proving that individuals are exercising those actions protected by law. While these laws and individuals must be considered in the EIS, the term "practitioner" does not adequately acknowledge all interested Hawaiians parties. An example would be those who have traditional knowledge of places they may no longer visit or who have a deep understanding of customs they no longer practice. Despite this lack of active or current involvement, these individuals may value these places and customs highly and consider them very significant. Recognizing these values and concepts are explored more in the historic preservation laws and accompanying literature which is a fundamental requirement of the EIS.

Definitions of Individuals Warranting Consideration. The authors present six categories that define those organizations and individuals who will be considered in their survey. We have no objections to the range of people encompassed by these categories or their definitions. In fact, we find them thorough and thoughtful. We feel, however, that a much clearer distinction needs to be made between residents or non-residents with close ancestral ties to the major study areas and those who wish, particularly from a distance, to maintain an opportunity to exercise particular religious or gathering rights. Those with close ancestral ties, particularly those with traditional knowledge of the major study areas, should be given a clearer priority in the research design and their perspectives given greater weight in the resulting assessments. This recognition of regional authority in terms of knowledge, jurisdiction and responsibility can probably be considered a wide-spread Hawaiian cultural value. It has been evident repeatedly in the formation of the Island Burial Councils and in

their deliberations. Council members were chosen from the major geographic areas of each island so they could represent the varying interests and traditions of those districts through their regional networks. In considering decisions brought before them, Councils will often defer to the perspectives of the member from the area in which the decision is located. Although the importance of local or regional values is mentioned in the documents submitted, it generally appears to be overshadowed by descriptions of individuals who have more distant claims. The categories presented were apparently adopted from a previous study and we feel that they need some reshaping to reflect the needs of this ethnographic survey. Again, the American Indian Religious Freedom Act and traditional use rights disproportionately dominate the concepts used to define groups and individuals who warrant consideration.

Distinction Between Individuals with Traditional Knowledge and Hawaiians with Long-Term Concerns about Traditions and Community Lifestyles - This project seems to have two quite distinct, although not mutually exclusive, aims. One is to collect information on the traditions, customs and practices of the study areas as well as those of dominant themes such as Pele. The other is to assess how geothermal exploration and development will impact the tangible and intangible remains of these traditions and the lives of Hawaiians who are concerned about these traditions and the lifestyles that embrace them. We feel these distinctions should be defined more clearly in the introduction because the approaches needed to document and explore each can be quite different. Some sections are confusing because there is a sense that these two, often different, aims are being combined when it would be better to treat them more distinctly. This would be particularly important in framing portions of the research design and conducting the study. For example, some individuals who are very concerned about preserving the opportunity to perform certain customs and who express the need to do so very eloquently, may have very little first-hand or detailed knowledge of the traditions of these areas. Their perspectives would probably be better dealt with in the focus groups. Some older individuals with a great deal of traditional knowledge may not want to address, in public, the implications of a broadly-defined and largely hypothetical project on their knowledge or beliefs.

Apparent Absence of New Material in the Documents. - In many cases, the submitted documents appear to be a compilation of excerpts from reports or papers previously written by the authors. While this is expectable where appropriate and when it will save duplicated effort, this particular reuse of material often gives the submitted documents a generic character and leaves the reader with little sense of how broadly stated concepts and statements will be applied to this particular project and will meet the goals of this survey. Background and introductory sections should eventually be reworked to specifically address the needs of this project, the two regions being studied in detail and those broader beliefs and practices that could be effected by Geothermal.

Demonstrated Familiarity with Laws and Documents Cited in or Required by the Statement of Work. The Statement of Work cites a number of laws, documents and rules that the subcontractor and Agency must consider. This includes the National and State laws with which the agency should comply (NEPA; NHPA, AIRFA, Chapter 6E HRS, Sate Historic Preservation Division Draft Rules, etc.); "pertinent guidelines" (e.g. National Register Bulletins #30 and 38) and examples of other cultural resource studies. While we do not

expect the subcontractor to show full, working knowledge of these documents or to have conducted an exhaustive review of comparable studies in these Phase I documents, we did expect some indication that the more crucial documents had been reviewed and that they are thinking of how pertinent concepts will be incorporated in the study. For example, it is only an AIRFA amendment and interpretations of State gathering rights laws that are addressed, presumably because these had been crucial in documents previously prepared by the authors. Also, in discussing significance determinations in the letter report to the archaeological subcontractor, there is no indication that the authors are familiar with the process or criteria used to evaluate the significance of cultural properties. This process and the criteria are essential components of documents required in the Statement of Work (see Quality Assurance Requirements, #1).

Narrative Style. Major portions of the documents have been written in what might be called a advocacy style or one in which information is organized to argue a single perspective instead of exploring a range of options and opinions. The authors state that it is their intent to "accurately document and reflect the broad range of concerns and viewpoints" and we do not doubt these intentions, but feel that this must be evident in the tone, composition and phrasing of the report.

Letter Report Discussing Native Hawaiian Concerns About Archaeological Investigations and Preservation

new reviewer - style change

We see a number of problems with this letter and feel that, as currently written, it would be difficult for the archaeological subcontractor to answer it as intended. If we understand correctly, the intent of this letter was to express concerns that can be realistically addressed by the archaeologists and truly incorporated in their cultural resources survey. Many of the concerns expressed are beyond their control given aspects of the well-established historic preservation review process; the very broad, ideological characterizations of some of the expressed concerns; and the nature of archaeological surveys. The letter report may be more effective if it were divided into two parts: one giving an overview or generalized characterization of known Hawaiian concerns about archaeological work and the other listing specific and realistic ways that some of these concerns could be met during this project. There is little in the letter report that most archaeological contracting firms in Hawaii have not heard and any solutions would be helpful.

The letter report primarily focuses on Hawaiian concerns raised within the context of large development projects, many of which have been opposed by community groups. The introductory overview should clearly state that this is the context in which many Hawaiians form their opinions about archaeological work and the one in which concerns are most often expressed publicly. It should also be pointed out that decisions on which sites are destroyed, preserved and studied are made routinely in a much wider range of circumstances and, also, that their destruction often occurs without review. This is particularly true in parts of Puna, where bulldozers are routinely used to clear house lots or agricultural fields with minimal or no permits. It should be stated in the introduction that a number of concerns are primarily the responsibility of the ethnographic survey and one of the reasons an ethnographic survey is being conducted. This includes identifying celebrated places or landmarks, coming to terms with culturally-based significance assessments, interpreting the use of sites and establishing

family ties to specific places or areas. A part of the letter probably should outline how information and perspectives gathered during the ethnographic survey should be incorporated in the archaeological report, particularly those sections dealing with appropriate mitigation measures.

Perhaps some consensus can be reached on what can and cannot be reasonably addressed and by whom if the subcontractors meet and discuss the concerns. This would give the archaeologists an opportunity to explain why some concerns are not easily met or how some may arise from a misunderstanding of the review process or archaeology. For example, including an Hawaiian from the area on the survey is feasible and should be encouraged but obtaining permission from the kupuna of an area could be very difficult. When large areas are concerned, identifying which kupuna are appropriate could be as time consuming and difficult as the consultation process which is now being required by law. The idea that proper protocol should be followed on particular sites is appropriate but what are these actions and in which circumstances should they be followed? What would these prohibitions be in the major study areas? It is much more difficult for someone to participate in another religion, say through prayer, than it is to observe behavioral prohibitions respectfully. The criteria (and proposed criteria in Draft State Rules) for determining significance is broad enough to accommodate most of the concerns mentioned in the letter report and explicitly includes criteria for places and sites that are of traditional and local significance and that are good representative site types. Is it the process or its application that is of concern? Hawaiian informants can definitely contribute to the interpretation of archaeologically identified features and this should be encouraged whenever possible. The conflicts in interpretation cited, however, were not between a Native Hawaiian source on one hand and an archaeological interpretation on the other. The conflicting claims both arose from archaeological interpretations with some members of the Hawaiian community choosing to follow one instead of the other.

We feel that one of the most important issues for both subcontractors to come to terms with is confidentiality and, if they do meet, this topic should be a priority. In terms of preservation, we concur with any emphasis on community or individual group participation and responsibility for site guardianship or curatorship. Given the number of sites or areas that merit protection, community participation is, by far, the most effective way to maintain the long-term integrity of areas.

Interim Ethnographic and Ethnohistorical Background - Review of Available Literature

Overall, the ethnographic and ethnohistorical background appears to draw heavily on material written by the author for other purposes which gives certain topics, issues and areas a disproportionately high representation. In Puna the emphasis is almost entirely on the Kalapana area, the inland most Geothermal Subzone (in the former Wao Kele o Puna Natural Area Reserve) and issues are generally framed to argue for subsistence gathering rights and the significance of Pele. While these topics rightfully belong in the Survey, we hope the survey and final report will truly develop background on the uses and people associated with all three Subzones. On Maui, the emphasis is shifted to the Hana and Kipahulu areas, we assume because the author has established ties with people in that area. We question the prominence given the statement that the Hawaiian population of south Maui moved to Hana. This may be a good area to make initial contacts but, based on our experience, older people with knowledge

of depopulated areas are living all over the State. This would also be true of the Ulupalakua and Makena area which should be given equal, if not greater, consideration than Hana because of its proximity to the transmission line corridor.

We concur that the rural character and consequences of this context are important points in both study areas. These sections tend to empathize what did not occur in these areas in terms of economic development and the resulting importance of subsistence practices in this relative void. The economic life of both areas, however, included a significant cash base with many rural Hawaiians being employed in ranching, government service, construction work and the sugar industry. Sugar was grown around Pahoa and Kapoho which are in or are very close to the lower Geothermal Subzones. We agree that fishing is an important issue for South Maui but ranching has been the dominant economic theme in the area's history over the past 100 years. A much more diverse discussion of the history of the two study areas is needed if the discussions are to be local cultural histories.

We feel that some of the background characterizations of Hawaiian practices and traditions are too broadly stated to serve as a foundation for topics that need to be addressed in the Survey, particularly for an audience that may have very little understanding of the Hawaiian culture. The present text seems to aim more at addressing broad impressions, a number of which would probably be true of many indigenous cultures. This is particularly true in the section discussing the Hawaiian relationship with the land. The discussions on Pele adequately touches on the spectrum of roles Pele plays now and in the past but these roles would be much clearer if they were illustrated by examples. The portrayal of Pele as aumakua is particularly important. The final report should address observed and potential variations in these roles among families, regions and islands.

We question the statement that the bulk of the Puna lands were public lands. Perhaps the number of awards suggests fewer parcels of privately held land but if acreage is compared, we suspect that a greater percentage of land was held privately. This is based on our visual inspection of the Puna map and may not prove to be correct if the appropriate calculations are made. The point that many of theses lands were still being used for subsistence purposes, however, may hold true regardless of their being held publicly or privately. As we understand it, the resources of large tracts of privately held lands were still used by the local community when they remained undeveloped or were not drastically altered for other uses such as ranching or sugar cultivation.

The review of sources demonstrates that the author is certainly aware of the general literature, institutions and types of resources that are most likely to provide the necessary background but the needed summary review of these sources is absent. We had hoped for at least a preliminary assessment of the kinds of information that are and are not available in these sources and document types. This will be particularly important in selecting appropriate topics for informant interviews, either because certain topics are shown to be important or because there are apparent gaps in the available sources. According to the Statement of Work, the results of this search are to be incorporated in the research design. With a few exceptions, this would be difficult to achieve based on what was submitted. Again, we believe that the author has read these sources but has yet to truly apply their contents to this project. We are also hoping that the final report will include an assessment of these source materials, the kinds of

information they contain and their role in the survey's results. This could prove to be an important guide to future work in these regions. The submitted bibliography appears thorough as an interim review of the Puna Region although we note there is no comparable submission for South Maui.

Review of Efforts to Identify and Establish Contacts with Pertinent Native Hawaiian Groups

In terms of defining which Native Hawaiians should be contacted, our concerns are the same as those expressed earlier about the term practitioner and the apparent dominance of concepts drawn from a limited number of Federal and State laws. Our office is finding it difficult to establish effective procedures by which we and other agencies can routinely consult with Native Hawaiians during the historic preservation review process, particularly as the process involves hundreds of reviews each year. There has been a tendency, for efficiency's sake, to treat Hawaiian organizations as though they are the equivalent of Indian tribes in the decision making process but we are finding it equally important to contact a range of individuals in order to truly identify and address the appropriate concerns. We concur with your emphasis on a family unit (ohana) which may reflect your recognition of the same problem. We suggest, however, that the term be used not to imply a nuclear family so much as extended family or clan networks that are still traceable in these rural areas. Once these extended families are defined, then the study can attempt to contact representative members of each branch. In some cases, particularly in identifying cultural expertise, consideration might have to be taken to the level of individual. Often a number of individuals in an Hawaiian community will have different kinds of knowledge, backgrounds and life experiences that makes each of them an appropriate "cultural expert" and each may be acknowledged by the community for his or her particular expertise. Some of these people may or may not be accessible through their membership in various organizations. While focusing on groups or their representatives may be an efficient way to initiate and complete the compliance process, it may not fulfill the intent of the law given the historic circumstances of Hawaiian communities.

We have no objections to the people contacted thus far although we assume that the eventual list will include a broader range of families associated with all sections of the major study areas. As with the ethnographic background, we were hoping for some kind of preliminary summary based on these contacts, including the kinds of information these individuals are willing to discuss and some of their concerns. Again these contacts appear to have been made for reasons other than this study and how they will contribute to this study remains largely undefined.

Draft Research Design Study Plan

Overall, we feel it would benefit the subcontractors if their approaches to the individual interviews were much more structured. This would include defining the different steps taken from initiating contacts through the use of the resulting information in the final report. We also feel that a relative schedule for these steps should be defined more clearly, particularly in regard to the background research and how this information will be incorporated in the interviews. Approaches that have proven successful elsewhere are discussed in the oral history literature and could be very useful. In particular we think it is important that preliminary

The public's pre-conceptions of what geothermal development is and its potential impacts probably varies enormously. Perhaps the research design should specifically state how the project is being depicted to focus groups and individuals. How people perceive potential impacts and possible mitigation measures relies heavily on their understanding to the once-proposed project. To avoid potential complaints about how the project was depicted or that it was not portrayed uniformly, we feel the project description should be agreed upon during this phase.

The eight-point list that categorizes impacts to be assessed appears sufficiently comprehensive. It would be more effective, however, if the descriptions given in the categories were tailored to reflect the geothermal project being assessed. For example in what ways could the geothermal project impact the community, the family and the economic life of these communities? Impacts on specific sites, areas, resources and practices is easier to visualize but these should also be stated to make the research design more effective. Even a fairly large number of geothermal well sites would not eliminate or completely destroy many natural and cultural resources in these sizable areas. What levels of impact might the geothermal project have on these resources or other factors listed in the proposed categories? Also the need to discuss mitigation measures should probably be incorporated in these categories. Maybe the general range of historic and cultural sites that merit consideration under Federal and State laws should be acknowledged somehow, possibly under the category of Human Ecosystems or Customs and Practices. Maybe continued participation in the State and Federal historic preservation process should be considered a "right" for many concerned individuals.

In outlining the contents of the draft report, introductory sections should be included that describe the landscape and cultural history of the major project areas and the methodology used for interviews, focus groups and to contact participants. As we stated earlier, we would really appreciate an assessment on how effective the approaches were and any suggestions the authors may have for future surveys.

We have arranged to meet with the subcontractors to discuss our concerns. If you have any questions or comments about our review, please contact Holly McEldowney or Nathan Napoka at 587-0047.

Very truly yours,

Keith W. Ahue, Chairperson and
State Historic Preservation Officer

HM:jt

cc. Luciano Minerbi, Davianna McGregor and John Matsuoka
Manabu Tagomori
Dean Nakano

2159

Department of Energy

Oak Ridge Operations
P.O. Box 2001
Oak Ridge, Tennessee 37831—8600

April 26, 1993

Mr. Willian Paty, Chairman
Mr. John Keppler, Acting Chairman
Department of Land and Natural Resources (DLNR)
1151 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Paty and Mr. Keppler:

Enclosed is a copy of the *Implementation Plan for the Hawaii Geothermal Project Environmental Impact Statement* (DOE/EIS-0187) and a copy of the EIS mailing list. Copies of the Implementation Plan have been distributed to press contacts; Federal, State and local agencies; business and special interest groups; community, environmental and Native Hawaiian organizations; geothermal developers; and utilities who have expressed interest in the Hawaii Geothermal Project EIS. Copies of the Implementation Plan and the EIS mailing list have also been placed in the DOE reading rooms identified in the enclosures. Questions about the Implementation Plan or requests for copies may be directed to:

Ms. Judith C. Stroud, ER-10
Program Director, Hawaii Geothermal Project
Environmental Impact Statement
U.S. Department of Energy, Oak Ridge Operations
P.O. Box 2001
Oak Ridge, TN 37831-8600
Telephone: (615) 576-0723
FAX: (615) 576-0006

Thank you for your continued interest in the Hawaii Geothermal Project Environmental Impact Statement.

Sincerely,

Judith C Stroud

Judith C. Stroud
Program Director
Hawaii Geothermal Project

Enclosures (2)

Implementation Plan

for the

Hawaii Geothermal Project

Environmental Impact Statement

Prepared by
The United States Department of Energy
Office of Energy Efficiency and Renewable Energy

April 1993

U.S. Department of Energy
Washington, D.C.

Implementation Plan
for the
Hawaii Geothermal Project Environmental Impact Statement

Prepared by
The United States Department of Energy
Office of Energy Efficiency and Renewable Energy
Washington, D.C.

In Cooperation with
County of Hawaii
County of Maui
National Marine Fisheries Service
National Park Service
State of Hawaii
United States Army Corps of Engineers
United States Fish and Wildlife Service
United States Geological Survey

April 1993

CONTENTS

PREFACE

The Hawaii Geothermal Project (HGP) has been proposed by the State of Hawaii as part of a strategy for developing an indigenous, non-fossil power resource in the State. It has been determined that the HGP is subject to the National Environmental Policy Act of 1969 (NEPA). An environmental impact statement (EIS) (DOE/EIS-0187) is being prepared by the U.S. Department of Energy (DOE) to identify and assess the environmental consequences of the HGP.

This Implementation Plan (IP) is a DOE public disclosure document, prepared preceeding issuance of a draft EIS, for recording the results of the scoping process and providing guidance to DOE for preparation of the HGP Draft EIS. The IP includes a statement of the planned scope and content of the EIS; the purpose and need for the proposed action; a description of the scoping process and the results, including a summary of comments received and their disposition; target schedules; anticipated consultation with other agencies; and disclosure statements executed by contractors and subcontractors assisting DOE in the preparation of the EIS. The IP is a "living document" in that it may be revised as needed throughout the preparation of the EIS to provide updated information regarding major changes in scope, methodology, or work plan.

As a public disclosure document, the IP and any formal revisions are available to the public for information. Copies of the HGP IP are available upon written request. Copies will be filed in 25 DOE public reading rooms and circulated among agencies and organizations on the HGP EIS mailing list. This IP has received an internal review by DOE and by cooperating agencies that are participating in the preparation of the EIS.

Questions about the IP or HGP and written requests for copies of the IP may be directed to:

Ms. Judith C. Stroud, ER-10
Program Director, Hawaii Geothermal Project
Environmental Impact Statement
U.S. Department of Energy, Oak Ridge Operations
P.O. Box 2001
Oak Ridge, TN 37831-8600
Telephone: (615) 576-0723
FAX: (615) 576-0006

General information on the procedures followed by DOE in complying with NEPA may be obtained from:

Ms. Carol Borgstrom, Director
Office of NEPA Oversight (EH-25)
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585
Telephone: (800) 472-2756 (Toll free)
(202) 586-4600
FAX: (202) 586-7031

Implementation Plan for the Hawaii Geothermal Project Environmental Impact Statement

1. INTRODUCTION

The U.S. Department of Energy (DOE)* is preparing an Environmental Impact Statement (EIS) (DOE/EIS-0187) that identifies and evaluates the environmental impacts associated with Phases 3 and 4 of the proposed Hawaii Geothermal Project (HGP), as defined by the State of Hawaii in its 1990 proposal to Congress (DBED 1990), and reasonable alternatives to the HGP. The EIS is being prepared pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA), as implemented by the President's Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508) and the DOE NEPA Implementing Procedures (10 CFR Part 1021), effective May 26, 1992. It will provide a basis for incorporating environmental factors into DOE's decision of whether to partially fund Phase 3 of the HGP. The funding of Phase 4 is currently uncertain, and development activities could proceed independently of DOE's actions. The EIS will provide a body of facts and analyses that will be used to support final decisions for Phases 3 and 4 of the HGP.

Originally, the State's proposal for the HGP (the location of the proposed project is shown in Figure 1.1) consisted of four phases: (1) exploration and testing of the geothermal resource beneath the slopes of the active Kilauea volcano on the Island of Hawaii (the Big Island), (2) demonstration of deep-water power cable technology in the Alenuihaha Channel between the Big Island and Maui, (3) verification and characterization of the geothermal resource on the Big Island, and (4) construction and operation of commercial geothermal power production facilities on the Big Island, with overland and submarine transmission of electricity from the Big Island to Oahu and possibly other islands (DBED 1990). From 1985 through 1989, the State had envisioned a large-scale 500-MW(e) geothermal/inter-island submarine cable project as an alternative to the State's 90-percent dependence on imported oil for electricity generation. However, as of January 1990, the State of Hawaii has redefined its geothermal development goal to a planning level that seeks to have geothermal development first meet the energy requirements of the Big Island. This downsized project would not include an inter-island submarine cable system. If this goal is successful, only then would the State consider a large-scale geothermal and inter-island cable project.

DOE has previously prepared appropriate NEPA documentation for separate Federal actions related to Phases 1 and 2 research projects, both of which have been completed. The HGP EIS will assess the potential impacts of Phases 3 and 4, and of reasonably foreseeable alternatives to meet the State's energy goals, such as the use of biomass, coal, solar thermal and photovoltaic, and wind energy (or some combination of these), and construction and operation of commercial geothermal power production facilities on the Big Island.

*A list of acronyms and abbreviations is given in Appendix E.

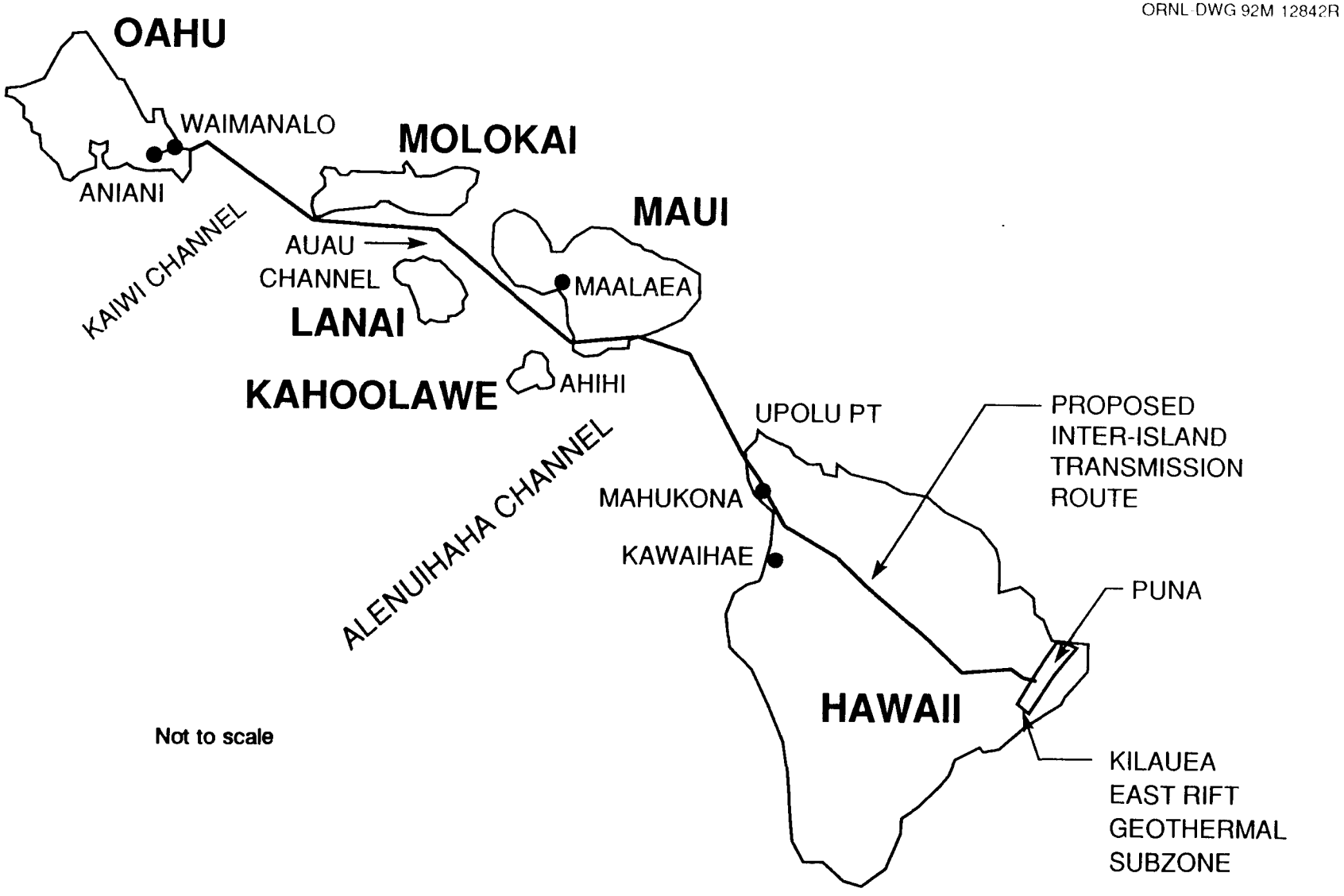

Figure 1.1. Proposed location of the Hawaii Geothermal Project and cable. *Source:* Hawaiian Electric Company, Inc., *Request for Proposal for the Geothermal/Inter-Island Transmission Project,* Hawaiian Electric Company, Inc., Honolulu, Hawaii, May 1989.

for exclusive use on the Big Island. In addition, the EIS will consider the reasonable alternatives among submarine cable technologies; geothermal extraction, production, and power generating technologies; pollution control technologies; overland and submarine power transmission routes; sites reasonably suited to support project facilities in a safe and environmentally acceptable manner; and non-power generating alternatives, such as conservation and demand-side management.

1.1 PURPOSE OF THE EIS IMPLEMENTATION PLAN

DOE has prepared this Implementation Plan (IP) for two purposes: (1) to provide guidance for the EIS preparation, and (2) to record results of the scoping process. To serve these purposes, this IP has been prepared in accordance with DOE NEPA Regulations (57 *Fed. Reg.* 15122, April 24, 1992) (to be codified at 10 CFR Part 1021). The IP has been made available at this time to inform the public of DOE's approach in preparing the EIS and to document the results of the public scoping process. The IP is a "living document" in that it may be amended as needed throughout the preparation of the EIS to incorporate changes in schedules, alternatives, or other content. The IP will be given broad distribution by including agencies and organizations on a mailing list compiled by DOE to provide information about the preparation of the EIS. In addition, the IP will be placed in all DOE Reading Rooms and other resource locations throughout the State of Hawaii (see Attachment 1 to Appendix A for a list of Reading Rooms).

Section 2 of this IP describes the treatment of alternatives. Section 3 discusses the scoping process, includes a discussion of the major issues identified through public scoping, and as appropriate, states how these issues will be addressed in the EIS. Consultations with agencies, preparers of the EIS, significant EIS milestones, and related environmental documentation are described in Section 4. Section 5 contains references cited in preparing the IP. The seven appendices to this IP contain a summary of oral and written scoping comments, a summary of agency scoping comments, a preliminary outline for the EIS, a glossary of terms used in the IP, a list of acronyms and abbreviations, copies of the Advance Notice of Intent and Notice of Intent, and the contractor disclosure statements. Comments by the cooperating agencies on a working draft of the IP (Appendix B) are addressed in this IP.

1.2 BACKGROUND OF HAWAII GEOTHERMAL PROJECT

1.2.1 Purpose and Need

The purpose of the DOE action is to assist the State of Hawaii in developing its indigenous geothermal resource for the production of electricity. Currently, the State of Hawaii uses petroleum for approximately 90 percent of its electrical energy, the highest percentage usage of all 50 states. The State has declared in its 1990 proposal to Congress, its 1991 Hawaii Integrated Energy Policy Program, and its 1991 State Functional Energy Plan that alternatives are needed to help reduce the State's heavy dependence on imported oil as an energy source. Thus, the EIS examines the HGP in the context of reasonably foreseeable alternative means of meeting the State of Hawaii's energy goal.

1.2.2 Description of HGP Phases 1 and 2

The HGP is the culmination of research and development efforts begun in the mid-1970s to explore the feasibility of using Hawaii's indigenous geothermal resource for the production of electricity. Geothermal exploration began in Hawaii in 1972 with funding from the National Science

Foundation (NSF). A high-potential geothermal resource site was identified on the east rift of the Kilauea volcano on the Big Island. Subsequent exploratory drilling (also funded by NSF) between December 1975 and April 1976 resulted in a productive geothermal well at a depth of approximately 6450 ft. In 1976, the Energy Research and Development Administration, a predecessor to DOE, funded the testing of the geothermal well, which was designated as the HGP-A well. In 1979, DOE funded the development of a 3-MW(e) demonstration power plant at the HGP-A site. In 1986, the HGP-A facilities were transferred by DOE to the State of Hawaii to be used for further research. The State has referred to this early exploration and testing of the Big Island geothermal resource as Phase 1 of the HGP.

DOE also provided funds for the Hawaii Deep Water Cable Program (HDWC), which was initiated in 1981 and completed in 1991. The goal of the HDWC was to determine the technical feasibility of constructing and operating a deep water submarine power-transmission cable that would serve the Island of Oahu and would operate for a minimum of 30 years. This project demonstrated the feasibility of deploying and retrieving the deep water power-transmission cable. The State of Hawaii referred to the HDWC as Phase 2 of the HGP.

Over an 11-year period, DOE has provided approximately $33 million for geothermal and deep water cable research in Hawaii, which is about 80 percent of the cost of the HGP Phases 1 and 2. The State and others cost-shared the balance of costs for these HGP phases.

1.3 PROPOSED ACTION

In its 1990 proposal to Congress, the State of Hawaii requested additional Federal funding for what is defined by the State as Phase 3 of the HGP: resource verification and characterization. In 1990, Congress appropriated $5 million (Pub. L. 101-514) for the State's use in Phase 3. Because Congress considered Phase 3 work to be research and not development or project construction, Congress indicated that this funding would not be considered a major Federal action under NEPA that would typically require an EIS. However, because the project is highly visible, somewhat controversial, and involves a particularly sensitive environment in Hawaii, Congress directed in 1991 (House Resolution 1281) that ". . .the Secretary of Energy shall use such sums as are necessary from amounts previously provided to the State of Hawaii for geothermal resource verification and characterization to conduct the necessary environmental assessments and/or environmental impact statement (EIS) for the geothermal initiative to proceed." In addition, the U.S. District Court of Hawaii, in litigation filed by several environmental groups (Civil No. 90-00407, June 25, 1991), ruled that the Federal Government must prepare an EIS for Phases 3 and 4 of the HGP before any further disbursement of Federal funds was made to the State for the HGP.

1.3.1 DOE Decision

The decision to be made by DOE in its Record of Decision is whether or not to partially fund Phase 3 of the HGP, as defined by the State in its 1990 proposal to Congress, using any funds remaining from the $5 million Congressional appropriation for Phase 3 after EIS expenditures. The funding for Phase 4 is currently uncertain.

The EIS will evaluate the activities to be conducted during both Phases 3 and 4 of the HGP as required by Congressional directive and U.S. District Court of Hawaii ruling. However, the DOE decision will be rendered only with regard to the disbursement of Federal funds to the State to partially fund Phase 3.

1.3.2 Description of HGP Phases 3 and 4

The State of Hawaii considers the unknown extent of its geothermal resource to be one of the primary obstacles to private investment and commercial development in geothermal energy production. State and private industry experts estimate that at least 25 commercial-scale exploratory wells would need to be drilled to verify the generating potential of the resource (these wells will, if possible, be used in Phase 4). To that end, Phase 3 activities would include well drilling, logging of cores from holes, measuring temperatures, collecting and analyzing geothermal fluid samples, and making downhole geophysical and geochemical measurements. Information on the feasible locations for Phase 3 activity and details regarding the methods of analyses will be obtained from various sources, including the U.S. Geological Survey (USGS), State of Hawaii, University of Hawaii, DOE, and developers.

Forecasts based on resource characterization to date indicate that between 10 and 20 separate geothermal power plants of 25 to 50 MW(e) each could be developed to produce a maximum of 500 MW(e) (net) of power delivered to Oahu. The actual number of plants would depend on the extent of the resource defined in Phase 3. Because the exact location of plants would not be known until Phase 3 was completed, the EIS will rely on best available data and information to encompass impacts at development sites. Further NEPA documentation may be required for specific projects and permits identified in the future. Based on the physical characteristics of the resource and contemporary geothermal energy development practice, the State estimated that about 125 production wells and 30 injection wells may be needed to produce 500 MW(e). The power plants, to be constructed in Phase 4, most likely would be connected by a network of roads, piping, and overland transmission lines. In addition, overland and underwater transmission lines (±300 kV) would be constructed to distribute power to Oahu and other islands (see Figure 1.1). Section 2.1.4 contains a description of the transmission cable system.

For purposes of the EIS analysis, a typical geothermal power plant may be briefly described as consisting of a moderate size [~30 MW(e)] single-flash, condensing cycle turbine coupled to a generator. Geothermal steam would pass from the well head through a separator and a demister, then to the turbine. The system would allow complete bypass of the turbine directly to the condenser. A two-stage steam ejector would remove gases from the direct-contact-type condenser. Non-condensable gases including hydrogen sulfide (H_2S) would be compressed, mixed with other spent geothermal fluids (brine and steam condensate), and then injected by surface pumps into the general vicinity of the geothermal reservoir. Steam condensate from the condenser would be cooled by a forced draft cooling tower. Power plant, transmission line, and submarine cable technologies will be further defined as the EIS progresses, using information from various sources including the Hawaiian Electric Company (HECO), the State of Hawaii, USGS, the University of Hawaii, Puna Geothermal Venture, True Geothermal Energy Company, Mission Energy Company, Mid-Pacific Geothermal, Inc., Campbell Estate, and DOE. In addition, various development scenarios will be considered based on the extent of the resource and other factors. Because no specific plant design has been proposed for the HGP, a reasonable composite or typical design based on current information will be used to assess potential impacts.

According to the State of Hawaii (DBED 1988), the 500 MW(e) of electrical power was expected to be delivered to the Island of Oahu. A recent evaluation of transmission losses associated with high-voltage direct current (HVDC) delivery of

500 MW(e) from the Big Island to Oahu indicated a gross electrical generating capacity requirement of 520 MW(e), or a 4 percent total HVDC transmission system loss including converter station losses (Bonnet 1992). HECO indicated that it was interested in purchasing up to 500 MW(e) of geothermally generated power. The Maui Electric Company (MECO) also has indicated some interest in whether a tap for 50 MW(e) from the project's transmission system is technically feasible (HECO 1989). Other configurations of the HGP including more or less power production are possible, depending on the extent of the geothermal resource and other variables. For purposes of the EIS, the proposed project will be defined as the development of sufficient gross capacity for delivery of 500 MW(e) (net) to Oahu. Alternatives will consider variations that develop up to the net capacity of 500 MW(e), but not more. Some alternatives that would develop less than the net capacity will be considered in the EIS, as well as transmission and delivery of some of the geothermal power to Maui and the Big Island.

In the 1990 proposal to Congress, the State projected that permitting and financing for Phases 3 and 4 would occur in 1991, and that 500 MW(e) of power could be on-line by 2005. Compliance with State and Federal legal and environmental requirements is likely to extend this schedule. As discussed above, the State has redefined its geothermal development goal from the four-phased, 500-MW(e) inter-island project to first meet the energy requirements of the Big Island, thus initially excluding the inter-island submarine cable (see Section 1).

1.4 RELATIONSHIP TO OTHER GEOTHERMAL DEVELOPMENT ACTIVITIES

As discussed earlier, geothermal power development activities have been underway along the east rift of the Kilauea volcano on the Big Island since the mid-1970s, with exploratory drilling having occurred as early as 1961. The earliest power-producing well was the HGP-A well funded by DOE, which operated in the 1980s (see Section 1.2.2). A number of other geothermal development activities have occurred since the 1970s, some of which are still active. These include developers such as the Puna Geothermal Venture, the True Geothermal Energy Company, Mid-Pacific Geothermal, Inc., and the State's Scientific Observation Hole research program. Non-Federal environmental documentation was prepared for each of these activities (see Section 4.4). The HGP EIS will *not* reevaluate the environmental impacts of these activities. However, impacts of these other activities may contribute to cumulative impacts of the HGP. The CEQ NEPA regulations define cumulative impacts as those resulting from the incremental impact of an action when added to the impacts of other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes them. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Known impacts from other geothermal development on the Big Island will be factored into the HGP impacts analysis, as appropriate.

1.5 EIS COOPERATING AGENCIES

As part of the scoping process, DOE invited other agencies to participate in the EIS preparation as cooperating agencies. Cooperating agency roles and responsibilities in EIS preparation, as defined in the CEQ regulations (40 CFR Part 1501.6), can include participating in the scoping process, developing information, preparing environmental analyses, providing technical reviews, and/or lending staff support. The U.S. Army Corps of Engineers (COE), the U.S. Fish and Wildlife Service (FWS),

USGS, the National Park Service (NPS), the National Marine Fisheries Service (NMFS), the State of Hawaii, the County of Maui, and the County of Hawaii have agreed to be cooperating agencies on the HGP EIS. Memoranda of Understanding have been signed by DOE and each cooperating agency. In addition, FWS, USGS and COE are being funded by DOE to conduct technical support studies to assist in preparation of the EIS.

Details of FWS, USGS, and COE technical support studies are currently under review; preliminary plans for the studies are discussed in Sections 3.3.1, 3.3.3, and 3.3.4. In general, support from FWS will include a literature review, native forest bird survey, vegetation community survey, survey of threatened and endangered species, wetland and floodplain inventory, assessment of non-native species introduction at existing geothermal facilities, and an invertebrate survey. Support from USGS will include a literature review, geothermal fluid characterization, determination of volcanic gas emissions, groundwater resource evaluation, volcanic and deformation hazard analyses, seismic hazard analysis, and estimation of the potential for undersea slides and turbidity currents. COE will provide a literature review, a wetland map unit legend, and delineation of wetland types.

It is important to note that the proposed FWS, USGS, and COE technical studies are being supported by DOE to satisfy CEQ requirements (40 CFR Part 1502.22) regarding "incomplete or unavailable information." CEQ states that "If the incomplete information. . .is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement." In addition, these studies are necessary to provide data and analyses sufficient for DOE to conduct effective consultations with agencies who have statutory and regulatory responsibilities (see Section 4.1, Tables 4.1 and 4.2). On the other hand, CEQ allows that, if costs are prohibitive and/or the means to obtain information are unknown, an "agency shall include within the environmental impact statement: (1) a statement that such information is incomplete or unavailable; (2) a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment; (3) a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment; and (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community."

2. TREATMENT OF ALTERNATIVES

2.1 ALTERNATIVES WITHIN THE PROPOSED PROJECT

2.1.1 Development Scenarios

Forecasts based on resource characterization indicate that 10 to 20 separate geothermal power plants of 25 to 50 MW(e) each could be developed under the State's original 1990 HGP proposal to produce a maximum of 500 MW(e) (net) of power delivered to Oahu. The actual number of plants would depend on the extent of the resource defined in Phase 3. Because the exact location of plants will not be known until Phase 3 is completed, the EIS will rely on best available data and information to encompass the possible impacts at the development sites. Various development scenarios will be prepared for the EIS using information that has been collected over the years on the geothermal potential of the Kilauea East Rift Zone (KERZ) and energy demand forecasts

provided by HECO and its wholly owned subsidiaries MECO and Hawaii Electric Light Company, Inc. (HELCO).

2.1.2 Geothermal Technologies

Alternative geothermal technologies will be described and considered in the EIS. Based on the physical characteristics of the geothermal resource and contemporary geothermal energy development practice, the State previously estimated that about 125 production wells and 30 injection wells may be needed to produce the 500 MW(e) (DBED 1992). For the EIS, reasonably foreseeable geothermal technology options will be considered using best available information from geothermal developers, the State of Hawaii, and others. These options will include, but are not limited to, the use of conventional cooling towers using condensate as cooling water, reinjection of all fluids, and individual power generating units between 25 and 50 MW(e) each.

2.1.3 Alternative Sites

In the State of Hawaii, the production of electricity from geothermal resources can occur only in geothermal resource subzones (GRSs). Alternative sites for geothermal development and construction of power plants and associated facilities will be considered within three State-established GRSs of the KERZ on the Big Island. These include the Kilauea Middle East Rift Subzone, Kilauea Lower East Rift Subzone (Kamaili section), and Kilauea Lower East Rift Subzone (Kapaho section). One GRS on Maui will not be considered because it is not expected to be economical for power generation and therefore is not comparable to the GRSs on the Big Island. Alternative sites will be chosen based on the best available information on the potential commercial development of these GRSs for near-term geothermal development.

2.1.4 Alternative Cable and Transmission Line Routes and Technologies

The EIS will define potential alternative overland transmission routes based on route configurations in HECO (1989) (Figure 1.1), existing overland transmission routes, and future discussions with Hawaii State and County governments and utilities. The EIS will also address alternative transmission technologies as they are identified. The EIS will compare the impacts of direct current (dc) vs alternating current (ac) transmission based on existing literature and experience in other locations.

The EIS will also address various alternatives related to different submarine cable routes and different submarine cable technologies. Various cable routes, based on prior HDWC studies and on-going consideration, will be evaluated in the EIS with regard to competing uses along the route and their impacts to marine species, economics, maritime safety, and Native Hawaiian concerns, in addition to consideration of extreme event occurrences. The EIS will consider alternative cable materials and different transmission systems. The potential impacts of alternative land-sea transitions will be evaluated.

2.1.4.1 Cable Routes

A number of optional cable routes have been proposed and are described elsewhere (HDWC 1985a,b). The simplest route would proceed directly from Upolu Point (Big Island) across the Alenuihaha Channel, along the shore at Kipahulu (Maui), along the Maui coast through the channels between Maui and Kahoolawe (Alalakeiki Channel) and Maui and Lanai (the Auau Channel), and across the Kaiwi Channel to Oahu. Other variations include cable (1) ashore on Maui (see Figure 1.1) and (2) ashore on both Maui and Molokai. Differing sea-land transition points for the cable on

the various islands will be considered. Options to be considered will include the possibility of following existing transmission routes. Another alternative to the previously considered routes was presented at the Maui scoping meeting (see Section 3 and Appendix A) and has been reiterated in a written scoping submittal. This alternative route would proceed from the Big Island to Lanai to Oahu, with possible spur lines to Maui and Molokai.

2.1.4.2 Cable Materials and Configurations

Many configurations for the submarine cable have been examined previously (HDWC 1985b,c) from primarily technical and cost bases, including paper-insulated, high-viscosity oil-impregnated, non-pressurized cables, and low-viscosity, oil-impregnated, self-contained, oil-filled pressurized cables. Solid-dielectric cables present another option. Both aluminum and copper were examined as conductors, but only aluminum was found to be acceptable. Since those studies were performed, technologies have advanced, and the bases for costing scenarios have changed. The EIS will review technology advances and review costing for the prior scenarios.

2.1.4.3 High-Voltage dc vs High-Voltage ac Transmission

Current plans for the submarine cable call for HVDC transmission. During scoping, several commenters suggested that if development is staged, then ac transmission over relatively short distances might be cost effective. This assumption will be examined, and the relative environmental impacts of dc vs ac transmission will be discussed based on available literature and experience in other locations.

2.1.4.4 Land-Sea Transitions

Different land-sea transition configurations will be considered based on the need for oil-pumping stations (to maintain pressure in the cables if the self-contained, oil-filled cable is selected) and transformers. If a tap to the local system is required, a conversion station may also be necessary.

2.1.4.5 Multiple Uses of the Cable

Multiple uses of the submarine cable, once it is installed and operational, will be considered in the EIS. It has been suggested that the submarine cable could be used in a reverse mode to transport electrical power from Oahu to the other islands. For example, the EIS will consider the use of residual fuel oil to produce power on the island of Oahu for use there and for possible export to the other islands via the cable. Commenters have suggested that this alternative may be justified in light of potential liabilities from continued inter-island shipping of residual fuel oil.

2.2 ALTERNATIVES TO THE PROPOSED PROJECT

Utilities in Hawaii are currently preparing Integrated Resource Plans (IRPs); therefore, supply and demand options cannot be evaluated on the basis of specific projects at specific sites. Rather, alternatives to the HGP need to be evaluated in the context of various reasonable energy scenarios that would enable the State of Hawaii to meet its energy goals for the next 30 years (i.e., the life of the HGP project). For example, a no-action alternative implies an energy scenario in which the conventional resource options now used on the island (i.e., oil- and coal-fired power generation plants) would continue to play a dominant role.

Conversely, an alternative action involving investments in renewable energy resources and energy conservation would shift the resource mix to lesser dependence on conventional supplies. Thus, to assess the possible environmental and economic impacts of the proposed supply and demand alternatives, it will be necessary to consider alternative energy scenarios for Hawaii. The EIS will also consider a mix of geothermal development and alternative supply-demand options (Section 2.2.2).

2.2.1 No-action

The no-action alternative is defined as "business as usual" (i.e., continued reliance on the existing and planned generating mix of resources), which is predominantly oil-fired capacity with some coal-fired capacity and renewable energy sources. Under the no-action alternative, the energy needs for Hawaii, Maui, Molokai, and Oahu would be achieved using supply or demand-side options on each island. The assessment of the no-action alternative will examine the environmental impacts of reasonably predictable actions that could be taken by others if the proposed action is not taken, as compared with the impacts of going forward with the proposed action.

2.2.2 Alternative Supply-Demand Options

In addition to no-action, two supply-demand alternatives will be evaluated in the EIS. The first is the development of up to 500 MW(e) net of geothermal power for exclusive use on the Big Island, with no inter-island transmission cable. The State of Hawaii's preferred alternative is development of the geothermal resource to meet the projected needs of the Big Island, and submarine cable to export some level of power at a later date if the geothermal resource and project economics justify the cost of a cable. Although a definite geothermal development scenario has not yet been proposed, the EIS will examine an alternative geothermal generating capacity of 100 MW(e) or more [up to 500 MW(e) net] for the Big Island only. The lesser amount represents the geothermal capacity that is currently permitted for development on the Big Island only.

The second supply-demand option would consist of conservation and demand-side management (DSM) alternatives and a mix of currently feasible renewable energy sources (e.g., biomass, solar thermal, wind, geothermal, and photovoltaics). DSM refers to the reduction of demand for energy through electrical load management, energy conservation, and improvements in energy utilization to reduce energy demand.

All alternative supply-demand options will be compared and assessed within the framework of IRP using available data and methods developed for the State utilities' IRP, currently in progress. Where possible, the supply-demand options will be characterized in terms of their relative cost, fiscal impacts, contribution to the State's overall energy demand, and environmental impacts.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED CONSIDERATION

Although many alternatives were mentioned during the scoping process, only those alternatives deemed to be viable and reasonably foreseeable within the time frame of the proposed action (i.e., 30 years) will be considered. In general, the alternatives that will not be considered in the EIS were either anticipated to be not technically feasible within the project time frame (e.g., ocean thermal energy conversion, wave and tidal power, and hydrogen as a carrier fuel) or technically feasible but extremely unlikely because of legislative or other impediments. As an example of the latter, the construction of a nuclear power plant in Hawaii is unlikely because of a State constitutional

requirement for a two-thirds vote in each house of the Legislature for such an action [Act XI, Section 8, Hawaii Revised Statutes (HRS)].

During scoping, commenters recommended that the EIS consider transportation alternatives that would reduce petroleum (oil) consumption. One of the State's primary reasons for encouraging the development of Hawaii's geothermal resource is to reduce the State's reliance on imported oil as an energy source. The EIS *will* address the reduction of oil consumption that would result from the development of geothermal capacity and other alternatives (i.e., the amount of oil replaced by the proposed geothermal power generation and other alternatives as part of the energy supply-demand scenarios). However, because various transportation alternatives would not directly affect power generating capacity in Hawaii, they will not be evaluated in the EIS.

In addition to alternative supply-demand options that will not be considered in the EIS, there also are some alternatives to geothermal development that are beyond the scope of the EIS. For example, the GRS on Maui will not be considered as feasible for development as part of the HGP because resource characteristics defined to date indicate that it has direct heat application only and is not believed to be economic for electricity production. Therefore, the GRS on Maui is not comparable to the GRSs on the Big Island.

3. THE SCOPING PROCESS AND RESULTS

CEQ regulations (40 CFR Part 1501.7) require " an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action." This process is termed "scoping" and usually has two phases. During the first phase, the lead agency conducts internal studies to define the proposed action, identify preliminary alternatives, and develop preliminary issue areas to be addressed in the EIS. The second phase involves participation by the public and other agencies. The objectives of public scoping are to notify interested persons, agencies, and other groups of the proposed action and alternatives; solicit their comments regarding environmental issues, alternatives to the proposed action, and other items of interest; and consider those issues in the preparation of the EIS.

CEQ regulations [40 CFR Part 1501.7(a)] require the lead agency to

- invite the participation of affected Federal, State, and local agencies; any affected Indian tribe; and other interested persons;
- determine the scope and significance of issues to be analyzed in depth in the EIS;
- identify and eliminate from detailed study the issues that are not significant or that have been covered by previous environmental reviews, narrowing the discussion of these issues in the EIS to a brief presentation of why they will not have a significant effect on the human environment, or providing a reference for their coverage elsewhere;
- allocate assignments for preparation of the EIS among the lead and cooperating agencies, with the lead agency retaining responsibility for the EIS;
- indicate any public environmental assessments and other EISs that are being, or will be, prepared that are related to, but not part of, the scope of the EIS under consideration;
- identify other environmental review and consultation requirements so that other studies may be conducted concurrently and integrated with the EIS; and
- indicate the relationship between the timing of environmental analyses and the planning and decision-making schedule.

The full range of potential impacts of the proposed project and reasonable alternatives that were identified during scoping will be addressed in the HGP EIS. Appendix A contains a summary of oral and written scoping comments received during the HGP EIS scoping period. It also summarizes a mass mailing concerning religious issues. Appendix B lists by agency the scoping comments received from Federal, State, and County sources. Environmental resource areas and concerns identified during scoping that have the potential for impact include land use, air quality, water resources, ecological resources, geologic resources, noise, health and safety, socioeconomic issues, cultural resources, marine resources, and aesthetic resources. Further information on these and other topics is given in Section 3.3. A preliminary outline for the HGP EIS is presented in Appendix C.

3.1 NOTICE OF INTENT

In accordance with DOE NEPA Implementing Procedures, 57 *Fed. Reg.* 15122 (1992), to be codified at 10 CFR Part 1021, DOE published an Advance Notice of Intent (ANOI) to prepare the HGP EIS in the *Federal Register* (Vol. 56, No. 170, pp. 43585–87) on September 3, 1991. (The ANOI is reproduced in Appendix F.) The ANOI announced the initiation of planning and scoping of the HGP EIS and solicited public input regarding the scope and content of the EIS. In response to the ANOI, DOE received 55 comment letters on EIS-related topics, all of which have been considered in this IP (see Appendices A and B). These comments also assisted DOE in developing the Notice of Intent (NOI) and were the stimulus for a series of DOE information exchange meetings. In September, October, and November 1991, and in March and July 1992, DOE met with Federal, State, and County agencies; environmental, civic, Native Hawaiian, and public interest groups; and utility and geothermal developers (see Table 3.1). On February 5, 1992, DOE extended an invitation to eight Federal, State, and County agencies to become "cooperating agencies" in the preparation of the EIS. This invitation also solicited additional agency comments on the ANOI and the forthcoming NOI.

On February 14, 1992, DOE published an NOI in the *Federal Register* (Vol. 57, No. 31, pp. 5433–37) (reproduced in Appendix F) to announce its intent to prepare an EIS for Phases 3 and 4 of the HGP, as defined by the State in its 1989 proposal to Congress. For purposes of project description, the State's 1989 and 1990 proposals are almost identical. The NOI announced that ten public scoping meetings would be held in Hawaii from March 7 through March 16, 1992 (see Section 3.2). The NOI noted that written scoping comments, which were to be given equal weight with oral comments, would be received until April 15, 1992, for consideration in the IP (see Appendices D, F, G).

3.2 SCOPING MEETINGS

Beginning on March 7, 1992, DOE held afternoon and evening public scoping meetings at each of five locations in Hawaii, as shown below. These meetings were held

Scoping Meeting Locations and Dates

Pahoa (Big Island)	March 7, 1992
Wailuku (Maui)	March 9, 1992
Kaunakakai (Molokai)	March 12, 1992
Honolulu (Oahu)	March 14, 1992
Kamuela/Waimea (Big Island)	March 16, 1992

in compliance with CEQ regulations (40 CFR Part 1501.7) and DOE NEPA Procedures and in concert with DOE's policy to facilitate public involvement in the NEPA process. The purpose of these meetings was to assure adequate opportunity

TABLE 3.1.—*Information Exchange and Cooperating Agency Meetings*

	Information Exchange Meetings
October 1991	Puna Geothermal Ventures (included a site visit); Sierra Club Legal Defense Fund
November 1991	Blue Ocean Preservation Society; Campbell Estate; Coral Reef Foundation; Kaupo Ranch; Maui Tomorrow; Pele Defense Fund; Mayor's Energy Advisory Commission; Big Island Papaya Growers; Big Island Rainforest Action Group with Malu Aina; Citizens for Responsible Energy Development with Aloha Aina; Greenpeace Hawaii; Hawaii Island Geothermal Alliance; Kapoho Community Association; Lani Puna Gardens Association; Puna Community Council; West Hawaii Sierra Club; Native Hawaiian Legal Corporation; National Audubon Society; Natural Resources Defense Council; Oahu Rainforest Action Network; Rainforest Action Network; Sierra Club Legal Defense Fund; Hawaii utilities; Bishop Museum
March 1992	Native Hawaiian Organizations; Pele Defense Fund; Puna Geothermal Ventures (included a site visit); True Mid-Pacific (included a site visit)
July 1992	Pro-Geothermal Alliance; Hawaii Island Geothermal Alliance
	Cooperating Agency Meetings
September 1991	U.S. Department of the Interior (DOI); U.S. Geological Survey (USGS); U.S. Fish and Wildlife Service (FWS); National Park Service (NPS); U.S. Army Corps of Engineers (COE); National Marine Fisheries Service (NMFS); U.S. Environmental Protection Agency (EPA)
October 1991	Hawaii Department of Business, Economic Development, and Tourism; County of Hawaii; USGS; NPS; Hawaii Office of State Planning; Hawaii Department of Land and Natural Resources; Hawaii Department of Health; Hawaii Office of Environmental Quality Control; NMFS; FWS; COE; Hawaii Office of Hawaiian Affairs; Hawaii Office of State Planning
November 1991	County of Maui; County of Hawaii; NMFS; Office of Hawaiian Homelands; State Historic Preservation Officer; State Office of Consumer Advocacy
March 1992	County of Hawaii; USGS; DOI; EPA; County of Maui; Hawaii Department of Business, Economic Development, and Tourism; COE; NMFS; FWS
July 1992	Hawaii Office of State Planning; Hawaii Department of Health; Hawaii Office of Hawaiian Affairs; Hawaii Department of Labor and Industrial Relations; Hawaii Department of Agriculture; EPA; Hawaii Department of Land and Natural Resources; COE; County of Hawaii; NPS; USGS; County of Maui; NMFS; FWS; review of Working Draft Implementation Plan with all cooperators

for public and government agency participation in developing the EIS scope by identifying the issues to be addressed, commenting on the proposed action, and suggesting alternatives to be analyzed. These scoping meetings were recorded, and copies of the meeting transcripts are available at DOE Reading Rooms (see Attachment 1 to Appendix A). DOE has notified all interested parties by mail of the availability of the meeting transcripts. One-hundred seventy individuals provided more than 700 oral comments during scoping meetings (see Figure 3.1). In addition, 230 individuals submitted written scoping comments and other materials to DOE during the scoping period (which originally had a deadline of April 15, 1992; DOE extended the deadline to provide commenters ample opportunity to provide written comments). The majority of the comments in these written submissions came from individuals; however, about 50 organizations, including environmental, public interest, and community groups, also participated by offering comments through representatives. About 1800 scoping comments were received (see Figure 3.2).

DOE also has prepared an extensive mailing list, copies of which are available in the Reading Rooms, identifying parties who are participating in the EIS preparation and who have submitted scoping comments.

3.3 RESULTS OF SCOPING

The following discussions summarize the comments made during the scoping process according to the topics or issues raised. The number of written and oral comments relating to each concern or issue is shown in Figure 3.2. For each general subheading, examples of comments from which each issue was derived are provided, followed by a discussion of how the EIS will address that issue. The discussion also identifies issues that DOE considers to be outside the EIS scope. Scoping comments are summarized in Appendix A.

3.3.1 Meteorology/Air Quality/HGP Emissions

Many commenters expressed concerns about atmospheric emissions from the HGP, especially during an accident. Based on experience with geothermal development and accidents in Puna, commenters suggested a variety of environmental effects that may result from these operations. Of particular concern to the public were the emissions of H_2S and other airborne pollutants from geothermal well venting and their resultant effects on the health of nearby residents; several examples of ongoing effects were noted. Some commenters expressed the concern that such effects are poorly understood and frequently underestimated.

Issues that were identified in the scoping process include

- effects on human health (see Section 3.3.7) of acute, cumulative, and chronic exposure to H_2S and other potential air pollutants (e.g., radon, heavy metals, and organic compounds);
- nuisance effects of H_2S;
- potential synergistic effects among atmospheric pollutants;
- degradation of ambient air quality relative to ambient air quality standards (H_2S, sulfur dioxide, nitrogen oxides, carbon monoxide, ozone, lead, and suspended, inhalable particulate matter)
- validity of existing data regarding H_2S exposure and the validity of using standards for healthy workers as opposed to standards for the general population (see Section 3.3.7);
- sufficiency of air quality monitoring;
- global issues (acid rain, global warming);
- effects of certain meteorological conditions (e.g., air stagnation during both kona and trade wind regimes) on concentrations of pollutants that might affect human health (see Section 3.3.7);

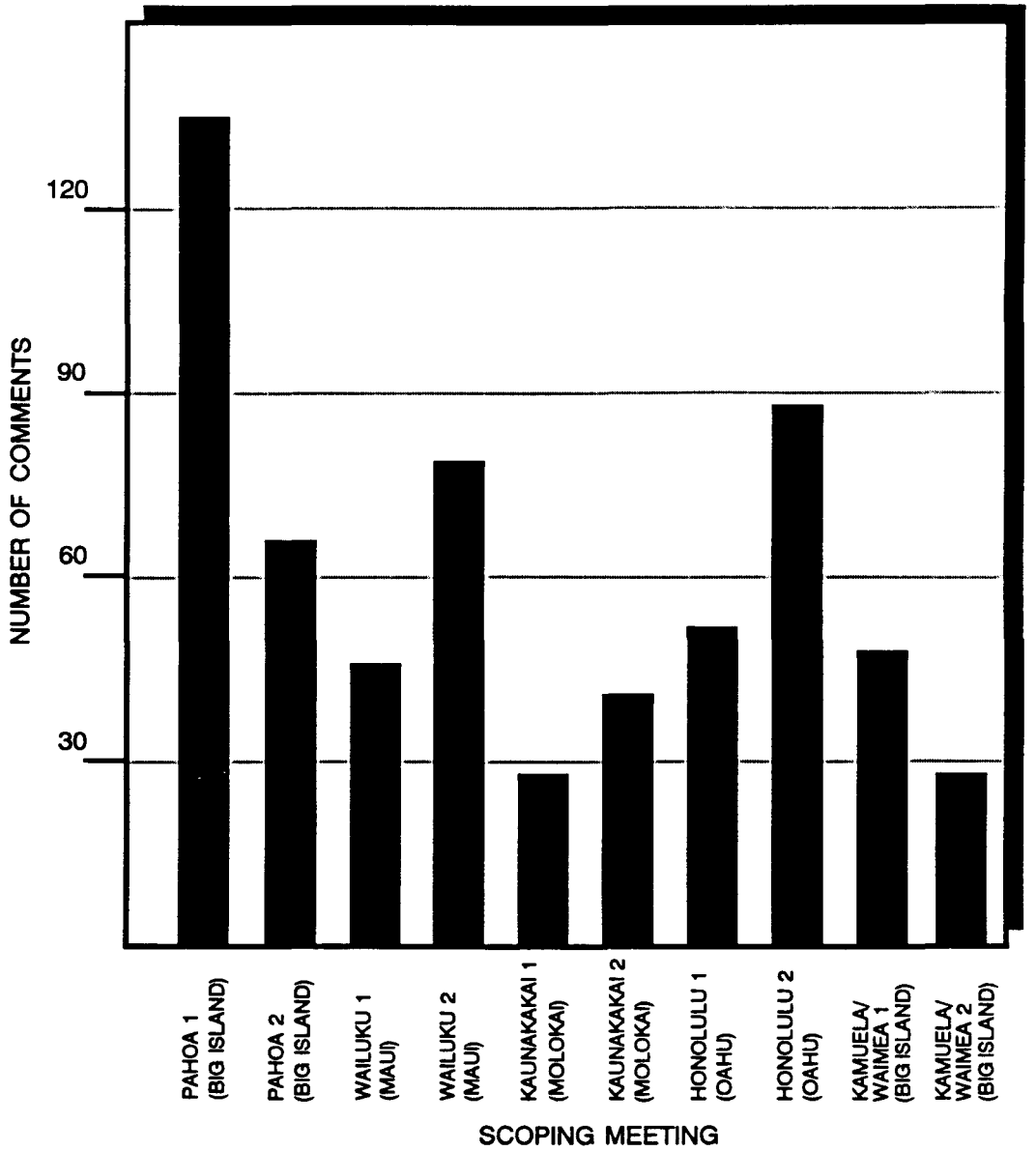

Figure 3.1 Number of oral scoping comments at the ten public scoping meetings for the HGP EIS. More than 700 comments were offered.

- thermal pollution from cooling towers; and
- regional venting contributions due to well casing failures (i.e., corrosion induced).

The EIS will address all meteorological, air quality, and emissions issues listed herein. To address these issues, the EIS will discuss the existing meteorological and climatological conditions characteristic of the Big Island and other islands and the

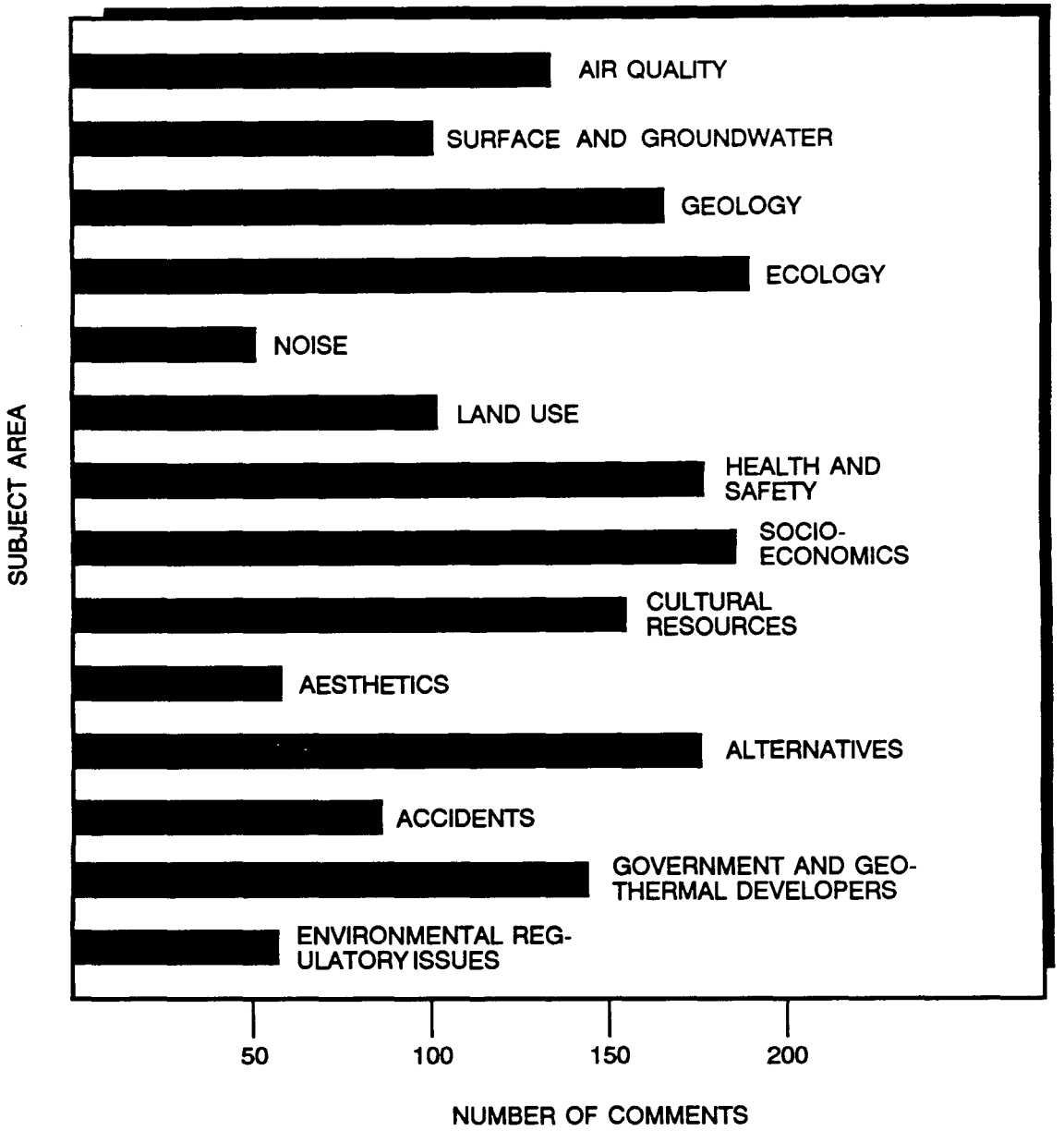

Figure 3.2 Number of oral and written scoping comments by subject area. About 1800 comments were received.

influence of these conditions on air quality. Meteorological conditions necessary for volcanic smog (vog) formation and air stagnation will be described.

The EIS description of ambient air quality will include emissions contributed by existing geothermal development; regional sources, such as volcanoes; and other sources (e.g., agricultural). USGS will provide data on volcanic contributions to ambient air quality. The State of Hawaii Department of Health (DOH), Clean Air

Branch, will provide DOE with recent background ambient air monitoring data for criteria and non-criteria pollutants in the Puna District and will identify non-volcanic emissions sources. Ambient air quality specifically associated with vog will be addressed. Ongoing air quality monitoring (of existing conditions) and any additional or recommended monitoring of air pollutants will be discussed. Where applicable, the EIS will discuss mitigation measures that can be used to achieve the lowest possible emissions rate.

The EIS will identify criteria and non-criteria atmospheric pollutant sources from drilling, construction, and operation of the geothermal power plants as well as potential sources of pollutants that may occur during a facility accident. Additionally, pollutant sources during transmission line construction (primarily particulates) will be identified and quantified. Pollutant concentrations will be estimated using modeling codes approved by the U.S. Environmental Protection Agency (EPA). To assess impacts, background levels of air pollutant concentrations will be added to estimates of pollutant concentrations resulting from the proposed action, and the results will be compared with the National Ambient Air Quality Standards (NAAQS), State of Hawaii standards [including the recently passed State of Hawaii standard for H_2S (DOH 1992)], and other applicable standards.

Prevention of significant deterioration (PSD) of air quality will also be addressed in the EIS. It is possible to conform to the NAAQS and still be in violation of the standards for PSD. The Hawaii Volcanoes National Park (HVNP) is designated a Class I PSD area. Class I areas are designated to severely restrict the degradation of air quality, and specific standards for certain pollutants (nitrogen oxides, sulfur dioxide, and airborne particulate matter) apply. The effects on HVNP will be addressed in the EIS (see Table 4.1). Air-quality-related values such as visibility degradation and objectionable odors will also be addressed in the EIS. These values are of particular importance in national parks and other Class I areas. Consultation with NPS will occur regarding issues related to Class I air quality (see Section 4.1.1 and Tables 4.1 and 4.2).

The EIS will address the impacts of H_2S and other toxic pollutant emissions during routine operations and during facility accidents. H_2S is among both the 189 hazardous air pollutants and 16 extremely hazardous pollutants listed in Title III, Section 301 (r)(3), of the Clean Air Act Amendments of 1990 (Pub. L. 101-549). The Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) recommended H_2S exposure limits (in addition to the new State H_2S ambient air quality rule) will be presented and discussed in the EIS. Because of the importance of H_2S emissions control, measures for pollution abatement and mitigation will be discussed. Any secondary impacts (e.g., waste disposal) resulting from pollution abatement will also be discussed.

Specific issues to be addressed include background ambient air quality, nonattainment (if applicable), hazardous air pollutants, meteorological conditions affecting air quality (e.g., stagnation), fugitive emissions from construction and operation, air quality monitoring, potential synergistic effects among atmospheric pollutants, thermal pollution from cooling towers, emergency response plans (see Section 3.3.7), and noise (see Section 3.3.5). Additionally, the EIS will discuss, to the extent possible, emissions from routine operations that may affect global air quality concerns. These include atmospheric emissions of carbon dioxide, other greenhouse gases, and acid rain precursors.

3.3.2 Surface and Groundwater Resources

Commenters were concerned that well drilling, resource utilization, and well reinjection activities may affect the availability and use of water resources. Surface impoundments (appropriately lined and monitored) would contain mud, brine, and drilling fluids generated during plant construction, and geothermal fluids would be reinjected during normal operation. Residents in the Puna District were concerned about the effects of airborne emissions on the rain water catchment systems used as drinking water (potable) supplies. Airborne emissions may include hazardous and toxic substances (e.g, H_2S, radon, heavy metals, and organic compounds) whose presence could render water from catchment systems unfit for human consumption.

Commenters also noted the complex hydrogeology of the region and the importance of area aquifers and drinking water supplies. All issues raised in this section will be addressed in the EIS. Issues identified during scoping include

- leakage into aquifers due to production and/or injection well casing failures;
- impacts of accidents, such as well blowouts;
- thermal and chemical contamination caused by reinjection;
- impacts to the quality of nearby potable water catchment systems and deep wells;
- dewatering of and/or reduced yield from groundwater resources that could impact availability and use;
- transport of contaminants from HGP-related wastes and effects of drilling effluent brine impoundments, both into underground sources of drinking water;
- erosion control during construction and operation of HGP-related facilities;
- management of point and nonpoint contamination sources;
- groundwater monitoring system requirements, including parameters to be monitored (both water quality and elevation of the water table surface);
- mitigation plan to halt emanating groundwater contamination and/or water table declination detected by groundwater monitoring system;
- complete geothermal fluid characterization;
- identification and mapping of nearby potable water wells that could be affected by HGP-related construction and operation;
- spill prevention, containment, and mitigation methodology;
- source of water for well drilling during construction and well quenching during plant operation;
- well casing and hydrologic monitoring plan for both production and reinjection wells; and
- registration of geothermal wells as water wells.

There is an interrelationship between water resources and geologic resources. Issues related to geologic resources are discussed in Section 3.3.3. Springs and thermal springs are included in the definition of water resources as used in this section; wetlands and anchialine ponds are discussed in Section 3.3.4.

Water resources are also vital to subsistence and religious practices of Native Hawaiians; cultural uses of water resources are addressed in Section 3.3.9. Marine water quality issues are discussed in Section 3.3.4.

Studies will be undertaken to obtain environmental baseline information that is not available in the open literature. Cooperating agency involvement will include the State of Hawaii, USGS, and the County of Hawaii. A water resource inventory that will be provided by USGS, with input from

the State of Hawaii and County of Hawaii, will be included in the EIS (see Section 4).

The State of Hawaii is considering the status of its water quality designation in the geothermal subzone beneath the District of Puna. All analyses of environmental impacts will be based on the water quality designation in effect during the writing of the EIS.

The uses and water quality of surface and groundwater resources in potential development areas and the effects of the HGP on these resources will be discussed in the EIS. Hydrogeological data for the HGP site, and vicinity and HGP source terms for potential effluents and contaminants, will be used to assess the potential for contaminant deposition and transport. Results of these analyses will factor into health and ecological assessments (discussed in Sections 3.3.7 and 3.3.4, respectively). State of Hawaii and EPA-approved underground injection regulations will be used as a basis for groundwater impact analysis. State of Hawaii drinking water quality standards and National Primary and Secondary Drinking Water Regulations (40 CFR Parts 141 and 143) will be the criteria used to gauge the significance of impacts of atmospheric pollutant deposition in catchment systems. Monitoring of conditions for permits issued by the State of Hawaii, as well as written agreements between the State of Hawaii, EPA, and current geothermal developers, will be used to assess reduced yield from groundwater supplies (see Section 4.1 and Tables 4.1 and 4.2).

The water resources impact analysis will describe (1) impacts that occur during normal plant operation, (2) impacts from accidents that are mitigated by safety systems such as shut-off valves, and (3) impacts from severe accidents that could overwhelm safety features designed into the plants (see Section 3.3.12).

3.3.3 Geologic Issues

The location of geothermal facilities on the site of an active volcano concerned many commenters. They indicated that the potential for seismic disturbances and lava flows at the geothermal facilities increased the risk of accidents and created conditions that cannot be addressed by the current state of technology. A geologically active and complex region, they said, is not suitable for industrial facilities. Geologic complexities and the potential for resource depletion also concerned Native Hawaiians, some of whom equate the geothermal resource with the volcano goddess, Pele. (Native Hawaiian religious concerns are addressed in Section 3.3.9. A mass mailing on the subject is addressed in Appendix A.) The rugged and unstable terrain of the marine environment in which the undersea cable would be placed also was noted as an issue.

The principal issues identified in the scoping process were

- normal operations-driven impacts related to withdrawal and reinjection of geothermal fluids, including induced seismicity, induced subsidence, impacts to groundwater quality and use (see Section 3.3.2), and geothermal resource depletion;
- accident-driven and natural geologic hazards impacts (see Sections 3.3.12.2 and 3.3.4.3), including impacts to land-based facilities (earthquakes, volcanic activity, uplift, subsidence, and slides) and impacts to cable routes and shoreline facilities (earthquakes, volcanic activity, uplift, subsidence, slides, turbidity currents, wave action, storm surge, and tsunamis);
- erosion and contamination of soils (see Sections 3.3.4.3 and 3.3.6) due to construction and the routine use of herbicides during operations, and because of accidental spills (human error or natural hazard); and

- comparison of the proposed HGP site with other geothermal development sites (e.g., in Iceland).

The geologic issues listed herein will be addressed in the EIS. Geologic issues concerning both the HGP and the transmission/cable system will be treated in the EIS. The volcanically and seismically active nature of the proposed development area raises a number of geologic issues that require an objective evaluation. Data from site studies and available literature will provide a basis for assessing several geologic issues such as subsidence and withdrawal/reinjection effects. The geologic suitability of the site for HGP facilities also will be assessed.

Geological literature on the Hawaiian Islands is extensive. USGS will assist DOE in collecting and evaluating existing literature. USGS also will assist DOE in analyzing geologic hazards such as volcanic activity (eruptions, including tephra falls, and lava flows), seismicity (including ground motion, liquefaction, induced landslides, and surface rupture), and natural surface uplift and subsidence in both terrestrial and marine environments. In addition, USGS will assist in analyzing geologic natural hazards that are peculiar to the marine and/or shoreline environments (turbidity currents, undersea landslides, tsunamis, and hurricane storm surge). USGS also will assist DOE's analysis of the natural impact of Kilauea's activity on air quality in the Puna District. Finally, USGS will assist DOE with groundwater resources characterization and geothermal fluid chemical characterization.

The HGP EIS will examine the potential for damage to geothermal facilities by fresh lava flows as well as effects of earthquake-induced phenomena such as excessive ground motion, surface rupture, liquefaction, and landslides. Environmental impacts of accidental release of geothermal fluids will be assessed (see Section 3.3.2). The effects of prolonged withdrawal and reinjection of geothermal fluids during plant operations also will be analyzed (see Section 3.3.2). If possible, reservoir engineering characteristics will be used to predict the nature of induced seismicity, subsidence, and geothermal reservoir depletion (the latter is addressed in Section 3.3.2). These analyses will depend on the availability and appropriateness of existing models. Analysis of routine operational impacts will be based on the assumption that automatic shut-off valves and blowout preventers function as intended and that other reasonable safety features (such as flexible joints between steam gathering lines on the surface and well heads) are included. Accident-driven impacts are discussed in Section 3.3.12.

Soils in the Puna District and on transmission line rights-of-way will be described from existing U.S. Soil Conservation Service (SCS) or equivalent surveys. Construction, operational, and accident-related impacts (erosion and contamination) to these soils will be assessed (see Section 3.3.6 and 3.3.4.3). Contamination from accidents and routine spraying (herbicides) of access roads, pipelines, plants, and transmission lines will be addressed. SCS will be consulted (see Table 4.1).

Well completion designs and erosion and sedimentation control plans (ESCPs) will be assessed for compliance with existing State regulations. This assessment will require consultation with the Hawaii Department of Land and Natural Resources, the Division of Water Resources Management, and DOH. County governments and the SCS will be consulted with respect to ESCPs. Effective monitoring of construction- and operation-related erosion and sedimentation is a regulatory requirement of an ESCP. In addition, USGS and County of Hawaii will be consulted during EIS preparation regarding volcanic eruption mitigation measures (see Tables 4.1 and 4.2).

3.3.4 Ecological Resources

A recurring concern expressed by commenters was the effect of the HGP, transmission corridors, and cable construction on ecological resources. A number of commenters cited the uniqueness and value of the Wao Kele O Puna rain forest as an overriding concern. Other commenters identified specific concerns related to effects of the submarine cable in the coastal zone and marine environment.

Ecological resources on the Big Island, along marine cable routes, and at cable landing sites on other islands will be described in the EIS, and the impacts of HGP development, construction, and operation on the resources, including wetlands, floodplains, coastal zones, the marine environment, and species and areas of special concern, will be analyzed. The potential for effects of acid rain or fog on soil quality and on land based terrestrial and acquatic ecosystems as the result of operation of the geothermal extraction and power production facilities will be assessed. Assessment will draw upon existing literature and studies conducted by FWS and COE, including comprehensive surveys of biota (e.g., forest birds, threatened and endangered species, invertebrates, and vegetation), a Hoary bat survey, a native rain forest ecosystem analysis, and wetland delineations. The need for additional data collection is currently being evaluated in consultation with DOE, FWS, COE, and others. NMFS, National Oceanic and Atmospheric Administration (NOAA), and other appropriate experts will be consulted for information on marine resources. Depending on the results of the assessment and the relationship to proposed alternatives, appropriate mitigation action plans will be developed in the preparation of the EIS.

Principal ecological issues for terrestrial, aquatic, and marine resources are listed below; there were several issues common to all ecological areas, while others were specific to one or more resource areas. The EIS will address all ecological issues listed in this section. The following ecological issues were identified during scoping.

General

- impacts from construction of power production facilities, submarine cable system, and transmission corridors;
- effects of atmospheric emissions, liquid effluents, waste disposal and impoundments, and noise; and
- impacts on endemic, threatened and endangered, and sensitive species.

Terrestrial

- deforestation and loss of biodiversity;
- impacts of the HGP and transmission line right-of-way on habitat;
- impacts of electromagnetic field (EMF) on fauna along land transmission corridors;
- impact of corridor construction on fauna and flora, including sensitive plants, threatened and endangered species, and protected habitat;
- effects of emissions and effluents on agricultural crops, livestock, and pets;
- loss or disturbance of wetlands;
- impacts on cave ecosystems and invertebrates; and
- impacts of chemical (e.g., herbicide) control of non-native plants.

Aquatic

- impacts on anchialine ponds as a result of erosion and changes in groundwater hydrology and thermal contamination from reinjection of geothermal fluids (see Section 3.3.9);
- impacts on populations of endemic, sensitive, and threatened and

endangered species and on protected habitat;
- impacts of construction and maintenance of the transmission line rights-of-way on aquatic habitat;
- impacts on aquatic systems from potential water quality alterations (e.g., from runoff, effluents, altered flows and quality of streams, springs, and hot springs); and
- impacts from the use of herbicides to control non-native plant species and for transmission line right-of-way maintenance.

Marine
- impacts of cable installation and operation (especially EMF effects) on marine species, including Hawaiian monk seals, precious corals, humpback whales, rays, skates, sharks, sea turtles, endemic, threatened and endangered, and sensitive species;
- competing use of the undersea transmission cable with coastal zone use for marine emanations and cultural resources (see Section 3.3.9), recreational uses (see Section 3.3.8), and commercial, recreational, and subsistence fishing, shipping, etc.;
- competing use of the transmission cable with marine coastal zones and channels for communications and military cables used for national defense;
- impacts on marine biota due to noise; water quality degradation from runoff, effluents, and oil spills; and perturbations resulting from cable construction and maintenance;
- impacts of construction, operation, and maintenance of production sites, cable landings, and transmission routes on the marine environment (e.g., fish ponds, coastal zone, reefs, and deep water); and
- potential to cause ciguatera (fish poisoning) as a result of cable construction, deployment, and maintenance in coastal reef areas.

3.3.4.1 Terrestrial Resources

Commenters asked that comprehensive surveys of rain forest species be completed and the results evaluated. Moreover, they thought that the EIS should fully investigate the potential short- and long-term impacts of the HGP to pristine environments, such as the rain forest in Hawaii, the southeast coast and Hana districts of Maui, much of Molokai, the marine environment (see Section 3.3.4.3), and other locations potentially affected by the HGP.

The impacts on terrestrial ecosystems will be addressed in the EIS with particular emphasis on the rain forest, wetlands, cave ecosystems (e.g., lava tubes), vegetation, birds, threatened and endangered species, invertebrates, and ethnobotanical and medicinal species. These resources are extremely important to Native Hawaiians, whose culture and religion are closely tied to natural resources (see Section 3.3.9). Potential impacts of invasion of non-native species as a result of the HGP and power transmission corridors will be evaluated, and the impacts to terrestrial ecosystems as the result of controlling non-native plant species with herbicides within the project area will be considered. Associated risks of chemical vegetation control (i.e., the use of herbicides) on humans is considered in Section 3.3.7.

A Geographic Information System (GIS) data base for the project will be built from existing data bases and results from studies to be conducted by FWS (e.g., vegetation community, native bird, threatened and endangered species, and invertebrate surveys) and the COE (e.g., wetlands). GIS will be used to integrate the ecological resource data and analyze potential impacts on terrestrial ecosystems and ecosystem components. Analyses include (1) fragmentation of the rain forest from natural occurrences (e.g., lava flows) and artificial occurrences (e.g., road building associated with HGP development); (2) non-native

species invasion into disturbed and natural areas; (3) potential for the project to contribute to loss of native fauna and flora, including impacts from erosion as a result of construction and maintenance operations; (4) land area impact of (a) well pad size and number resulting from initial development and from expansion as the geothermal resource is depleted and (b) road length; (5) alternative locations of well pads and roads to minimize ecological disturbances; (6) interrelationships among biota, lava flows, and vegetation regeneration; (7) effects of transmission line EMF on terrestrial fauna; and (8) other issues identified as appropriate during data collection.

The extent and types of wetlands within all land areas potentially involved in the geothermal resource area and along transmission corridors will be delineated by COE. EPA will also be consulted concerning wetlands (see Section 4.1). COE will use the 1987 *COE Wetland Delineation Manual* to delineate wetlands. Wetlands maps and supporting data will be provided to DOE for the purpose of performing wetlands assessments based on the practicable alternatives analysis in accordance with Clean Water Act [Section 404(b)(1)] guidelines for dredging and filling. When wetlands are identified, a detailed assessment of the potential impacts on the wetland ecosystem will be made, and approaches for minimizing or avoiding wetland involvement will be discussed. The assessment will include potential impacts on wetland functions, including water quality, hydrology, vegetation composition and structure, habitat for threatened and endangered species, and biological diversity.

The potential for HGP to impact threatened and endangered species and wetlands (see above) requires analyses in the EIS. During EIS preparation, FWS, as well as the State Department of Natural Land and Resources, will be contacted for information and consultation under Section 7 of the Endangered Species Act (see Section 4.1).

3.3.4.2 Aquatic Resources

Commenters identified several issues related to aquatic resources that will be addressed in the EIS. Results of existing studies and those conducted in support of the EIS will be incorporated into the EIS.

Land-based freshwater and brackish-water ecosystems, including streams, springs, and anchialine ponds, and their associated fauna and flora will be identified for all development areas, and potential impacts of the proposed development and alternatives will be addressed in the EIS. The potential impacts to aquatic ecosystems from groundwater quality alteration due to reinjection of geothermal fluids and potential changes in surface water quality will be addressed. Existing information, including that from FWS and NMFS and from studies conducted in support of the EIS, will be used to determine the impacts of the proposed development on land-based aquatic resources. Wetlands will be addressed primarily as part of the terrestrial resources (see Section 3.3.4.1); however, linkages between wetlands and aquatic ecosystems will be addressed in the aquatic resources sections of the EIS.

The potential for impacts to threatened and endangered species in land-based aquatic ecosystems will be addressed using existing information and FWS survey information. During the EIS preparation, FWS, NMFS, the State Department of Land and Natural Resources, and other knowledgeable experts will be contacted for information; consultation as required under Section 7 of the Endangered Species Act will be conducted. The results of these consultations will be included in the EIS (see Section 4 and Tables 4.1 and 4.2).

3.3.4.3 Marine Resources

Commenters identified a number of concerns relative to the marine environment that will be addressed in the EIS. Marine ecosystems, including benthic communities, reefs, coastal zones, and deep water, along the underwater transmission corridors will be identified and described. Impacts could occur in the coastal zone, reefs, benthic communities, or at sea. Species could be affected by siltation, increased turbidity, or water quality changes due to construction (including dredging and drilling), operation, deployment, or maintenance of the HDWC or oil spills. The mechanical operations of cable-related activities (dredging, blasting, cable laying, etc.) can also affect marine species. All these activities are associated with construction in coastal zones, and the impacts of such activities will be assessed (including consideration of competing uses such as shipping and fishing) based on comparable experiences in Hawaii and elsewhere, and by reference to the literature.

The particulate loading and visibility of marine waters may be affected by construction, dredging, drilling, or maintenance, and erosion due to HGP-related activities on land. Particulate matter may alter the dissolved oxygen content, nutrient content, and the concentration of organic carbon in the coastal zone. The impacts of particulate loading, increased turbidity, and siltation due to these activities will be assessed based on the literature and prior experience with similar activities in Hawaii. Knowledge of currents and projected particulate loading will be used to predict the range of increased turbidity and siltation. Leakage from an oil-filled cable (as a result of natural events, accident, or sabotage) or oil spills from associated shipping will be assessed in a similar manner. Species and regions that are particularly sensitive to petroleum products will be identified and the likelihood of contamination determined based on the physical oceanography of the region. Both EPA and the Coast Guard will be consulted.

Impacts to the marine environment from potential damage to and maintenance of the undersea transmission cable and alternatives to the cable will be addressed (see Section 3.3.11.2.2). Scenarios in which an undersea cable may rupture or be severed and produce impacts as the result of strong ocean currents, submarine erosion by ocean currents, and submarine landslides generated by earthquakes will be addressed (see Section 3.3.12.2).

The potential for ciguatera as a result of disturbance of the marine environment during cable construction and maintenance, and mitigation measures to avoid or limit these impacts, will be addressed (see Section 3.3.7). Those impacts that could occur as the result of cable oil leakage and cable accidents will be addressed (see Section 3.3.12.2 and 3.3.7).

Impacts to commercial, recreational, and native subsistence fisheries and fish ponds in the coastal zone and along the transmission cable route as the result of construction and operation of the cable will be addressed (see also Section 3.3.9). Economic impacts associated with the undersea cable in terms of commercial, recreational, and subsistence fisheries, mariculture and fish ponds, use of recreational areas, and use of precious corals will be addressed, as well as those economic impacts associated with cable construction, maintenance, operation, and other related aspects of deployment, retrieval, and rehabilitation.

The potential for impacts to endemic, threatened and endangered, and other sensitive species in the marine environment, including Hawaiian monk seals, humpback whales, skates, rays, and sharks, will be determined. During EIS preparation, NMFS, FWS, NOAA Office of Marine Mammals, the State Department of Natural Resources, and other knowledgeable experts and agencies will be contacted for information and consultation as required under Section 7

of the Endangered Species Act and the Marine Mammals Protection Act (see Tables 4.1 and 4.2).

The EIS will include an evaluation of the potential biological effects on marine life as the result of EMF produced by the submarine cable. There is concern that EMF may affect humpback whales and other sensitive species that use naturally occurring EMFs for navigation. At least three possible cases will be evaluated for potential effects on marine species: (1) fields produced during normal operation of the cable system, including typical static magnetic and electric fields as well as induced fields that may occur during transients and line loading changes; (2) temporary events after damage to one or more of the cables with higher than normal current densities around the damaged cable; and (3) only one cable functioning with current return through the ocean. Impacts associated with staged development in which there could be ac transmission between the islands of Hawaii and Maui will be addressed in the EIS as part of the discussion of alternatives to the proposed action.

Certain marine animals (e.g., sharks, rays, and skates) have specific sensory organs that detect extremely weak electric or magnetic fields that aid in navigation and foraging. Effects on behavior patterns, including potential attraction, may occur as the result of transmission line fields such as would be associated with the proposed undersea cable. The available knowledge regarding the effects of these fields on sensitive marine life will be reviewed, and pertinent information will be obtained from other cable transmission studies to address the potential impacts associated with this issue. This information, along with the calculations of the fields produced by the proposed undersea cables, will be used in the EIS to predict potential impacts on sensitive marine life.

The EIS will include an evaluation of the potential effects of noise during cable route construction and maintenance on sensitive marine biota. For example, effects of noise on breeding, calving, and migration of humpback whales will be assessed.

3.3.5 Noise

Some commenters pointed out that well drilling and venting from HGP development and operations will create noise. Well drilling and venting from current local geothermal developments were often cited as activities that produce intense noise. Noise is also associated with transmission lines, especially in moist conditions. Quiet conditions (with respect to human-produced sources) currently prevail in the area where noise impacts resulting from the proposed activity are expected.

Noise issues that were identified in the scoping process include

- occupational and public health impacts of noise from drilling, construction, and (unannounced) venting operations, and possible associated exceedances of standards of the Occupational Safety and Health Administration (OSHA) and the National Institute of Occupational Safety and Health (NIOSH) (see Section 3.3.7);
- effects on terrestrial and marine fauna;
- nuisance impacts related to noise (e.g., loss of sleep) (see Section 3.3.7);
- noise associated with construction and maintenance of transmission lines; and
- noise associated with high tension transmission lines, especially the crackling noise produced by the lines during inclement weather or during periods of high humidity.

All noise-related issues listed herein will be addressed in the EIS. The EIS will use existing data provided by qualified professionals specializing in noise characterization to describe and assess noise impacts. Noise measurements will include ambient levels as well as noise resulting from

existing geothermal activities (drilling and operating). Noise contours will be developed. The noise measurements will include day and night levels, peak levels, and energy-averaged levels. Noise from both normal operation (including transients) and upset conditions will be described.

The EIS will assess and evaluate potential impacts of noise to the affected residential population and to terrestrial and marine species, and adaptation by these species to noise will be discussed.

The EIS will also examine the potential for noise-induced hearing loss associated with the HGP. The noise levels associated with hearing loss will be compared with expected noise contours from HGP operations. Compliance with applicable public and occupational standards and guidelines for noise, including psychological effects, will be addressed in the EIS. Noise-related annoyance to residents living near well-drilling, construction areas, or other geothermal activities will also be addressed. Noise associated with the use of aircraft for construction and maintenance of HGP facilities and along transmission lines will be assessed. Noise abatement and mitigation measures (e.g., rock mufflers) will also be addressed.

3.3.6 Land Use

Commenters raised a variety of land-use concerns, especially those pertaining to compatibility between residential use and the HGP. All issues raised in this section will be addressed in the EIS. Specific issues that were identified in the scoping process include

- compatibility of HGP plants and transmission facilities and corridors with competing residential, commercial, agricultural, coastal, and military land uses, conservation lands, Native Hawaiian homelands, and the Hawaii Volcanoes National Park (HVNP) and other land preserves;
- compatibility of HGP plants and transmission facilities and corridors with planned land uses in the areas listed above;
- land-use impacts of expanding geothermal development as the resource is depleted;
- impacts on unique land resources, such as the Wao Kele O Puna rain forest;
- changes in traditional land ownership and land-use patterns as a result of the HGP; and
- impacts on coastal zone land uses including mariculture, recreational and subsistence fishing, and other commercial, recreational, and cultural uses of coastal areas.

Land-use issues will be addressed in several sections of the EIS. Land use as it relates to agriculture, ecological issues, and unique land resources will be discussed under the terrestrial ecology heading (see Section 3.3.4). Land-use issues related to Native Hawaiian interests and culture and changes in traditional land use will be discussed separately (see Section 3.3.9), and land-use issues related to compatibility, expanded development, coastal impacts, and economics will be discussed in the socioeconomics sections of the EIS (see Section 3.3.8).

To assess potential land-use impacts, the EIS will estimate the total land area that would be required for the HGP plants and transmission facilities and corridors, identify existing and planned land uses in the proposed vicinity of HGP plants and transmission facilities and corridors, and determine the extent to which construction and operation of the HGP would affect those land uses. Agencies that will provide information about existing and planned land uses include the Counties of Hawaii and Maui, NPS, COE, and the State of Hawaii (e.g., the Department of Land and Natural

Resources and the Office of State Planning). In particular, County Community Development Plans for affected Counties and the State's statutes regarding the designation and regulation of GRS (Sections 205-5.1 and 205-5.2 HRS) will be consulted (see Table 4.1).

3.3.7 Health and Safety

Participants in scoping expressed concern about health risks to workers and the public from routine operations and accidents.

Issues that were identified in the scoping process include

- acute and chronic health and safety impacts of routine emissions (via air and water pathways);
- HGP accidents—effects on human health (see Section 3.3.12.2);
- cable accidents (see Section 3.3.12.2);
- effects of uncontrolled, unabated well venting and blowouts;
- occupational safety;
- EMF effects;
- psychological effects of construction, operation, and potential accidents;
- effects of hazardous materials and wastes, including the use of herbicides to control non-native plant species and for transmission line right-of-way maintenance;
- health impacts of herbicide use in the rain forest and along transmission lines, including potential impacts to plants used for medicinal purposes (see Section 3.3.9);
- synergistic effects on sensitive individuals;
- cumulative effects of planned full-scale development;
- ciguatera associated with cable construction in the near-shore environment;
- threats of civil disorder associated with the potential for accidents; and
- fire hazards in dry areas due to transmission lines.

The EIS will address all of the health and safety issues listed herein. The EIS will evaluate health and safety impacts as they relate to both operations and accident conditions, including uncontrolled and/or unabated venting. The analyses will be based on the 500-MW(e) development scenario. Although effects of this larger development will have a cumulative nature, the basic methods for addressing different situations are similar. For public exposures, the first step is to identify the materials that will be emitted to air or water. These would include H_2S, radon, heavy metals, and organic compounds emitted to the air (see Section 3.3.1) or deposited in water; in addition, because of their potentially widespread use, herbicides will be examined as a source of public exposure. The next steps are to consider the various transport pathways, such as inhalation, dermal exposure, food, and drinking water, and then calculate intake either on a continuous basis or under accident (episodic) conditions. These intakes then are converted to health effects via dose-response relationships. In addition, potential occupational exposures will be evaluated, to the extent possible, with respect to OSHA and NIOSH regulations. Certain operations that disrupt the near-shore marine environment can result in ciguatera. This, in turn, can be directly harmful to people who consume toxic fish, or indirectly harmful in depriving individuals of a source of food. The extent to which these effects may be harmful and/or mitigated will be discussed.

Of special concern are hazardous materials, including waste, which may be present at geothermal sites. To the extent possible, these will be listed along with applicable regulations. Drilling muds and waste ponds represent a source of possibly toxic materials, and they may pose a special waste disposal challenge. To the extent

possible, the contents of such muds and ponds will be characterized so that any potential health effects issues can be quantified and future waste disposal requirements can be identified. The human health effects of herbicide, which would be used to control non-native plant species in the geothermal development subzone and vegetation along the transmission corridor, will be addressed.

Public concern over the possible health effects of EMFs associated with power generation and transmission has increased sharply in recent years. The EIS will include an evaluation of EMFs near the power generation facilities, along the transmission line rights-of-way, at the conversion stations, and at ocean entry and exit points. Consideration of possible EMF impacts in the marine environment is discussed in Section 3.3.4.3. Because economics or emergency situations may dictate the need for single-cable operation, safety issues associated with ocean return currents during single cable operation will also be evaluated as appropriate. In addition, a section will be prepared that summarizes the most recent scientific understanding of the possible long-term effects on humans. Consideration of possible impacts on marine life is discussed in Section 3.3.4.3.

Accidents, which could result from natural phenomena or from a variety of human factors including operator error, and choices of materials and designs, will be assessed in the EIS. Human health effects of accidents will be assessed in the health and safety sections of the EIS. Other impacts of accidents will be assessed where appropriate in the EIS (see Section 3.3.12).

The EIS will address the effects of sleep deprivation and emergency evacuations related to the construction and operation of geothermal facilities (e.g., noise, H_2S or other emissions, night lighting). Comments received from residents in the Puna District indicated a concern for their general health, with some commenters referring to a general "malaise" associated with living near the existing geothermal development. The EIS will review the literature on identified emissions and sources for potential contributions to "malaise."

The EIS will address emergency preparedness needs both on the HGP site and in the Puna District that may arise from the proposed project and will discuss alternative mitigation measures that could be incorporated as remedial actions. The EIS will examine whether the proposed and alternative actions would increase the risk of lethal accidents or lead to potential for harm to resident populations, and will assess the adequacy of the existing resources within the community available to respond to those consequences. The potential problems of uncontrolled venting will be addressed, especially for areas where single routes exist for emergency evacuation of residents affected by possible H_2S emissions. The EIS will discuss mitigative measures that may be needed to ensure citizens' health and safety, such as monitoring stations within the community, early warning or call-down systems for more sensitive populations (e.g., the elderly, infirm, or the very young), evacuation via helicopter in remote locations, and the use of outside agencies to ensure compliance from geothermal developers on coordinating efforts with local officials for adequate warning systems. The EIS will address the current problem of communicating warnings in remote areas to potentially affected residents. Emergency preparedness will be discussed in light of the existing State Department of Health (DOH) H_2S standards, the Federal Emergency Management Agency's *Guide for Development of State and Local Emergency Operations Plans* (1985) and the supplement to that document, *Guide for the Review of State and Local Emergency Plans* (1988), the requirements of Title III of the Superfund Amendments and Reauthorization Act (1986) mandating public disclosure of chemical release information and the

development of emergency response plans (see Table 4.1).

3.3.8 Socioeconomics

Socioeconomic concerns were expressed by many commenters. Scoping participants noted that the potential social and economic costs and benefits of the HGP are complex and need to be evaluated in detail. Socioeconomic concerns ranged from the local effects of the HGP (e.g., effects on property values) to more general concerns (e.g., economic effects on Hawaiian tourism and industry). Specific socioeconomic issues that were identified in the scoping process include

- the need for an accurate estimate of the total cost of the HGP to consumers, rate payers, taxpayers, and utilities from inception to decommissioning and rehabilitation. Total costs should include the costs of construction, operation, impact mitigation, environmental monitoring and enforcement, decommissioning, rehabilitation, and the cost of drilling additional wells because of resource depletion;
- the impacts of further industrialization (especially heavy industry) as a result of increased power availability from the HGP and alternatives, particularly in terms of a proposed commercial rocket launching facility and a proposed manganese nodule refining facility on the Big Island [see, for example, DOI (1990)];
- effects on property values near HGP facilities and along the transmission line corridor;
- effects on electric rates (because of the HGP's cost and perceived reliability) in comparison to the no-action alternative and to conservation and demand-side management (DSM) for the same amount of power;
- increasing tourist developments and economic dependence on tourism;
- impacts of the HGP on life styles and quality of life of the general population, including Native Hawaiians (see Section 3.3.9);
- the cost to consumers, rate payers, taxpayers, and utilities of providing backup utility capacity for the HGP because of the project's perceived reliability;
- the total cost to consumers, rate payers, taxpayers, and utilities of property destruction (e.g., because of HGP-related corrosion), property condemnation, relocation, and/or financial reimbursement to nearby residents and businesses due to liability-related issues;
- economic impacts on terrestrial land uses, including agriculture, recreation, and tourism;
- economic impacts on the marine environment, including commercial, recreational, and subsistence fishing, mariculture, tourism, and recreation;
- economic effects of the HGP's visual impacts (e.g., the impact of night lighting on the Mauna Kea observatories); and
- the total cost to consumers, rate payers, taxpayers, and utilities of precluding other energy options because of investment in the HGP.

All issues raised in this section will be addressed in the EIS, except as noted below. The EIS will also address other potential socioeconomic issues, including (1) HGP employment-related population changes and subsequent impacts to employment, housing, public services, land use, transportation, and recreation and tourism and (2) the possibility of the HGP providing power for increased urbanization, industrialization, and tourism, and subsequent impacts on population distribution and employment.

The EIS will assess socioeconomic impacts by examining the impacts of

constructing and operating existing geothermal projects, submarine cables, and transmission facilities, as well as other large energy-related facilities, and projecting the HGP's impacts based on experiences in other parts of the world. The socioeconomic impact assessment will rely heavily on data from County planning agencies, the State of Hawaii (including the State's *Energy Functional Plan*) (see Section 4 and Tables 4.1 and 4.2), and geothermal developers.

Some concerns raised by commenters are beyond the scope of the EIS. Issues that will not be addressed in the socioeconomic impact assessment include costs to the State for promoting HGP, the costs of HGP-related litigation, and the political and social conflict generated by the HGP.

3.3.9 Cultural Resources/Native Hawaiian Concerns

Many speakers at the public meetings requested that the EIS consider the Native Hawaiians and their rights, religion, and culture. Many people expressed the belief that the HGP would desecrate the volcano goddess Pele and requested that the EIS examine potential impacts of the HGP on Native Hawaiian lifestyles and cultural and religious practices. A mass mailing concerning this issue is discussed in Appendix A.

Issues identified during scoping include

- potential desecration of Pele, the volcano-nature goddess, and impaired ability to observe Native Hawaiian religious practices associated with Pele; interrupted generational continuity in the training of young persons in traditional religious and cultural practices;
- loss or desecration of religiously, spiritually, culturally, and socially unique habitats, land forms, resources (e.g., archaeological sites and artifacts; atmospheric signs such as rainbows), and species (see Section 3.3.4);
- impediments to religious and other cultural uses of surface and subsurface waters located near the geothermal resource (see Section 3.3.2);
- compliance with the American Indian Religious Freedom Act, the National Historic Preservation Act of 1966, and other pertinent State and Federal legislation (see Tables 4.1 and 4.2);
- confidentiality of Native Hawaiian practices and religiously significant sites, including heiau (sacred sites) and burial sites in caves, cliffs, lava tubes; concern for potential desecration of sites;
- reduced access to traditional coastal trails, healing places, and areas important for subsistence gathering, maricultural development, and medicinal use of plants; loss of ability to exercise gathering, fishing, and water rights;
- reduced contact with and access to marine resources: sanctuaries (coastal caves and heiau), spiritual emanations or hoailona (natural signs) such as waves, subsistence fishing from reefs and nearshore fishing grounds, gathering of limu (seaweed) (see Section 3.3.4.3);
- reduced contact with fish, birds, and other wildlife identified as 'aumakua (deified ancestors); loss of traditions rooted in aloha 'aina (respect and love for the land);
- precluded use of Native Hawaiian homelands and ceded lands; loss of access to or delayed homesteading of such lands (see Section 3.3.6);
- alteration of the traditional rural physical setting and landscape;
- effects of the HGP on the integrity of archaeological resources; potential for increased unauthorized access to archaeological sites and areas important to traditional culture, which could lead to their alteration or destruction;
- potential for damage from submarine cables to submerged archaeological

remains such as nearshore underwater fishing sites;
- loss of racial identity;
- effects on subsistence lifestyles, including degradation of fishponds;
- impact on State constitutional Native Hawaiian legal rights and Common Law rights of 1892;
- impact on Native Hawaiian family and community life;
- impact on intergenerational linkages to ancestral lands and cultural/historic sites; and
- impact on quality of life, changes in mental/cultural health, and impact on Native Hawaiian identity and pride.

The EIS will address all issues raised in this section, except as noted below. Additional comments made by Native Hawaiians suggest that not all Native Hawaiians agree on how these issues should be characterized. For instance, some Native Hawaiians distinguish between worshipping and respecting Pele. They advocate wise use of and protection of natural resources but do not view the HGP as an agent of potential religious desecration.

To assess specific cultural resources and Native Hawaiian concerns, the EIS will employ professional archaeologists to generate predictive models and conduct archaeological surveys in two of the main project areas, the geothermal resource subzones (GRSs) in the Puna District, Hawaii, and the south shore of Maui. The State Historic Preservation Division has identified these areas as being likely to contain previously unidentified cultural resources. Additional reconnaissance and inventory surveys will still be required on affected islands, of Puna GRSs, transmission line corridors and access roads, and land-sea transition points along submarine cable routes. Marine archaeological surveys may be required off the coast of Maui in areas where nearshore underwater fishing sites are suspected. These surveys will be undertaken when and if the proposed project or subsequent projects reach more precise levels of definition than are currently available and would not be done for the EIS.

In addition, the EIS will utilize a Native Hawaiian cultural resource survey that will involve archival research and ethnographic and ethnohistorical description and analysis of those aspects of Native Hawaiian culture covered by this project. Information from these sources is essential in evaluating and describing various claims that sites within the project area are important for the perpetuation of particular traditional practices, and such information will be necessary for predicting the probable distribution of historic sites in the various areas of potential impact. Consultation with Native Hawaiians and the State Historic Preservation Division will provide mechanisms for ensuring that confidentiality of information about religiously and archaeologically significant sites is maintained.

Where appropriate, the EIS will also address impacts to cultural resources not specifically identified as Native Hawaiian. The Hawaii State Historic Preservation Officer, the Office of Hawaiian Affairs, the Office of Hawaiian Home Lands, National Park Service (NPS), and the President's Advisory Council on Historic Preservation will be consulted as important sources of information and guidance in undertaking the required studies. These archaeological and cultural resource surveys will provide the basis for compliance with pertinent Federal legislation, including the National Historic Preservation Act of 1966 (as amended), Sections 106 and 110; the American Indian Religious Freedom Act of 1978 (amendments proposed); and the Native American Graves Protection and Repatriation Act of 1990. If the project would require placement of dredged or fill materials, DOE must also initiate Section 106 coordination with the Archaeological

and Historic Preservation Act of 1974. Pertinent State legislation includes Hawaii State Constitution, Article 12, Section 7; Hawaii Revised Statutes, Chapter 6E; and State Act 306 concerning religious and cultural rights, historic preservation, and protection of burial sites, respectively (see Tables 4.1 and 4.2).

Some aspects of Native Hawaiian issues are beyond the scope of the EIS; these include, for example, the potential loss of racial identity. Other issues will be addressed only to the extent that they relate clearly to impacts generated by the HGP. For example, a compilation of litigation involving Native Hawaiian claims aside from those directly related to the HGP is beyond the scope of the EIS. However, DOE intends to consult and cooperate with Native Hawaiians through mutually recognized expert consultants and Native Hawaiian organizations that represent various Native Hawaiian viewpoints and concerns, including but not limited to Hui Malama I Na Kupuna O'Hawaii Nei. DOE also intends to consult with the Office of Hawaiian Affairs, an agency in Hawaii charged with representing Native Hawaiian interests and managing ceded lands. By establishing these contacts, DOE seeks to ensure that the EIS accurately reflects to the extent practicable the concerns and issues that some Native Hawaiians regard as significant. In addition, DOE will promote wherever possible community access to the results of cultural studies. To the extent possible, consultations on these surveys will extend directly to affected Native Hawaiian communities.

3.3.10 Aesthetic Resources

Commenters stated that the EIS should address the aesthetic impacts of HGP on all islands, including impacts to natural and agricultural landscapes, beaches, and recreation areas. Specific issues that were identified in the scoping process include

- visual impacts of clearing land in the Wao Kele O Puna rain forest;
- visual impacts from vented steam and cooling towers;
- visual impacts of transmission lines, cable facilities, and increased erosion, particularly in established scenic areas, near park and reserve lands, and near recreation areas;
- visual impacts of an industrial facility in a residential and/or rural environment;
- aesthetic impacts to the Puna District and along transmission line corridors because of HGP-related noise, odor, and night lighting, including potential nuisance impacts of noise (see Section 3.3.5);
- proximity of HGP facilities to the Hawaii Volcanoes National Park (HVNP) in consideration of visual impacts (e.g., night lighting), Air-Quality-Related Values under the Clean Air Act, and noise impacts on HVNP's Wilderness Area; and
- visual impacts on the marine environment (e.g., oil slicks, cable presence, and water clarity), including coastal areas.

The EIS will address all issues raised in this section. The EIS will identify and describe important aesthetic resources in the vicinity of HGP plants and transmission facilities and will assess the impacts of the proposed project on those resources. The assessment will include an aesthetic resources survey and analysis and will involve contacting County planning agencies, the State of Hawaii, and citizen groups for information and assistance in preparing the survey and analysis. DOE will consult with NPS planners and managers in Hawaii with regard to the potential for aesthetic impacts in protected areas within HVNP (see Section 4). Aesthetic impacts associated with construction in the marine environment as it affects water quality and marine biota are addressed in Section 3.3.4.3.

3.3.11 Alternatives

Commenters suggested that the alternatives-related issues listed below be addressed in the EIS. All issues raised in this section will be addressed in the EIS, except as noted below.

- the State of Hawaii's preferred alternative of geothermal for the Big Island only initially should be considered;
- commenters requested an examination of conservation and demand-side management (DSM) and renewable energy sources (biomass, solar thermal, wind, etc.) as alternatives to the proposed action;
- concern was raised that if the purpose of the HGP is to reduce the need for imported oil in the transportation sector, then the use of oil in the transportation sector should be examined;
- environmental and economic impacts of geothermal power should be compared with the impacts of other reasonably foreseeable alternatives, including renewable energy sources and coal;
- all alternative strategies should be analyzed in an integrated resource planning (IRP) context, and externalities should be identified and quantified where possible;
- commenters noted that if a geothermal resource of 500 MW(e) exists on the Big Island, then its full development with or without a submarine cable is a reasonably foreseeable consequence, the impacts of which should be assessed;
- effects of increased industrialization of the Big Island as the result of any alternative should be considered;
- alternative power generating strategies need to be characterized for each island where geothermal-derived energy is being planned to be delivered;
- use of coal-fired power generation as an alternative should include an assessment of the potential environmental impacts (air quality and solid wastes);
- concern was raised that proposed coal-burning facilities in Hawaii might use coal mined in a rain forest of another country;
- use of petroleum byproducts (residual oil from petroleum processing for transportation fuels) should be considered for power production on the Island of Oahu for use there and for possible export to the other islands;
- impact assessment of alternatives needs to address fiscal impacts, population distribution, contribution to energy demand, and reliability of resource;
- alternative cable (overland and submarine) routes and technologies should be evaluated in the EIS;
- various HGP designs and configurations, including alternative facility locations, should be considered and should be sited away from residential areas; and
- off-grid electric power systems (e.g., solar hot water, synthetic natural gas/propane for cooking, wind, etc.) should be considered where possible in assessment of alternatives.

From 1985 through 1989, the State had envisioned a large-scale, 500-MW(e) geothermal/inter-island submarine cable project as an alternative means of reducing the State's 90-percent dependence on imported oil for electricity generation. However, as of January 1990, the State has redefined its geothermal goal to a planning level that seeks to have geothermal development first meet the requirements of the Big Island. This downsized project would not include an inter-island submarine cable system. If this goal is successful, only then would the State consider a large-scale geothermal and inter-island cable project.

Alternatives to the proposed DOE action (partially funding Phase 3) and reasonably foreseeable alternatives to the

proposed project (Phase 4, the proposed construction and operation of the HGP) by others will be addressed in the EIS. These alternatives will include the no-action alternative of not providing some Federal funding for Phase 3. In addition, reasonable alternatives to and within the proposed HGP, both supply and non-supply, as well as design and location alternatives, will be considered. The criteria for evaluating alternatives will include and consider the energy objectives and policies cited in 226-18, Hawaii Revised Statutes (HRS), of the Hawaii State Plan.

The HGP will be evaluated to determine which alternatives have the potential to achieve similar objectives. The main emphasis will be in determining the proposed HGP's contribution to meeting power generation needs and Hawaii's energy policy goal of reducing reliance on imported oil. This determination will be based in part on projections of electric generation requirements and plans to meet these requirements. Transportation actions that would potentially reduce dependence on oil will not be considered as alternatives to the proposed action. Although these actions have been mentioned during scoping meetings as possible alternatives because they could potentially accomplish one of the proposed action's primary objectives, (i.e., reduce Hawaii's dependence on imported oil), they do not achieve the crucial HGP objective of supplying electric power. Therefore, this alternative is not considered comparable to the proposed action. The EIS will consider, however, the amount of oil displaced by the use of up to 500 MW(e) of geothermal energy and other supply-demand alternatives.

Alternatives that will be considered include alternative geothermal technologies, sites, and capacities; alternative supply-demand options, such as no-action, geothermal on the Big Island only, and conservation and DSM plus renewable energy supply sources; alternatives associated with the overland transmission routes; and alternative submarine cable routes and technologies. Alternatives to the proposed submarine cable system will include: various cable routes and cable materials, such as solid dielectric or oil-filled submarine cables, operation at either high voltage alternating current (HVAC) or high voltage direct current (HVDC), and alternative methods of land-sea transition. Each of these alternatives will be evaluated based on its economic and technical viability. The potential environmental and economic impacts for each energy supply-demand option will be identified, examined, and compared to the impacts of the proposed action.

3.3.11.1 Alternatives Within the Proposed Project

3.3.11.1.1 Development Scenarios

During scoping, several commenters questioned the need for power-generating capacity where geothermal-derived energy was being planned to be delivered. Because the geothermal resource is not yet commercially defined, various geothermal development scenarios will be proposed using available information on (1) the geothermal resource potential that may be commercially available and (2) the energy demand forecasts provided by the Hawaiian Electric Company (HECO) and its wholly owned subsidiaries the Maui Electric Company (MECO) and the Hawaii Electric Light Company (HELCO). These scenarios will allow for a staged development of geothermal resources to meet the energy demands projected by the utilities.

3.3.11.1.2 Geothermal Technologies

Alternatives within the proposed 500-MW(e) (net) HGP will include various power-generating strategies and power-generating technologies (e.g., total

reinjection and in situ heat exchange). Technology alternatives will be selected from the best available information from the State of Hawaii, geothermal developers, utilities, and other experience with geothermal development.

3.3.11.1.3 Alternative Sites

In response to scoping comments about the location of geothermal facilities, alternative sites will also be considered in the EIS. Because the basis for site selection will be the availability of adequate geothermal resources, the EIS will rely on best available information regarding the development potential of the Kilauea East Rift Zone (KERZ). Geothermal development on Maui will not be included because the resource is not expected to be economical for power generation.

3.3.11.1.4 Overland Transmission Routes

The scoping process identified the need to consider alternative overland transmission routes and technologies. Potential overland routes, based on configurations described previously in HECO (1989), existing overland routes, and discussions with the State and County of Hawaii, will be defined and discussed in the EIS in terms of impacts to land use, ecological resources, health and safety, socioeconomics, cultural resources and Native Hawaiian concerns, and aesthetics.

3.3.11.1.5 Submarine Cable Routes and Technologies

The concerns identified as environmental (see Section 3.3.4.3), socioeconomic and recreational (see Section 3.3.8), and cultural (see Section 3.3.9) regarding the marine environment will be addressed for each of the alternative cable scenarios.

Cable routes. The preferred route is at present only roughly defined. Therefore, factors relating to competing uses, impacts to water quality and marine ecology (particularly to threatened and endangered species), economics, impacts to cultural heritage, and risks of reasonably foreseeable accidents (see Section 3.3.12.2) will be important in defining the preferred routes and viable alternatives.

Alternative cable materials and configurations. When the Hawaii Deep Water Cable Program (HDWC) analyzed the many possible configurations, an oil-filled cable was considered technically and economically the preferred alternative. Those cables that were found to be technically feasible (HDWC 1985a) will be reexamined from an environmental perspective, as will solid dielectric cables, if they are demonstrated to be reasonable from a technical and cost basis.

HVDC vs HVAC transmission. The preferred technological alternative for the submarine cable is HVDC. If HVAC is found to have sufficient technological merit that it can be considered a reasonably foreseeable alternative, then its potential environmental impacts will be considered. Of particular concern is the electromagnetic field (EMF) associated with alternating current (ac), which is considerably greater than that observed for the same power rating with direct current (dc).

Land-sea transitions. Only the potential impacts of alternatives of pumping station/no pumping station and conversion station/no conversion station (if there will be taps for the local system) will be considered. An examination of alternative refinements is not reasonable in the EIS because of insufficient details of proposed pumping or conversion stations.

3.3.11.2 Alternatives to the Proposed Project

3.3.11.2.1 No-Action

The no-action alternative is defined as Hawaii's continued reliance on the existing

and planned power generating mix, which is predominantly oil-fired capacity with some coal-based capacity and renewable energy sources. Using the energy demand scenarios developed by the Hawaiian utilities, the EIS will examine the technical, economic, and reliability aspects of this "business as usual" alternative as well as the potential environmental impacts.

3.3.11.2.2 Alternative Supply-Demand Options

In addition to the no-action alternative, two supply-demand alternatives will be evaluated. The first is the development of increments of up to 500 MW(e) of geothermal energy for use on the Big Island only (no submarine cable). Under this alternative, the State would be expected to continue its support for geothermal development of less than 500 MW(e) until the extent of the resource is known and it can be determined that the environmental and economic impacts of the transmission system are acceptable. By examining this alternative, the EIS will address the scoping concern that if a resource of 500 MW(e) exists on the Big Island, then its development for use on the Big Island only is a reasonably foreseeable consequence. The definition of this alternative will consider utility plans and/or the projected needs for generating power on the Big Island.

A second supply-demand alternative would include conservation and DSM plus a mix of renewable supply alternatives, such as biomass, solar, photovoltaic, geothermal, small-scale hydroelectric, and wind. These supply-demand options will be examined on an island-by-island basis in the framework of IRP. All supply-demand alternatives will be analyzed in the EIS using IRP methods available from Hawaiian utilities as well as from other sources. The extent of the EIS analysis will depend on the availability of credible data from the Hawaiian utilities and from the individual alternative assessments.

The energy supply-demand alternatives will be evaluated by first screening them for technical feasibility (i.e., whether the resource exists and is technically feasible to develop in the same time-frame as the HGP). If the alternative is technically feasible, its potential environmental impacts and economic costs will be evaluated.

The basis of the economic evaluation will be a comparison of the discounted value of the life-cycle costs of geothermal energy to a configuration of alternatives that would provide equivalent power and generation (or an equivalent increase in energy efficiency and DSM) over the assumed lifetime of the geothermal resource. Cost estimates of alternatives will be based on the best available information, with special consideration of cost factors affecting Hawaii.

Reasonable energy alternatives and strategies including conservation/DSM, off-grid electric power systems where possible, renewable energy sources, and alternative geothermal power generating plants will be compared using an IRP framework. This assessment will be conducted using available data and studies from the State, local utilities, and others, and will be coordinated, where possible, with Hawaii's IRP process that is currently under way.

Uncertainty about capital costs, energy costs, economic risks, and environmental factors will be incorporated through sensitivity analyses. Alternatives to the HGP will be evaluated through the simulation of alternative resource plans using utility planning models. The effect of alternatives on Hawaii's dependence on imported oil will also be explicitly examined where possible. This examination will focus on the displacement of imported petroleum for electric power generation, the use of petroleum processing residuals for power production, and the manner in which reductions in the use of oil for electricity production would affect Hawaii's dependence on petroleum imports. The

need for power production facilities will also be evaluated. The effect on environmental resources that are being considered for the proposed action will be considered for viable alternatives.

3.3.12 Reasonably Foreseeable Accidents

All issues raised in this section will be addressed in the EIS.

3.3.12.1 Proposed Geothermal, Geothermal Alternatives, and Overland Transmission Routes

As discussed in Section 3.3.7, commenters expressed concerns about accidents during construction and operation of the HGP plants and transmission facilities. Accidents could result from natural phenomena, such as seismic or volcanic activity, hurricanes, or tsunamis, or from human factors, including operator error or flawed plant design and construction. Specific issues identified during scoping include

- health and safety impacts to workers and the public from accidental releases of hydrogen sulfide (H_2S), radon, heavy metals, and organic compounds emitted into the air, surface water, and groundwater (see Section 3.3.7);
- accidents involving the HGP plants and transmission facilities resulting from volcanic and/or seismic activity;
- impacts to terrestrial and aquatic ecological resources resulting from accidental releases of hazardous materials into the air and water;
- economic impacts of accidents at the plants or along the transmission corridor (e.g., additional project costs for evacuating residents, replacing project facilities, providing reimbursement for damages); and
- impacts to Native Hawaiian cultural practices resulting from accidental releases of hazardous materials into the air and water.

As indicated by these examples, concerns over the potential impacts of accidents have been raised in connection with almost every resource area to be addressed in the HGP EIS. Therefore, most resource areas (meteorology/air quality, surface and groundwater resources, geological resources, ecological resources, health and safety, emergency preparedness, socioeconomics, and cultural resources) will include a discussion of the potential impacts of accidents. However, the primary discussion of impacts related to accidents during HGP construction and operation will be in the section of the EIS that will address reasonably foreseeable accidents.

In addressing accidents, the EIS will use an approach that will assess the consequences of potential accidents, discounted by their probability. Because the area in the vicinity of the proposed HGP is very active geologically, the EIS will assume that important accident initiators are earthquakes and volcanic eruptions. The analysis will further assume that these natural phenomena cause an accident in which (1) the HGP's pipeline/well head connections and automatic shut-off valves fail, leading to uncontrolled venting of geothermal fluid or (2) a blow-out preventer on an HGP well fails, leading to uncontrolled venting of geothermal fluid. For each scenario, the quantities and effects of the primary materials released—H_2S, radon, and toxic heavy metals—will be compared with the quantities and effects of the same materials released through the earth's natural venting process, and the cumulative effects from all sources will be evaluated. Hurricanes and tsunamis also pose a threat to transmission/conversion facilities near coastal areas. Loss of load could result in a period of venting, which may be uncontrolled for some period of time. The EIS will quantify the probabilities

of such accidents based upon the best available information.

3.3.12.2 Submarine Cable and Alternatives

Commenters raised issues about

- numerous hazards on land, in the coastal zone, and at sea with respect to fabrication, transportation, construction, deployment, maintenance, or retrieval operations for the submarine cable;
- cable reliability during extreme events, such as tsunamis, hurricanes, and debris flows or turbidity currents;
- potential of cable break due to mechanical impact (anchor dragging, shark bite, etc.); and
- possible hazards to human health if the EMF from the cable attracts sharks (see also Section 3.3.4.3).

Construction and operation in and near the marine environment involve numerous hazards on land, in the coastal zone, and at sea with respect to fabrication, transportation, construction, deployment, maintenance, and retrieval operations, and these will be addressed. The EIS will address operations in normal sea state and under extreme conditions. The impacts of a cable failure that affect primarily terrestrial systems, such as the community at a geothermal plant site or those relying on the power in Oahu, will be discussed (see also Section 3.3.4.1). The U.S. Geological Survey (USGS) and the U.S. Coast Guard will be consulted about the potential for accidents involving the submarine cable system (see Tables 4.1 and 4.2).

Commenters asked about the ability of the submarine cable system to withstand being hit by anchors, shark bites, or purposeful sabotage. The EIS will examine those concerns using information in the available literature and experiences elsewhere.

Commenters were also concerned that the EMF from the cable would attract sharks. Various experts on sharks will be consulted, and the literature will be carefully reviewed to determine whether attraction of sharks is credible. Shark attraction will be addressed to the extent available information permits.

3.3.13 Federal, State, and Local Government and Geothermal Developers

During the public scoping process, some participants questioned the credibility and neutrality of certain organizations involved in the development of the HGP. This questioning extended to environmental and engineering consultants affiliated with geothermal developers. The public requested that DOE carefully consider the qualifications and integrity of potential subcontractors for environmental support studies associated with the HGP EIS. Specific issues that were identified in the scoping process include

- lack of governmental concern for citizens' rights, health, and welfare;
- denial of due process in HGP-related litigation;
- dismissal of public concerns by government officials;
- collaboration between government and geothermal developers;
- powerlessness of citizens to influence government decisions on the HGP; and
- competence of government employees and geothermal developers.

These concerns are not within the scope of the EIS; however, DOE recognizes the importance of independent oversight and public involvement in activities to build confidence and trust and will continue to make information available to the public and respond to public comments.

As noted in Section 3.2, DOE held ten public scoping meetings (two a day at five locations) and provided a public comment period to accept written comments. Transcripts from these meetings were placed in the HGP EIS reading rooms for public review. In addition, information exchange meetings and meetings with Native Hawaiians were held (see Table 3.1 and Figure 3.1). This Implementation Plan (IP) is being made available for public review and comment. Also, an interactive workshop was held to receive comments and suggestions on the working draft IP from all cooperating agencies. To encourage public involvement, *Federal Register* notices, press releases, and local advertisements have been used to publicize activities. DOE will continue to publicize public participation opportunities. In addition, the Draft EIS will be the subject of public hearings prior to issuance of the Final EIS and Record of Decision (ROD).

3.3.14 Environmental Compliance Regulatory Issues

Commenters thought that the EIS should include a review of all applicable Federal, State, and County rules, regulations, and statutes, including the National Environmental Policy Act (NEPA), Occupational Safety and Health Administration (OSHA) requirements, the National Historic Preservation Act, the American Indian Religious Freedom Act, the Endangered Species Act (including Section 7 consultation), the Public Utilities Regulatory Policy Act, and other legislation (see Tables 4.1 and 4.2). Commenters also thought that the EIS should include a review of regulatory issues in light of the major changes that have occurred during the course of the HGP.

Issues that were identified in the scoping process include

- Federal, State, and County permit compliance;
- effect of past and current litigation on geothermal development;
- apparent violations of environmental laws by geothermal developers;
- inadequate monitoring for compliance with emissions standards; and
- role of State and County enforcement agencies.

All issues raised in this section will be addressed in the EIS. The HGP will be required to comply with all applicable Federal, State, and County regulations and legislation. The EIS will list and describe the Federal, State, and County laws and acts that apply to the HGP and will assess HGP impacts against the standards associated with those laws. For example, the National Ambient Air Quality Standards (NAAQS) and State of Hawaii air quality standards for H_2S will be used in the EIS assessment of HGP air quality impacts. In addition, Mitigation Action Plans, completed in conjunction with the EIS and its ROD, will explain how measures designed to mitigate impacts will be planned and implemented. These Mitigation Action Plans are required by DOE NEPA Implementing Procedures, 57 *Fed. Reg.* 15122 (1992), to be codified at 10 CFR Part 1021.

4. HGP EIS WORK PLAN

4.1 AGENCY CONSULTATIONS

A partial list of agencies expected to be contacted during EIS preparation is given by subject area and agency in Tables 4.1 and 4.2. This list will be revised and expanded as necessary based on recommendations made by various agencies. Appendix B summarizes the comments provided by Federal, State, and County agencies in response to (1) the Advance Notice of Intent (ANOI); (2) the Notice of Intent (NOI); (3) invitations to act as cooperating agencies; and (4) the working draft IP for the HGP EIS.

4.1.1 Cooperating Agencies

As part of the scoping process, DOE selected other Federal agencies, the State of Hawaii, and Counties in Hawaii to participate in EIS preparation as cooperating agencies. Cooperating agency roles and responsibilities in EIS preparation, as defined in Council on Environmental Quality (CEQ) Regulations (40 CFR Part 1501.6), can include participating in the scoping process, developing information, preparing environmental analyses, providing technical reviews, and/or lending staff support. The U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, U.S. Geological Survey, National Park Service, National Marine Fisheries Service, the State of Hawaii, County of Maui, and County of Hawaii have agreed to be cooperating agencies on the HGP EIS. Memoranda of Understanding have been signed by DOE and each cooperating agency. In addition, FWS, USGS, and COE are being funded by DOE to conduct technical support studies to assist in the preparation of the EIS. Details of the cooperating agency technical support studies are currently under review, but preliminary plans for the studies are discussed in Sections 3.3.1 through 3.3.4.

4.1.2 Other Federal Agencies and Non-Governmental Organizations

While preparing the HGP EIS, DOE will contact and conduct reviews with other Federal agencies and Native Hawaiian organizations. In particular, EIS preparers will contact the U.S. Environmental Protection Agency, U.S. Navy, U.S. Coast Guard, Soil Conservation Service, U.S. Department of the Interior, and U.S. Department of Transportation.

4.2 PREPARERS OF THE EIS

Oak Ridge National Laboratory (ORNL) has been selected by DOE to assist in the preparation of the HGP EIS and to support all EIS procedural requirements. ORNL is assisted by the University of Tennessee in the areas of cultural resources and socioeconomics and by subcontractors with specific expertise. Supporting documentation and data will be provided by Federal, State, and County agencies (especially those identified as cooperating agencies) and others. DOE is responsible for the scope and content of the EIS and supporting documents. NEPA disclosure statements are on file at DOE's Office of Conservation and Renewable Energy, Washington, D.C. Copies of these statements are included in Appendix G.

4.3 SIGNIFICANT EIS MILESTONES

Significant milestones in the preparation of the HGP EIS are shown in Figure 4.1. At this IP stage, the milestones are tentative and subject to change as needed to ensure the preparation of an EIS that meets all applicable requirements.

4.4 RELATED ENVIRONMENTAL DOCUMENTATION

Several Federal and State environmental documents related to geothermal development in Hawaii will be reviewed and used as information sources during HGP EIS preparation. In terms of Federal NEPA documents, EIS preparers will review the U.S. Energy Research and Development Administration's *Environmental Assessment of the Hawaii Geothermal Project Well Flow Test Program* (1976) and DOE's NEPA documentation for HGP-A, *Environmental Assessment, Hydrothermal Geothermal Subprogram, Hawaii Geothermal Research Station, Hawaii County, Hawaii* (1979).

EIS preparers will also review a number of environmental documents prepared by the State of Hawaii. Two early documents, prepared for the Hawaii Department of Planning and Economic Development in

1978, are the *Environmental Impact Statement for the Hawaii Geothermal Research Station Utilizing the HGP-A Well at Puna, Island of Hawaii* and the *Revised Environmental Impact Statement for Hawaii Geothermal Research Station, Island of Hawaii.* DBED's more recent environmental documentation, *Environmental Assessment for the Hawaii Deep Water Cable Program* (1987) and Environmental Review: 500 MW(e) Geothermal Development Within the Three Geothermal Resources Zones of the Kilauea East Rift Zone, Puna District, Island of Hawaii (1989), will also be reviewed during EIS preparation. In addition, EIS preparers will review environmental documentation for other development proposals, including a commercial rocket launching facility (when the document becomes available) and a manganese nodule refining facility on the Big Island, *Final Environmental Impact Statement, Proposed Marine Mineral Lease Sale: Exclusive Economic Zone Adjacent to Hawaii and Johnston Island* (1990).

Several environmental documents related to private geothermal developments on the Big Island have been prepared to date, and some of them have served as State EISs. Those that will be reviewed during HGP EIS preparation include two prepared for True/Mid-Pacific Geothermal Venture: *Revised Environmental Impact Statement for the Kahauale'a Geothermal Project, District of Puna, Island of Hawaii, State of Hawaii* (1982) and *Final Supplemental Environmental Impact Statement to the Revised Environmental Impact Statement for the Kahauale'a Geothermal Project* (1986); and a State environmental document prepared for Thermal Power Company, a private geothermal development group, the 1987 *Environmental Impact Statement: Puna Geothermal Venture Project.*

TABLE 4.1.—*Agency Consultations*

Subject Area	Legislation	Agency
Endangered species	Endangered Species Act of 1973, as amended; state laws	U.S. Fish and Wildlife Service, National Marine Fisheries Service, National Park Service, State agencies
Migratory birds	Migratory Bird Treaty Act	U.S. Fish and Wildlife Service, National Park Service
Archaeological, historical, and cultural resource preservation	*Federal:* National Historic Preservation Act of 1966; Archaeological Resources Protection Act; American Indian Religious Freedom Act; and Native American Graves Protection and Repatriation Act; *State:* Hawai'i State Constitution, Article 12, Section 7; Hawai'ian Historic Preservation Law [Haw. Rev. Stat. 6E-1 (1985)]; Hawai'ian Burial Law [Act 306 (Session Laws 1990)]; *County:* Ordinance No. 1941: "A Bill For An Ordinance Establishing A New Chapter In Title 2 Of The Maui County Code Creating A Cultural Resources Commission; Maui County Code, Title 2: "Administration and Personnel," Chapter 2.88, "Cultural Resources Commission"	Federal agencies, State Historic Preservation Office, President's Advisory Council on Historic Preservation, Native Hawaiian Groups, Office of Hawaiian Affairs, Maui County Cultural Resources Commission, State Department of Hawaiian Home Lands
Discharge of pollutants to water	Clean Water Act; Safe Drinking Water Act	U.S. Environmental Protection Agency, National Marine Fisheries Service, State agencies
Work in navigable waters of the United States	Section 404 of Clean Water Act; Section 10 of Rivers and Harbors Act	Corps of Engineers, National Marine Fisheries Service

TABLE 4.1.—*Agency Consultations*
(continued)

Subject Area	Legislation	Agency
Prime and unique farmlands	Farmland Protection Policy Act of 1981	Soil Conservation Service
Floodplains	Executive Order 11988	Federal agencies, State agencies
Wetlands	Executive Order 11990; Fish and Wildlife Coordination Act; Section 404 of Clean Water Act	Corps of Engineers, U.S. Fish and Wildlife Service, State agencies, U.S. Environmental Protection Agency
Water body alteration	Fish and Wildlife Coordination Act, Section 10 of Rivers and Harbors Act, Section 404 of Clean Water Act	U.S. Fish and Wildlife Service, National Marine Fisheries Service, State agencies, Corps of Engineers
River status	Wild and Scenic Rivers Act; Anadromous Fish Conservation Act; Hanford Reach Study Act	U.S. Department of the Interior
Air pollution	Clean Air Act	U.S. Environmental Protection Agency, National Park Service, State and local agencies
Water use and availability	Water Resources Planning Act of 1965; Safe Drinking Water Act; Primary and Secondary Drinking Water Standards; others	U.S. Environmental Protection Agency, Office of Water Policy, State agencies

TABLE 4.1.—*Agency Consultations*
(continued)

Subject Area	Legislation	Agency
Noise	Noise Pollution and Abatement Act of 1970; Noise Control Act of 1972	U.S. Environmental Protection Agency, National Park Service, State agencies
Siting and planning	State and County legislation	State and County agencies
Waste management and transportation	Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act and the Hazardous and Solid Waste Amendments of 1984; Comprehensive Environmental Response, Compensation and Liability Act; Emergency Planning and Community Right to Know Act	U.S. Environmental Protection Agency, U.S. Department of Transportation, State agencies
Coastal zones	Coastal Zone Management Act; State and County legislation	Office of State Planning, County Planning Department

TABLE 4.2.—*Government Agency Permit Consultation List*

Permit Abbreviation	Permit Title or Type	Cross-Reference to Related Permits/Permits Delegated to Other Agencies
	State of Hawaii Department of Land and Natural Resources	
DLNR 1	Ocean Waters Construction Permit	NOAA 1, CG 1, CG 2
DLNR 4	Forest Reserve Special Use Permit	
DLNR 5	Forest Reserve Access Permit	
DLNR 6	Entrance to Wildlife Sanctuary	
DLNR 7	Transporting Permit	
DLNR 8	Permit to Enter Closed Watershed	
DLNR 9	Natural Area Reserve Special Use Permit	
DLNR 10	Historic Preservation Review	COE 1, COE 5
DLNR 11	Use of State Land Including Submerged State Lands	NOAA 1, CG 1, CG 2
DLNR 12	Conservation District Use Application	
DLNR 13	Water Use Permit Within Water Management Areas	
DLNR 14	Stream Channel Alteration Permit	
DLNR 15	Stream Diversion Works Construction or Alteration Permit	
DLNR 16	Well Construction or Pump Installation Permit	
DLNR 17	Geothermal Resource Mining Lease	

TABLE 4.2.—*Government Agency Permit Consultation List*
(continued)

Permit Abbreviation	Permit Title or Type	Cross-Reference to Related Permits/Permits Delegated to Other Agencies
DLNR 18	Dams and Reservoirs Construction Approval	COE 2
DLNR 19	Geothermal Exploration Permit	
DLNR 20	Geothermal Resource Subzone Designation	
DLNR 21	Geothermal Plan of Operations	
DLNR 22	Geothermal Well Drilling or Modification Permit	
	State of Hawaii Department of Health	
DOH 1	Notification of Hazardous Waste Activity	EPA 1
DOH 2	Hazardous Waste Treatment, Storage and Disposal (TSD) Permit	EPA 1
DOH 3	Underground Storage Tank (UST)	
DOH 4	Underground Injection Control (UIC) Permit	EPA 3
DOH 5	Water Quality Certification (WQC) Army Corps of Engineers Section 401 Permit	
DOH 6	Authority to Construct (ATC) a Potential Air Pollution Source	EPA 2
DOH 7	Permit to Operate (PTO) a Potential Air Pollution Source	EPA 2
DOH 8	Prevention of Significant Deterioration (PSD)	EPA 2

TABLE 4.2.—*Government Agency Permit Consultation List*
(continued)

Permit Abbreviation	Permit Title or Type	Cross-Reference to Related Permits/Permits Delegated to Other Agencies
DOH 9	Community Noise Permit for Construction Activities	
	State of Hawaii Department of Business, Economic Development and Tourism	
DBEDT 1	District Boundary Amendment	
DBEDT 2	Land Use Commission Special Use Permit	
	State of Hawaii Office of State Planning	
OSP 1	Federal Consistency With the Hawaii Coastal Zone Management Program	COE 5
	State of Hawaii Department of Transportation	
DOT 1	Permit to Perform Work on State Highways	FHA 1
	Hawaii County	
HC 1	Geothermal Resource Permit (GRP)	
HC 2	Special Management Area (SMA)	
HC 3	Shoreline Setback Variance (SSV)	
HC 4	Special Permits	
HC 5	Use Permits	
HC 6	Subdivision of Land	
HC 7	Plan Approval	

TABLE 4.2.—*Government Agency Permit Consultation List*
(continued)

Permit Abbreviation	Permit Title or Type	Cross-Reference to Related Permits/Permits Delegated to Other Agencies
HC 8	Grubbing, Grading, Excavation and Stockpiling Permits	
HC 9	Excavation of Public Highways	
HC 10	Installation of Utilities Within Federal and Secondary County Highways	
HC 11	National Flood Insurance	
HC 12	Building Permits	
HC 13	Outdoor Lighting Permit	
HC 14	Electrical and Plumbing Permits	
HC 15	Sign Permit	
HC 16	Building Plan Approval	
	Maui County	
MC 1	Department of Public Works Construction Permits	
MC 3	Land Use Commission Special Use Permit	DBEDT 2
MC 5	Shoreline Setback Variance	
MC 6	Special Management Area Use Permits	
	City and County of Honolulu	
CCH 1	Conditional Use Permit-Type 1	

TABLE 4.2.—*Government Agency Permit Consultation List*
(continued)

Permit Abbreviation	Permit Title or Type	Cross-Reference to Related Permits/Permits Delegated to Other Agencies
CCH 2	Special Management Area Use Permit (SMP)	
CCH 3	Shoreline Setback Variance	
	U.S. Navy	
NAV 1	Notification Regarding Surface and Subsurface Plans	
	U.S. Army Corps of Engineers	
COE 1	Permits Under Sections 9 and 10 of the Rivers and Harbors Act of 1899 for Structures or Works in or Affecting Navigable Waters of the United States	NMFS 2, OSP 1
COE 2	Permits Under Section 103 of the Marine Protection Research and Sanctuaries Act of 1972 for Ocean Dumping of Dredged Material	FWS 1, NMFS 7, EPA 4, OSP 1
COE 3, 4, and 5	COE 3: Permits Under Sections 404 of the Federal Water Pollution Control Act of 1972 and Amendments for Discharges or Dredged or Fill Material into Waters of the United States; COE 4: Water Quality Certification from the State of Hawaii Department of Health; COE 5: Coastal Zone Management Consistency Certification from the State of Hawaii The Corps permit may also involve consultation with applicable agencies on endangered species and historic sites.	EPA 1, FWS 2, NMFS 1, OSP 1, DOH 5

TABLE 4.2.—*Government Agency Permit Consultation List*
(continued)

Permit Abbreviation	Permit Title or Type	Cross-Reference to Related Permits/Permits Delegated to Other Agencies
	National Oceanic & Atmospheric Administration	
NOAA 1	Notification to Charting and Geodetic Services	CG 1
	Department of Transportation, U.S. Coast Guard	
CG 1	Notification of Submerged Cable	NOAA 1
CG 2	Notification of Cable Laying Operations or Related Projects	
	U.S. Fish and Wildlife	
FWS 1	Endangered Species Act Activities Review	COE 2, NMFS 6
FWS 2	Clean Water Act Review	EPA 1, DOH 5, COE 3, NMFS 1
FWS 3	Rivers and Harbors Act Review	COE 1, NMFS 2
FWS 4	Fish and Wildlife Coordination Act Review	NMFS 9
	National Marine Fisheries Service	
NMFS 1	Clean Water Act Section 404 Permit Application Review	FWS 2, COE 3
NMFS 2	Rivers and Harbors Act of 1899 Section 10 Permit Application Review	COE 1

TABLE 4.2.—*Government Agency Permit Consultation List*
(continued)

Permit Abbreviation	Permit Title or Type	Cross-Reference to Related Permits/Permits Delegated to Other Agencies
NMFS 3	Clean Water Act Section 401, Water Quality Certification Application Review	COE 4, FWS 2, EPA 1
NMFS 4	Federal Coastal Zone Management Consistency Determination Review	OSP 1, COE 5
NMFS 5	Marine Mammal Protection Act (MMPA) Exemption	
NMFS 6	The Endangered Species Act (ESA) Section 7, Consultation Process	FWS 1
NMFS 7	Marine Protection Research and Sanctuaries Act of 1972, Section 103 Permit Review	COE 2
NMFS 8	National Environmental Policy Act, EIS preparation and review	
NMFS 9	Fish and Wildlife Coordination Act	FWS 4
	U.S. Environmental Protection Agency	
EPA 1	Permits and Licenses Under Section 402 of the Federal Water Pollution Control Act of 1972 and Amendments	DOH 1, DOH 2, FWS 2, COE 3
EPA 2	Permits and Licenses Under the Clean Air Act	DOH 6, DOH 7, DOH 8
EPA 3	Underground Injection Control (UIC) Permit	DOH 6
EPA 4	Ocean dumping permits under Sect. 102(a) of the Marine Protection Research and Sanctuaries Act of 1972	COE 2

TABLE 4.2.—*Government Agency Permit Consultation List*
(continued)

Permit Abbreviation	Permit Title or Type	Cross-Reference to Related Permits/Permits Delegated to Other Agencies
	Federal Highway Administration	
FHA 1	Approval for Work to be Performed on Interstate Highway	DOT 1

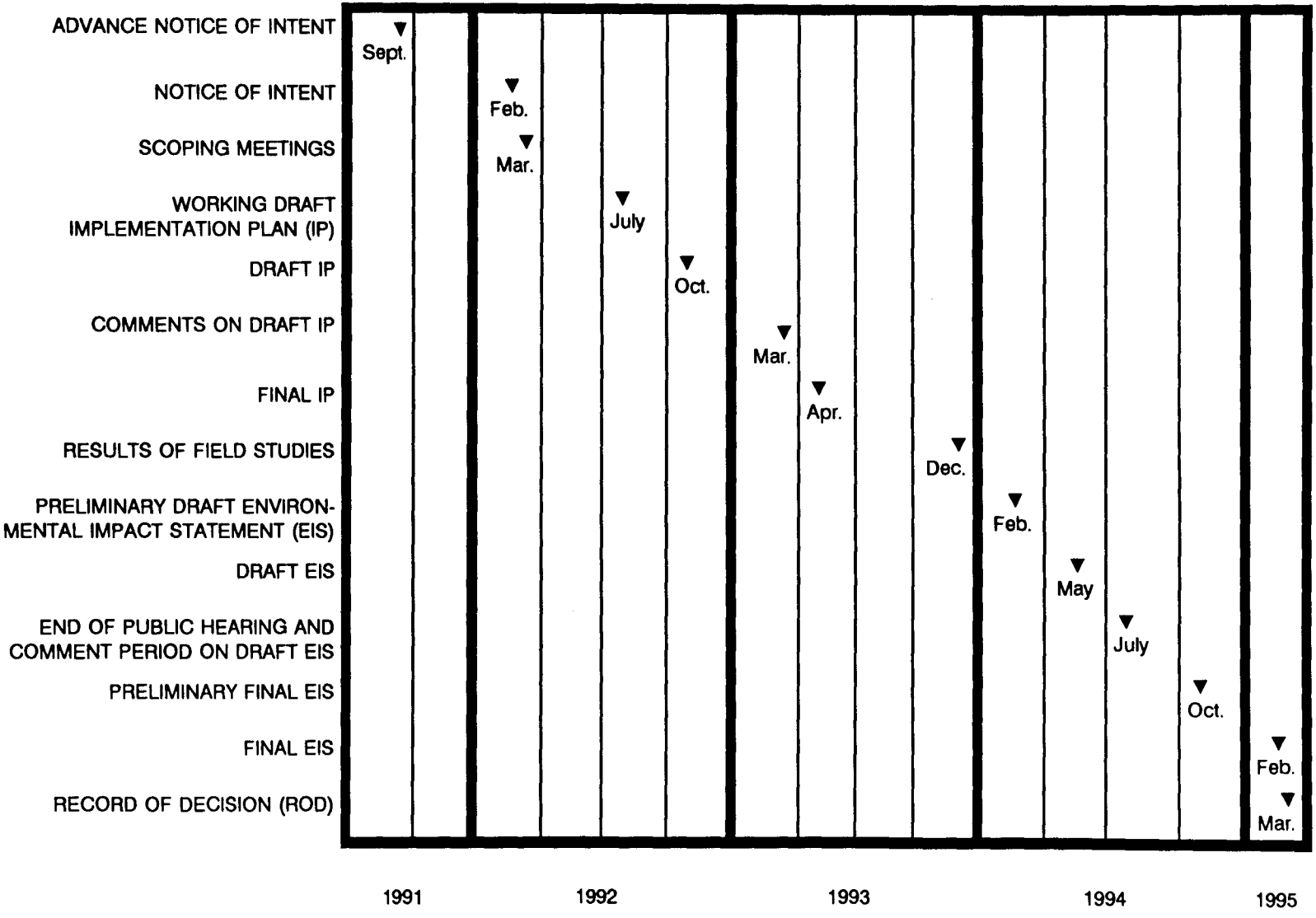

Figure 4.1. HGP EIS milestones.

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APPENDIX A

SUMMARY OF ORAL AND WRITTEN SCOPING COMMENTS

CONTENTS

1. INTRODUCTION

This appendix contains a summary of the oral and written comments received during the scoping process for the Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS). The summary provides an overview of the issues that have been suggested for inclusion in the HGP EIS, with equal consideration given to both oral and written comments.

Oral comments were presented during public scoping meetings. Written comments were solicited (1) at the public scoping meetings; (2) in the Advance Notice of Intent (56 *Fed. Reg.* No. 170, 43585–87) and Notice of Intent (57 *Fed. Reg.* No. 31, 5433–37) to prepare the HGP EIS; and (3) in project-related correspondence and meetings (e.g., cooperating agency meetings).

Listed in the table below are the ten public scoping meetings (one afternoon, one evening) that the Department of Energy (DOE) held at five locations in Hawaii. These meetings were held in compliance with Council on Environmental Quality regulations (40 CFR Part 1501.7) and DOE National Environmental Policy Act (NEPA) Guidelines (subsequently superseded by DOE regulations implementing NEPA (10 CFR Part 1021). Also, DOE policy is to facilitate opportunities for public involvement in the NEPA process. Accordingly, the purpose of these meetings was to ensure adequate opportunity for public and government agency participation in developing the EIS scope by identifying the issues to be addressed, commenting on the proposed action, and suggesting alternatives to be analyzed.

One-hundred seventy individuals provided more than 700 comments during scoping meetings (see Figure A-1), and 70 individuals submitted written materials and letters to DOE during the scoping period. In addition, scoping inputs obtained from public comment letters and discussions with federal, State, and County agencies through August 1992 (Appendix B) were considered in the preparation of this IP. The majority of comments came from individuals, but about 50 organizations (including environmental, public interest, and community groups) also participated by offering comments through representatives. Additionally, 242 people submitted a "clip

HGP EIS public scoping meetings in Hawaii

Location	Date
Pahoa (Big Island)	March 7, 1992
Wailuku (Maui)	March 9, 1992
Kaunakakai (Molokai)	March 12, 1992
Honolulu (Oahu)	March 14, 1992
Kamuela/Waimea (Big Island)	March 16, 1992

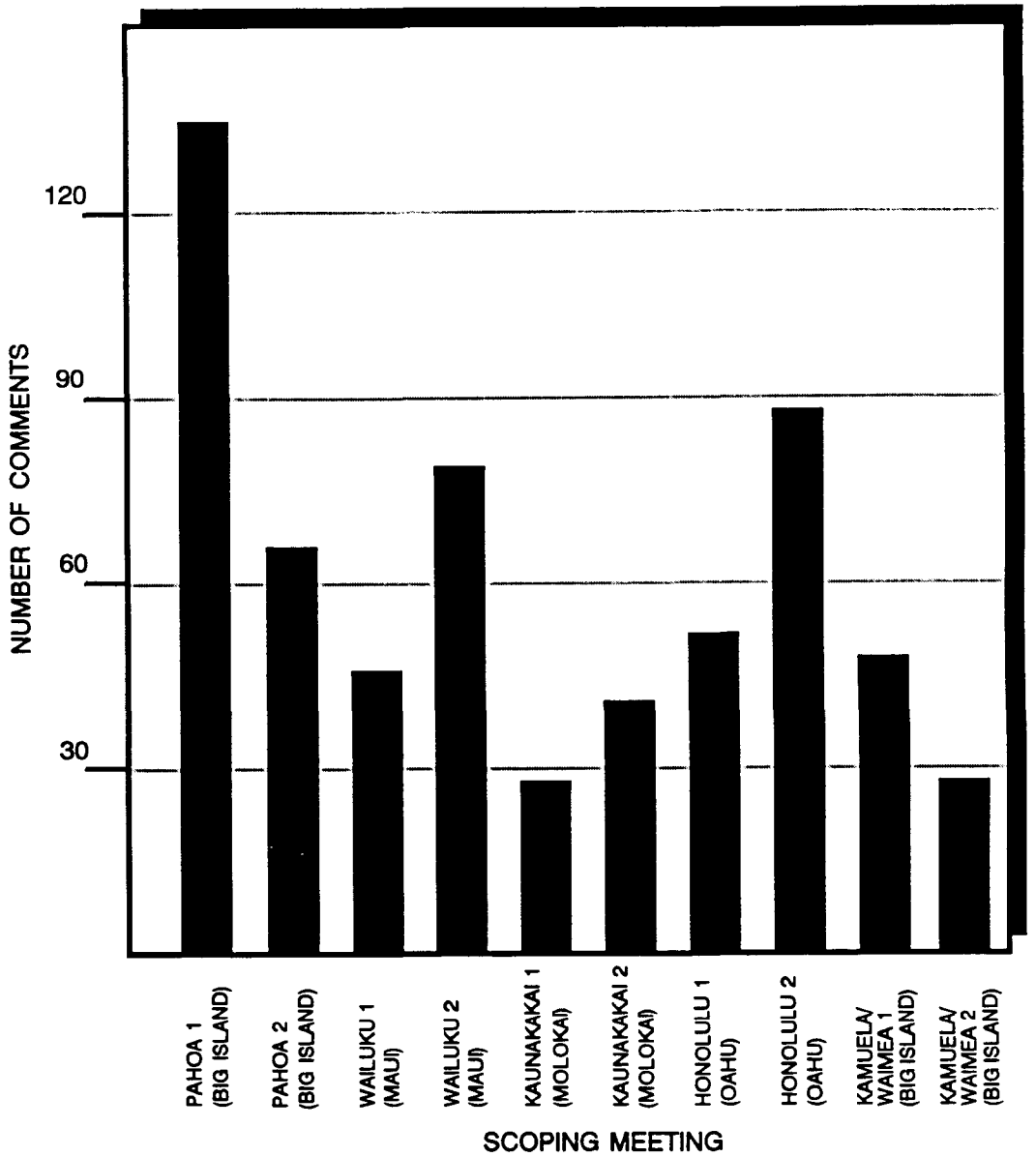

Figure A.1. Number of oral scoping comments at the ten public scoping meetings for the HGP EIS. More than 700 comments were offered.

and ship" coupon that states, "I support your efforts to evaluate the cultural and religious implications of geothermal development in Hawaii with your current EIS process. Please recognize that serious consideration must be given to the alternatives to geothermal because the cultural impacts of this energy development cannot be mitigated. I expect your EIS to reflect this conclusion." An offer to be on DOE's HGP Mailing List was sent to commenters who signed these coupons. All scoping comments submitted by federal, State, and County agencies are summarized in Appendix B of this IP, but the issues

raised in those submissions are also included in this summary.

During the scoping meetings, a court recorder transcribed all oral comments; the transcripts may be reviewed at DOE Reading Rooms (see Attachment 1 to this appendix) and at locations identified in the *Federal Register* notices. The transcripts give the name of each speaker. Authors of written submissions are given alphabetically by individual and organization in Attachment 2 to this appendix.

Oral and written scoping comments were reviewed and analyzed. Issues raised by the commenters were categorized by subject area and counted (see Figure A-2).

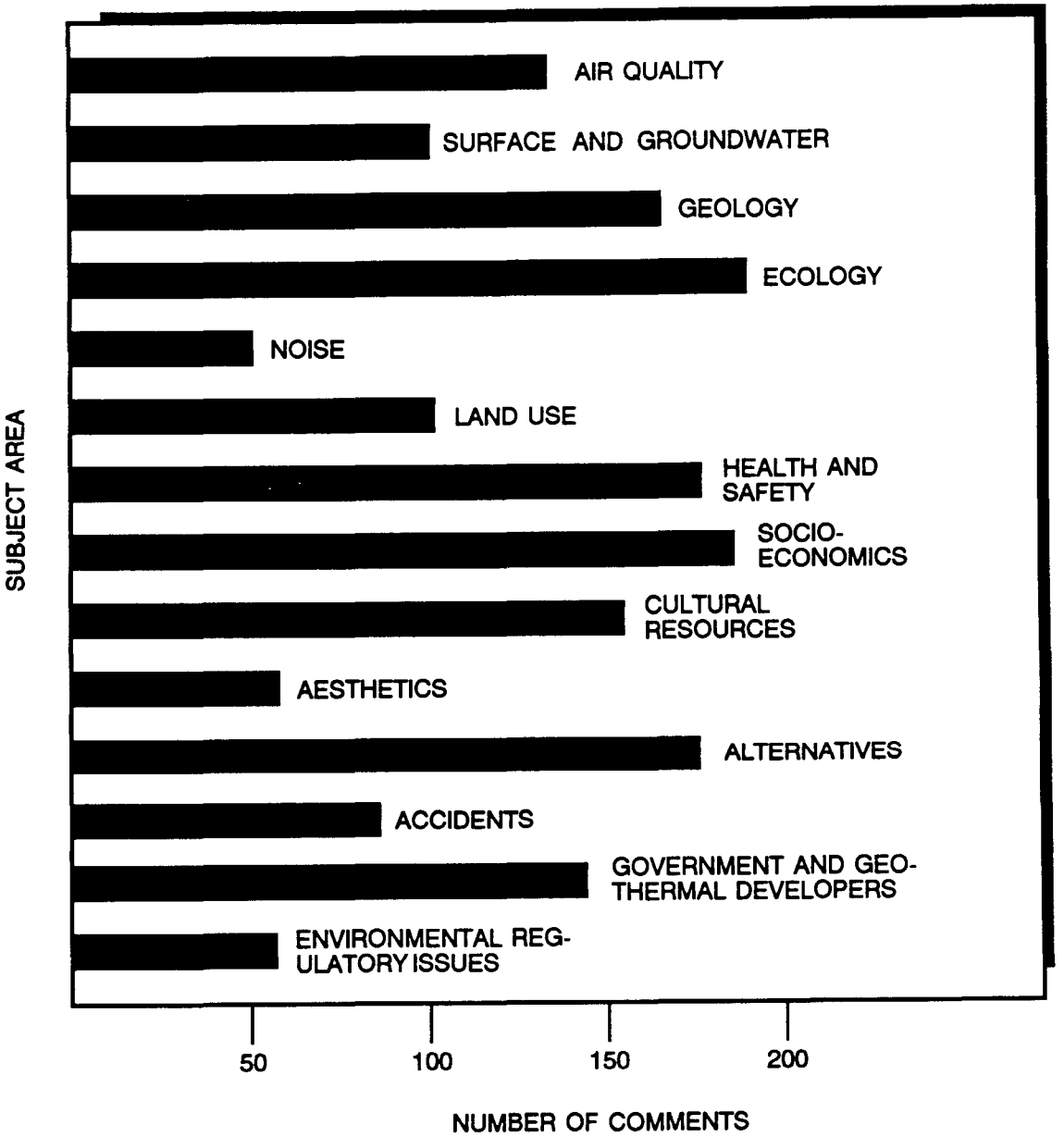

Figure A.2. Number of oral and written scoping comments by subject area. About 1800 comments were received.

2. COMMENT SUMMARIES

2.1 PURPOSE AND NEED FOR STATE ACTION

Several commenters suggested that the EIS state whether the HGP will achieve the goals of the State for the HGP: to alleviate Hawaii's dependence on imported fuels and to develop indigenous, cost-effective, renewable energy supply options for the State's future energy needs.

Commenters suggested that if additional energy or energy self-sufficiency were very important, then serious attempts at conservation would have been made, and laws requiring solar hot-water heating on State buildings or new homes would be enacted.

In questioning the objectives of the HGP, commenters noted that planning for the development of 500 MW(e) of geothermal power places substantial reliance on a single source of power with a high potential for failure either in the power supply or cable.

Many noted that the bulk of the crude oil used in Hawaii is used for transportation and that electricity is generated using the residuals. Therefore, unless the need for petroleum products for transportation were reduced, geothermal power would not in any meaningful way reduce the State's dependence on imported oil. If tourism is increased because of increased power availability, tourism's reliance on oil for transportation may increase Hawaii's dependency on oil.

2.2 GENERAL ISSUES REGARDING THE PROPOSED ACTION

2.2.1 Project Definition

Some commenters wanted a better definition of both phases of the HGP, believing that the EIS should clearly delineate the federal and State's participation in the HGP. It was noted that for 500 MW(e) to reach Oahu, more power must be generated at the source. The proposed action should be defined from inception through decommissioning and rehabilitation, including locations of power plants, well heads, transmission corridors, campsites, access roads, other infrastructure and aircraft used for surveillance. The number of wells for exploration, source, and reinjection should be estimated and the acreage required to support them for the lifetime of the plant. 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.

Because the wells for HGP are so close to sites of recent and on-going volcanic eruption, commenters also indicated that the EIS should discuss the idea that the infrastructure associated with the wells will be portable.

2.2.2 Mitigation Methods

Commenters requested that the proposed and alternative abatement and mitigation measures be described and their potential impacts identified and assessed, including best available control technologies, measures to prevent invasion of non-native species, reforestation techniques (i.e., reforest, restock with biota, etc.), and disposal of hazardous waste. Backup measures should be included. The EIS should state how implementation of monitoring, mitigation, and enforcement measures identified by the document will be guaranteed.

2.2.3 Cumulative Impacts

The commenters were concerned about whether the impacts of prior and on-going geothermal development would be considered in the EIS. There was considerable skepticism about past and

present geothermal development and developers (suggesting that the many failures are due to improper operation). Others noted that geothermal energy has been successful elsewhere. Commenters mentioned the effects that have already occurred in the Puna district: health effects, both physical and psychological (due to geothermal emissions and noise), and impacts to agriculture, livestock, and other plants, animals, and birds both in and out of the Wao Kele O Puna rain forest. Some residents were forced to leave their homes during recent venting incidents. The presenters also noted lowered property values and that community and individual rights have been violated.

Commenters felt that the EIS should assure that incidents, such as those that occurred at Puna Geothermal Ventures (PGV) in 1991, do not occur with the HGP, noting that PGV is a small-scale operation relative to HGP. This would require reviewing previous incidents and implementing the recommendations of the expert review team. The commenters expressed concern that, to date, geothermal developers have not provided citizens with accurate information concerning their operations and releases.

The presenters also noted that environmental examination of geothermal development to date has been segmented, inadequate, and performed using a very limited data base and perspective. Some prior environmental compliance documents did not address the reasonably foreseeable consequences of a successful project, were inadequate, and conditions for operation and mitigation were not followed.

2.2.4 Resource Surveys

A number of studies of the affected environment were suggested, including characterization of the affected environment (including socioeconomics), groundwater, the hydrology and geology of the Kilauea East Rift Zone (KERZ), local meteorology, natural (ambient) emissions, and geothermal emissions, fluids, and solid wastes. Commenters indicated that surveys of the biota in the KERZ region and all the proposed overland and undersea transmission corridors should be carried out; archaeological sites on the southeastern coast of Maui should be analyzed.

2.3 POTENTIAL ENVIRONMENTAL ISSUES

Commenters thought the EIS should fully evaluate the short- and long-term environmental, social, and economic costs and benefits of the HGP, (including wells, support structures, transmission lines/submarine cable, pumping stations, campsites, access roads, and aircraft used for maintenance reconnaissance), particularly to pristine environments such as the Wao Kele O Puna rain forest, the southeast coast and Hana districts of Maui, much of Molokai, and the marine environment. Commenters asked that the EIS consider not only local impacts but also planetary or global considerations. The preparers of the EIS should consider the fact that the Hawaiian islands are finite, and consider, therefore, if the HGP is consistent with this limitation on growth.

Commenters expressed a general requirement to protect the land and its biota as a responsibility of those living on it. Commenters noted that when assessing the impacts of the HGP, there should be no artificial separation of humans from the environment.

DOE should perform the environmental studies necessary to provide the scientific data required to weigh the costs and benefits of the HGP and should make the information available to the public. However, the commenter noted that studies that would be intrusive should not be performed. Commenters indicated that the EIS should clearly state information gaps and their significance. When measurements

(for monitoring or other purposes) are taken, they should be performed by analysts with appropriate expertise and at appropriate locations.

A number of issues raised apply to many of the categories below. For example, commenters felt that the EIS should identify and assess (1) chronic effects of HGP-related high- and low-level emissions, effluents, noise, and night light on plants, animals, birds, and insects, in the wild, in the rain forest, on agricultural lands, and on humans (see Health and Safety); (2) impacts of the HGP on plants and animals used for medicinal and ritual purposes by Native Hawaiians (EIS should also address the impacts of the loss of benefits of these plants); and (3) impacts of the HGP on plants, animals, birds, and fish used for subsistence living. In addition, commenters indicated that the EIS should describe measures that would be used to assure that herbicides used to prevent invasion of non-native plant species will affect only target species. It should demonstrate that these mitigation measures will be carried out and how they will be enforced. Herbicides so used can impact terrestrial and aquatic biota within or outside the rain forest, including threatened and endangered species. They can enter the human food chain in drinking water, air, or food.

Many of the presenters were concerned that acid rain or fog that may occur as a result of geothermal development, could impact air, water, and soil quality, terrestrial and land-based aquatic ecosystems, and have significant socioeconomic effects. Additional concerns were that emissions would cause acid rain resulting in excessive corrosion of piping or building materials or that emissions would discolor or erode paint, etc.

Commenters asked that the EIS establish whether the clearing of land for the HGP would exacerbate erosion affecting air and soil quality and terrestrial and aquatic land-based ecosystems. Increased erosion could cause increased siltation and turbidity, potentially impacting the near-shore environment including fishponds and fisheries, reefs, and tourism (economic, cultural, and archaeological concerns).

2.3.1 Air Quality

Several commenters recommended that the EIS characterize the emissions associated with the 500-MW(e) development and identify the impacts of those emissions, including toxic releases, acid rain or fog, and thermal pollution, and particles from solid wastes. Certain atmospheric conditions were reported to exacerbate the effects of HGP-related emissions in Puna and even degrade the air quality on Maui and Molokai. Geothermal emissions can affect the water quality in catchment systems, commonly used in Puna for drinking and bathing.

2.3.2 Surface and Groundwater Resources

Commenters recommended that the EIS characterize the effluents and the brine ponds associated with the 500-MW(e) development. The EIS should report the impacts of leakage of source and injection wells into aquifers due to well failure (from seismic/volcanic events or corrosion) or leakage/overflow from the brine ponds. Commenters want the EIS to address impacts of the HGP on drinking water quality (particularly in water catchments) and on surface or groundwaters, considering the effects of possible contact with HGP-related solid wastes, abatement technologies, or their possible failures, and changing the water quality designation of aquifers in the geothermal subzone.

2.3.3 Geologic Issues

The commenters expressed concern that undertaking geothermal development in a seismically and volcanically active zone may exacerbate those activities and upset the hydrological balance as the development will be situated on a geological structure that contains numerous vertical dikes, faults, and horizontal shelves. The EIS should examine geothermal-associated subsidence.

Commenters also said that the EIS should discuss the reliability of the geothermal power generation facility and associated infrastructure, noting mistakes that had been made in the past. Those concerned about the reliability of the geothermal facilities mentioned the potential hazards of locating such plants (and transmission lines) in an active seismic/volcanic zone, of isolation from the base load (both at the facility and to the users), of irreparable wells, and of uncontrolled and unabated blowouts. They were concerned about the integrity of well casings and the possibility that brine ponds might overflow during heavy rains or leak due to the corrosive nature, high temperature, and high pressure of the geothermal fluids. Others were concerned about availability of water for quenching.

Thus, commenters want the EIS to identify and assess potential impacts of failure modes. It should examine the unique geological system with which the HGP will interact, examining the potential for seismic/volcanic events interconnecting aquifers resulting in contamination.

Some commenters believe 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.

Other commenters were concerned that the magnitude of the resource in the KERZ has not been verified. The EIS should discuss the reliability and renewability of the resource. The EIS should investigate the effect of the need for expansion into additional land as the resource declines.

2.3.4 Ecological Resources

Many commenters asked that the EIS examine the project's impact on the unique ecosystems that make up Hawaii, including plants, vertebrates, and invertebrates. Many of the concerns raised could be applied to several ecosystems: terrestrial, aquatic, or marine ecosystems and the threatened, endangered, and endemic species therein and on humans.

Terrestrial Resources

Several commenters recommended that the EIS should address the potential impacts of the HGP on unique species (e.g., insects that live in lava tubes). Other commenters expressed particular concern for the rain forest. They felt that the EIS should identify and assess the impacts of the HGP (particularly in terms of species diversity and its ability to regenerate), including the effects of introduction of non-native species, extensive segmentation caused by building roads and clearing areas, and incursions of humans. Commenters also indicated that the EIS should study the impacts of destroying the unique and fragile habitat of the Wao Kele O Puna rain forest. It should note the interrelationship between the lava, the biota of the region, and the regeneration that occurs following an eruption.

Impacts to wetlands, cave ecosystems, birds, invertebrates, and ethnobotanical and medicinal species were also cited as concerns. The use of herbicides and invasion by non-native species were regarded as important issues.

One commenter was concerned that the construction of the HGP would start a series of complex changes in the lowland

rain forest ecosystem. He stated that the "long-term longitudinal study" necessary to understand this effect would be difficult to conduct for the EIS, making it equally difficult, if not impossible, to predict the consequences of those changes. Thus, the EIS should assess the risks of making a complex environmental decision without information regarding the impacts.

Some commenters were concerned about the potential impacts of the HGP on threatened, endangered, and endemic species, particularly in the rain forest of Puna and the dry forest on Maui. Species mentioned include ohia, happy-face spider, Hawaiian hawk, and hapu'u (tree fern). Commenters thought the EIS should consider that, because of the unusual geology in Hawaii (criss-crossing lava flows on all islands), very small areas of unique habitat exist that support the few remaining individuals of an endangered species that are evolving at different rates.

One commenter asked what happens if species become extinct as a result of the HGP.

Aquatic Resources

Commenters identified several issues concerning aquatic resources in streams, springs, and anchialine ponds: land-based freshwater and brackish-water ecosystems, potential impacts from groundwater changes that result from reinjection, effects on aquatic flora and fauna as a result of any HGP-induced surface water changes. Potential impacts to threatened and endangered species were also mentioned several times.

Marine Resources

Commenters requested that the EIS investigate the impacts of the submarine cable installation and maintenance (increased turbidity, possible ciguatera, and increased noise levels), normal operation (electromagnetic fields, electrotaxis), and in failure modes (such as oil leakage) on the ocean and its resources, including marine mammals, sea turtles, big game fish, dolphins, food stocks, sharks, rays, and skates; on beaches, surfing locations, and reefs; and on ecology in the coastal zone.

Commenters noted that the EIS should investigate the impacts of the cable on humpback whale migration patterns, birth rate, ability to navigate and locate, and the potential impacts of nets (used to protect swimmers if the submarine cable attracts sharks) on humpback whales' birthing habits in shallow, protected waters. Commenters also asked that the EIS investigate the impacts the HGP would have on fisheries and consider the impacts of the cable (e.g., installation, operation, maintenance) on the reefs and fish ponds.

2.3.5 Noise

Commenters indicated that the EIS should address the impacts of noise associated with geothermal development, including drilling, operations at and near the geothermal facility under normal operating conditions, and with unscheduled venting. Impacts would also occur along transmission lines, at work camps or substations, and due to aircraft (doing maintenance reconnaissance). They noted that noise can cause ear damage, fear, loss of sleep, and psychological stress.

2.3.6 Land Use

Commenters recommended that the EIS consider the propriety of (1) geothermal development in the residential neighborhoods of Puna, noting that blowouts occur at most geothermal installations world-wide; (2) using Native Hawaiian homelands, ceded lands, and conservation districts for the HGP, even though some of those lands are not currently being developed because they

have no supporting infrastructure; and (3) the land exchange in Puna (Campbell Estate for Wao Kele O Puna), and subsequent redesignation as a geothermal subzone to determine whether it has benefitted 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.

Commenters also requested that the EIS address the impacts of the HGP on water availability and water uses to determine if there is sufficient water within the Kilauea system to support the HGP and provide for other uses. In addition, fire hazards associated with the transmission line system exacerbated by drought conditions were mentioned. Commenters noted that the EIS should address the impacts of the absence of registration of geothermal wells as water wells, as some Native Hawaiians have claimed water use rights for the subsurface waters in the Puna district.

Several commenters asked that the EIS consider impacts of the HGP on aviation, communication, agriculture, and recreational uses, for example, in the rain forest and on beaches. Further, the EIS should examine how the possibility of geothermal development has influenced land ownership and land-use decisions.

2.3.7 Health and Safety

Commenters indicated that the EIS should assess the health and safety impacts of the HGP and its components, failures, mitigation measures, and future uses.

Several commenters expressed concerns about the potential health effects of geothermal emissions [particularly hydrogen sulfide (H_2S) and acid rain] and effluents, due to HGP-related changes in air, drinking water, and food quality. These effects can include eye, throat, and nose irritation, breathing trouble, coughing, wheezing, and lowered resistance to infection. Those presenting were concerned about the cumulative and synergistic effects of emissions, effluents, and brine ponds, on children and babies, those with respiratory ailments, the elderly, Native Hawaiians, and workers. The EIS should analyze the short- and long-term chronic and acute effects of geothermal emissions on public health and safety.

Some commenters indicated that the EIS should examine the health and safety impacts of the transmission line/underwater cable system (including transformers), particularly the effects of electromagnetic fields and stray voltage along the transmission line corridor, or ciguatera associated with cable construction in the near-shore environment.

The commenters recommended that the EIS address psychological impacts of the HGP and its associated development, including impacts of stress due to fear, unannounced venting, and sleep deprivation (due to noise, fear, frustration, and lack of trust) and the problem of the fears of geothermal development that exist in the surrounding communities due to the prior activities in the region. They asked what the psychological impacts are on a community experiencing controversy, lack of empowerment, and loss of due process. The EIS should consider psychological impacts on persons whose lifestyle had been disrupted (e.g., children and Native Hawaiians) and cross-cultural psychological issues.

With respect to geothermal developments in residential areas, the commenters strongly urged that the EIS should develop a worst-case scenario for the full development and, noting that there is no adequate emergency response plan for the Puna District, develop one. Residents are concerned about impacts of isolation of the facility from the base load, which could result in unabated and/or uncontrolled venting. The transmission lines would

parallel the Kea'au road, which is also the evacuation route from Pahoa. If a seismic or volcanic event occurred along that road, the facility could be isolated from its base load, and the community would be prevented from evacuating. They also mentioned inadequate communication systems.

Some commenters thought that the EIS should address the impacts of the violence that might occur should the HGP proceed.

With respect to the submarine cable, commenters asked that the EIS state what steps will be taken to protect the public and the cable if it attracts sharks, consider the implications of possible sabotage to the cable, and address the risks of accidents during maritime operations in the Alenuihaha Channel. They noted that the EIS should consider the civil defense issue of a major segment of power generation capacity being linked by such a transmission connection to its load.

Commenters indicated that the EIS should identify and assess the hazards of overland transmission lines, including the potential of increased fire danger and electrical hazards associated with high-voltage lines. Some commenters noted that the EIS analysis should consider the fact that the HGP may cause increased population that would (along with drought conditions which do occur on the Big Island) further exacerbate the problems mentioned above.

2.3.8 Socioeconomics

Many commenters expressed concern about the long- and short-term socioeconomic impacts of the HGP. Several commenters, for example, expressed economic concerns. They asked that the EIS delineate the costs (past, present, and future) of the entire HGP project to consumers, users and non-users, taxpayers, and utilities, from inception through decommissioning and rehabilitation, including all State and federal developmental and court costs, and costs for publicity, etc., drilling and wells, building new ships, harbors, and the cable, etc., mitigation, and rehabilitation, and monitoring and enforcement. It should examine the economic feasibility and cost-effectiveness of HGP. Commenters also requested that the EIS consider the cost of cable or facility failure once geothermal energy provides a significant proportion of Hawaii's energy needs, including the costs associated with a declining resource, of repair, and of development of backup capacity. Some commenters asked that the EIS identify who would be responsible for the consequences of lower property values or property condemnation.

Several commenters noted that the EIS should (1) address the economic impacts should the submarine cable affect fisheries (including fishponds), big game fish and food stocks, or tourism; (2) evaluate the impacts of the HGP (and the effects of its presence making large regions of the State less desirable for living) in terms of lower property values (including condemnation), increased cost of living, etc., loss of crops or livestock, increased depreciation (e.g., of fences, houses, and catchment systems) due to geothermal-related corrosion; (3) examine the economic impacts of geological risks and hazards, the impact of the indebtedness incurred; (4) consider impacts to businesses (including agriculture), such as job loss, business relocation, or loss of business; and (5) assess impacts to local economies.

Additionally, some commenters requested that the EIS identify who is liable—the federal government, the State, and/or privately-owned corporations—for all costs incurred and mandate that conditions of permits should include future liability clauses. Commenters felt that the EIS should identify means to provide insurance for those whose property values (etc.)

decline or are forced to move due to the HGP.

Some commenters asked that the EIS consider the impacts of diverting funds that could be spent on conservation technologies to the geothermal effort, and one commenter noted that investment in conservation has resulted in changing patterns of investment toward technologies that reduce the need for energy consumption. Investment in conservation technologies saves the costs of constructing and updating additional generation/ transmission facilities.

Commenters further indicated that the EIS should state what the economic benefits of the HGP are, identify who receives them, and weigh the potential benefits of the HGP against the environmental costs. The commenters wanted to assure that consumers and tax payers receive some of the benefits. The presenters would like the EIS to address the concern that those who will bear the greatest cost in terms of health and safety, economics, cultural resources, and environmental losses, will not be the ones to benefit.

Lifestyle issues were also raised by commenters. The EIS should address impacts of the HGP on the lifestyles of the general population, specifically on Native Hawaiians. They asked if the cable/ transmission lines will affect, for instance, subsistence lifestyles, the ability to access beaches, and the lifestyles of those who prefer privacy, peace and quiet, or lower levels of population, technology, or development (e.g., off-grid living).

Commenters felt that the EIS should address the social effects of the HGP, or its failure, particularly on communities near the geothermal operations and along proposed cable routes, including the social consequences of increased cost of living due to the HGP. It should identify and assess the socioeconomic costs due to a decline in resource after the HGP has stimulated growth and evaluate the social costs of HGP-related civil disobedience. One commenter noted that Hawaii, which has largely service-related jobs, has a low unemployment rate, whereas industrialized regions of the country are where the high unemployment occurs.

Several commenters indicated that the EIS should assess potential impacts to the many important, and often undocumented, archaeological and historical sites and regions, including the southeast coast of Maui, the south coast of Molokai, and North Kohala.

Commenters suggested that the EIS identify and assess the potential impacts of the future uses of geothermal energy on all islands affected: increased greater urbanization, growth, industrialization, and development that could include seabed mining and refining, construction of a space port, and increased tourism with associated golf courses and energy-intensive hotels. It should examine negative impacts on the infrastructure, overpopulation, crime, or social upheaval.

Some commenters were concerned that increased power availability could cause increased population and power consumption. They noted that increased tourism could result in increased use of fuels for transportation, thereby increasing Hawaii's dependence on oil.

It was noted that once the submarine cable is in place, other power generation facilities can use the cable as a conduit; in fact, laying of the cable could make construction of other energy-production facilities economically feasible.

2.3.9 Cultural Resources/Native Hawaiian Concerns

Many commenters thought that the EIS should respect Native Hawaiian race, rights, religion, history, language, and culture. Many expressed the belief that geothermal

development would result in the desecration of Pele. They asked that the EIS examine potential impacts of the HGP on Native Hawaiian culture and religious beliefs; the ability of Native Hawaiian practitioners to obtain herbs, animals, and birds necessary for medicinal and ritual practices; Hawaiian homelands or ceded lands (noting that Native Hawaiians have a right and spiritual need to be able to return to their homelands and live their chosen lifestyle); Native Hawaiian subsistence hunting, fishing, and gathering; and the land, ocean, and natural phenomena considered sacred. They expressed concern that HGP construction will result in desecration of ancient or modern Hawaiian burials in lava tubes, heiau (sacred places or shrines), and other places sacred to Native Hawaiians. Many commenters asked that the EIS 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).

Commenters further requested that the EIS address the anthropological impacts of the HGP. One commenter recommended that the study be designed by trained anthropologists and should involve personal interviews with practitioners, Hawaiian kupuna (Native elders), and Hula dancers, in order to investigate the impact the HGP would have on cultural practices.

2.3.10 Aesthetic Resources

Commenters wanted the EIS to address the aesthetic impacts of HGP-related noise, visual disturbances, and odors. Although noise is primarily a Health and Safety Issue, it is also an aesthetics issue as it is a nuisance, disrupting peace and quiet. Commenters want the EIS to address the impacts of chronic exposure to nuisance levels of noise associated with geothermal development, including drilling, operation and venting, and transmission lines.

Commenters expressed concern about the aesthetic costs of the HGP (particularly the impacts of the overland transmission lines and clearing the Wao Kele O Puna rain forest) on all islands, including impacts to natural and agricultural landscapes, beaches, and surfing spots. One commenter mentioned the problems of night-time lighting.

2.3.11 Alternatives

Many commenters stated that the EIS should identify and assess the relative merits and impacts of alternative energy supply options that are cost-effective, viable and safe, and could meet the goals of the State's stated purpose for the HGP. They asked that the EIS examine technical and economic feasibility/reliability and environmental impacts of such alternatives. These include "no action," fossil fuel options (coal gasification), conservation and renewables, and various geothermal options. Commenters indicated that alternatives should be considered within the framework of integrated resource planning (IRP) 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. They noted that the State is initiating such a process (but it may not be completed within the proposed time frame of the EIS).

Commenters stated that the EIS should examine conservation and renewable energy-supply options, such as photovoltaics, solar thermal (particularly solar hot water heating), wind, ocean thermal energy conversion, biomass, demand-side options (conservation/energy efficiency, passive solar), off-grid options, and others. Many believe that alternative energy options can meet the needs of the State, if the alternative energy supply options could be helped by tax-incentives and low-cost loans. They noted that wind, solar, and biomass are successful elsewhere

and that most islands have excellent wind and solar resources.

With respect to geothermal alternatives, commenters wanted the EIS to assess a staged development of the HGP so that experience is gained with the least capital costs, the possibility of closed-cycle geothermal using immediate reinjection, insitu heat exchange, and geothermal development at locations other than the Kilauea East Rift Zone (KERZ).

If a low level of geothermal development is successful, then greater development of up to, or even greater than, 500 MW(e) becomes a reasonably foreseeable scenario. One comment noted that if geothermal development is successful at the 25-MW(e) level, then it would not be economical or politically astute to limit development to that low level on the Big Island or (if sufficient resource is verified) to the Big Island. Several commenters wanted the EIS to look at the impacts of developing the full resource and all its potential uses.

Commenters asked that alternatives to transmission lines be considered including "no action," solid rather than oil-filled cables, high-voltage ac transmissions vs high-voltage dc transmission, and various cable/transmission line routes (above ground vs buried, percentage of lines on land vs submarine). A number of alternative routes were suggested, including an alternative to the route along the southeastern coast of Maui: North Kohala to Lanai with spur lines to Lahaina and Molokai and direct lines from Lanai to Oahu; or routing the cable directly to Oahu, not landing on Maui. Several commenters further indicated that the EIS should consider the costs (including indirect costs, such as impacts to property values and aesthetic impacts) of above- and underground transmission lines. This could be necessary on a district-by-district basis, given the variable geology of the state. Before development of the HGP and cable, a smaller demonstration should be conducted to determine whether power transmission to other islands is reasonable.

Commenters requested that the EIS examine reducing Hawaii's dependence on petroleum-based fuels for transportation (e.g., using fuel-efficient automobiles) in order to reduce Hawaii's dependence on imported oil. For this reason, commenters requested that the EIS examine the potential contributions of alternative transportation fuels, providing on-site or near-site employee housing, alternative methods for interisland travel. However, a commenter suggested that the EIS should examine the costs associated with supplying an "unneeded" mass transit system on Oahu to save energy.

Some commenters asked that the EIS identify and assess the impacts of fossil-fuel-fired operations, particularly the obtaining of foreign coal. The EIS should address the issue of fossil-fuel power generation adversely impacting air quality and potentially contributing to global climate change. 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 rain forests and then economically encouraging them to clear those forests.

2.3.12 Reasonably Foreseeable Accidents

Commenters expressed concerns about accidents during construction and operation of the HGP plant and transmission line. Accidents could result from natural phenomena, such as seismic or volcanic activity, or from human factors, including operator error or flawed plant design and construction. Specific concerns identified included health and safety impacts to workers and the public from accidental releases of H_2S, radon, heavy metals, and other gaseous and particulate emissions into

the air, surface water, and groundwater; accidents involving the HGP plant and transmission facilities resulting from volcanic and/or seismic activity; impacts to ecological resources as a result of accidental releases; economic impacts of accidents; and impacts of accidents on Native Hawaiian cultural practices.

2.3.13 Federal, State, and Local Government and Geothermal Developers

Many commenters expressed political concerns of one kind or another, noting their frustration with the political process. These comments related to a lack of concern by government, loss of due process because of government regulations and actions, loss of faith in government, lack of necessary expertise within government, and skepticism regarding motives and resolve of government. The commenters mentioned infringement on privacy due to the actions of geothermal developers' security personnel, insufficient public review, and inadequate distribution of information.

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.

Some commenters believe that State/federal governments should enforce the laws currently in existence (including permitting and monitoring requirements). They noted that the State has never set air quality standards for H_2S. They asked if regulations have been violated in the past, are they currently being violated and will they be in the future?

Some commenters additionally asked that the EIS consider the international implications of the messages conveyed by the United States to the international community, noting that U.S. actions, far more than words, help establish global policy. Thus, the EIS should address concerns about the example it sets for the global community when the United States permits cutting of the rain forest for the purpose of power generation (when it asks that other nations not cut theirs) and does not show respect for the cultural and ethnic resources of its citizens (i.e., Native Hawaiians).

2.3.14 Environmental Compliance Regulatory Issues

Commenters stated that the EIS should contain a review of all applicable rules, regulations, and statutes, including NEPA, the National Historical Preservation Act, the Native American Religious Freedom Act, the Endangered Species Act, Section 7 consultation and the Public Utilities Regulatory Policy Act of 1978.

Commenters also requested that the EIS 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, and they noted that the EIS should examine the complex regulatory situation with respect to land use and geothermal subzone designation.

ATTACHMENT 1 — DOE Reading Rooms with Copies of the HGP EIS Public Scoping Meeting Transcripts

This list is an updated version of the list given in the *Federal Register* notices (Appendix F).

Hawaii

Hawaii Energy Extension Service
Hawaii Business Center
99 Aupuni Street, Room 214
Hilo, HI 96720
Contact: Andrea Beck
Telephone: (808) 933-4558
Fax: (808) 933-4602

Hilo Public Library
300 Waianuenue Avenue
Hilo, HI 96721-0647
Contact: Claudine Fujii
Telephone: (808) 935-5407
Fax: (808) 933-4658

Kailua-Kona Public Library
75-138 Hualalai Road
Kailua-Kona, HI 96740
Contact: Irene Horvath
Telephone: (808) 329-2196
Fax: (808) 326-4115

Mountain View Public and School Library
Highway 11
Mountain View, HI 96771
Contact: Evelyn Garbo
Telephone: (808) 968-6300
Fax: (808) 968-6056

Pahala Public and School Library
Pakalana Street
Pahala, HI 96777
Contact: Lisa Cabudol
Telephone: (808) 928-8032
Fax: (808) 928-6199

Pahoa Public and School Library
15-3038 Puna Road
Pahoa, HI 96778
Contact: Laura Ashton
Telephone: (808) 965-8574
Fax: (808) 965-7170

State of Hawaii
Department of Business, Economic Development & Tourism
Hilo Office
99 Aupuni Street, Room 212
Hilo, HI 96720
Contact: Michelle Wong-Wilson
Telephone: (808) 933-4600
Fax: (808) 933-4602

Kauai

Kauai Office of Economic Development
4444 Rice Street, Room 230
Lihue, HI 96766
Contact: Glenn Sato
Telephone: (808) 245-7305
Fax: (808) 245-6479

Lihue Public Library
4391-A Rice Street
Lihue, HI 96766
Contact: Karen Ikemoto
Telephone: (808) 245-3617
Fax: (808) 246-0519

Lanai

Lanai Public and School Library
Fraser Avenue
P O Box A-149
Lanai City, HI 96763
Contact: Peggy Fink
Telephone: (808) 565-6996
Fax: (808) 565-6171

Maui

Hana Public and School Library
Hana Highway
Hana, HI 96713
Contact: Jeremy Kindred
Telephone: (808) 248-7714
Fax: (808) 248-7438

Kahului Public Library
90 School Street
Kahului, HI 96732
Contact: Lani Scott
Telephone: (808) 877-5048
Fax: (808) 871-9032

Maui Planning Department
Energy Division
250 South High Street
Wailuku, HI 96793
Contact: Kalvin Kobayashi
Telephone: (808) 243-7832
Fax: (808) 243-7634

Molokai

Molokai Public Library
Ala Maloma Street
Kaunakakai, HI 96748
Contact: Sri Tencate
Telephone: (808) 553-5483
Fax: (808) 553-5958

Oahu

Hawaii State Library, Document Center
Unit, 634 Pensacola Street
Honolulu, HI 96814
Telephone: (808) 586-3535
Fax: (808) 586-3584

Kahuku Public and School Library
56490 Kam Highway
Kahuku, HI 96731
Contact: Jean Okimoto
Telephone: (808) 293-9275
Fax: (808) 293-5115

Pearl City Public Library
1138 Waimano Home Road
Pearl City, HI 96782
Contact: Marilyn Van Gieson
Telephone: (808) 455-4134
Fax: (808) 456-4407

State of Hawaii, Department of Business,
Economic Development & Tourism
Energy Division, Publications Section
335 Merchant Street, Room 110
Honolulu, HI 96813
Contact: Maurice Kaya
Telephone: (808) 547-3800
Fax: (808) 587-3820

State of Hawaii
Department of Business, Economic
Development & Tourism
Geothermal Office
Financial Plaza of the Pacific
130 Merchant Street, Suite 1060
Honolulu, HI 96813
Contact: Dean Nakano
Telephone: (808) 586-2353
Fax: (808) 586-2536

State of Hawaii
Department of Business, Economic
Development & Tourism
Information Office
220 South King Street, Suite 1100
Honolulu, HI 96813
Contact: Marsha Anderson
Telephone: (808) 586-2405 or 586-2406
Fax: (808) 586-2427

State of Hawaii
Department of Business, Economic
Development & Tourism, Library
220 South King Street, Fourth Floor
Honolulu, HI 96804
Contact: Anthony Oliver
Telephone: (808) 586-2425
Fax: (808) 586-2452

U.S. Department of Energy
Pacific Site Office
Prince Kuhio Building
Room 4322
300 Ala Moana Boulevard
Honolulu, HI 96813
Contact: Eilieen Yoshinaka
Telephone: (808) 541-2563
Fax: (808) 541-2562

Waimanalo Public and School Library
41-1320 Kalanianaole Highway
Waimanalo, HI 96795
Contact: Nina O'Donnell
Telephone: (808) 259-9925
Fax: (808) 259-8209

Mainland

U.S. Department of Energy
Freedom of Information Public
Reading Room, Room 1E 190
1000 Independence Avenue, SW
Washington, DC 20585
Contact: Ed McGinnis
Telephone: (202) 586-6020
Fax: (202) 586-0575

U.S. Department of Energy
San Francisco Field Office Public
Reading Room
1333 Broadway
Oakland, CA 94612
Contact: Estella Angel
Telephone: (510) 273-4428
Fax: (510) 273-6316

ATTACHMENT 2 — Individuals and Organizations That Submitted Written Scoping Comments

When submitting written comments, some commenters failed to sign their submissions or to include any indication of the source of information provided. An attempt has been made, however, to acknowledge receipt of all written comments and to accurately summarize those comments regardless of their source. In addition, although the scoping period began on September 3, 1991 (with the publication of the Advance Notice of Intent), and ended on April 15, 1992 (comment deadline given in the Notice of Intent), some submissions were received outside of this period. For the Implementation Plan, comments received as late as August 30, 1992, were considered as part of scoping.

Scoping comments from federal agencies, State of Hawaii agencies, and Hawaii Counties are summarized by agency in Appendix B.

A city and state is given for each commenter if known.

Individuals

Don Abdul, Hilo, HI
Matthew K. Adolpho, Ho'olehua, HI
Thomas Aitken, Pahoa, HI
William and Rose Atkins, Pahoa, HI
Mary Jo Bafile, Pahoa, HI
Bonnie P. Bator, Kurtistown, HI
Robert Bethea, Hilo, HI
D. Hunter Beyer, Volcano, HI
Ian Bowman, Honolulu, HI
Burton Brees, Pahoa, HI
John A. Broussard, Kawaihae, HI
Cindy Bryan, Pahoa, HI
Janie Bryan, Kaunakakai, HI
Suzanne Ely Byrne, Hilo, HI
David A. Caccia, Honokaa, HI
Eleanor J. Cate, Hilo, HI
Sharon A. Clark, Honolulu, HI
L.A. Collins, Pahoa, HI
Sidney William Cook, Kamuela, HI
Pam J. Cooper, Pahoa, HI
John E. Crawford, Carson City, NV
John M. Davis, Mountain View, HI
Steve and Diane Davis, Pahoa, HI
Carla Deicke, Honolulu, HI
Leana Dumag, Kaunakakai, HI
Kaleoaloha English, Kaunakakai, HI
Sahoni English, Kaunakakai, HI
R. Ann Ernst, Pahoa, HI
Eileen Fiorentino, Kurtistown, HI
Denise Fleming, Keaau, HI
Ole Fulks, Keaau, HI
Brent Gallagher, Kurtistown, HI
Henry Gluckstern, Maplewood, NJ
Dave Gomes, Hilo, HI
Maja B. Gossom, Pahoa, HI
Regina Gregory, Honolulu, HI
Mary Groode, Kihei, HI
Kamuela Hamakua, Kaunakakai, HI
Robert A. Hamburg, Honolulu, HI
Lisa Hamilton, Hana, HI
Eric Hill, Honolulu, HI
Katherine Holford, Santee, CA
Brad Houser, Kailua-Kona, HI
Francis Howarth, Honolulu, HI
Albert Ia-ea, Kaunakakai, HI
Robert Kai Irwin, Honolulu, HI
Robert Jacobson and Julie Hedgecock-Jacobson, Kurtistown, HI
Luana Jones, Pahoa, HI
Cynthia K. Kanoholani, Honolulu, HI
Mahealani Kawikuamookekuaokalani-Henry, Pohoiki, HI
Kekau
Andrew C. Kier, Pahoa, HI
Pat Kikukawa, Kaunakakai, HI
Rona Lee Kleiman, Pahoa, HI

Fred J. Koehenen, Hilo, HI
Steven Krawn, Pahoa, HI
Charles Lamoureux, Honolulu, HI
Anne Lee, Hilo, HI
Randy Lee, Pahoa, HI
Stephen Lewis, Pahoa, HI
Aileen Lum, Hilo, HI
Dan and Lydia Makuakane, Pahoa, HI
Malia
Kalai Malin, Kaunakakai, HI
Penny Rawlins-Martin, Kaunakakai, HI
Carl and Carlyle Meierdiercks, Pahoa, HI
William Merwin, Haiku, HI
Mildred Mims, Pepeekeo, HI
Peter R. Ministero, Pahoa, HI
Robert Mowris, Berkeley, CA
Kevin E. O'Connell, Pahoa, HI
Noreen Parks, Keaau, HI
Gregory Pommerenk, Pahoa, HI
Kilia Purdy, Kaunakakai, HI
Jan L. Reichelderfer, Kailua, HI
Clement Reyes Jr., Kaunakakai, HI
Herbert M. Ritke, Pahoa, HI
Henry Ross, Kapaau, HI
Terri Scott, Kurtistown, HI
Dennis Sevilla, Honomu, HI
Christiane Schafer, Ho'olehua, HI
Penny Shaver, Pahoa, HI
Joseph Shaver, Pahoa, HI
Stephanie Shelofsky, Pahoa, HI
Megan Simpson, Redway, CA
Rene Siracusa, Pahoa, HI
Dian Smith, Pahoa, HI
William D. Smith, Wailuku, HI
Jim Snyder, Hilo, HI
Sean Stehura, Keaau, HI
Elizabeth Ann Stone, Naalehu, HI
Alice Suncloud, Pahoa, HI
Sarah Sykes, Kaunakakai, HI
Dr. Donald Thomas, Volcano, HI
Kalai Ualin
Bettie Van Overbeke, Pahoa, HI
Mr. and Mrs. Arlan Vierra, Keaau, HI
Pat Wilde, APO Area Pacific
James V. Williamson, Kihei, HI
Janice Ola Wilson, Pahoa, HI

Organizations

Aina Realty, Pahoa, HI; Francois L'Orange
AT&T, Morristown, NJ; Eric S. Wagner
BHP Petroleum, Pacific Resources, Honolulu, HI
Big Island Papaya Growers Association, Pahoa, HI; Delan Perry
Big Island Rainforest Action Group, Pahoa, HI; Russel Ruderman
Blue Ocean Preservation Society, Haiku, HI; Carl Freedman
Campbell Estate, Honolulu, HI; Clint Churchill
Citizens Advocating Responsible Education, Honolulu, HI; Wally Bachman, Science Advisor
Citizens for Responsible Energy Development, Mountain View, HI; Earl Dunn
Darby & Associates, Kailua, HI; Ron Darby
ECO Productions, Honolulu, HI; Dr. Sheila Laffey
Environmental Hawaii, Kailua, HI; Patricia Tummons
FB&D Technologies, Inc., Houston, TX; Alan Parolini
Global Environmental, Sacramento, CA; James A. Roberts
Goddard and Goddard Engineering, Lucerne, CA; Wilson Goddard
Greenpeace Hawaii, Hilo, HI; Denver Leaman
Greenpeace and the Rainforest Action Network, Honolulu, HI; Annie Szvetecz
Hana Community Association, Hana, HI; Dawn Lono
Hawaii Community College, Hilo, HI; Fred D. Stone
Hawaii County Economic Opportunity Council, Hilo, HI; Max Goldberger
Hawaii County Energy Advisory Commission, Hilo, HI; Francis Pachecho
Hawaii-La'i'ei Kawaii Assoc., Ka'awala, HI; Jim Anthony
Hawaii Island Geothermal Alliance, Hilo, HI; June Curtiss, Randolph Ahuna

Hawaii Speleological Survey, Hilo, HI; William R. Halliday
Hawaiian Dredging & Construction Co., Honolulu, HI; Frank A. McHale
Hawaiian Electric Company, Inc., Honolulu, HI; Dan Williamson, George T. Iwahiro, Executive Director
International Longshoremen and Warehouse Workers, Local 142, Hilo, HI; Fred Gladones
Ka Lahui Hawaii O'ahu, Honolulu, HI; Ao'pohaku Rodenhurst
Kanoelehua Industrial Area Assoc., Hilo, HI; Randolph Ahuna
Kapoho Community Association, Pahoa, HI; Barbara Bell, Jane Hedtke, Jennifer Perry
Kipahulu Community Assoc., Hana, HI; Rich Von Wellsheim
Kohala Ranch Property Owners Assoc., Kawaihae, HI; Kelley Pomeroy
Kona Palisades Estate Community Association, Kailua-Kona, HI; Roy Mushrush
Lani Puna Gardens Assoc., Pahoa, HI; Aurora Martinovich
Los Alamos Science Student Program, Los Alamos, NM; Alverton A. Elliot
Malu Aina Center for Non-violent Education Action, Kurtistown, HI; Jim Albertini
Maui Tomorrow, Wailuku, HI; Anthony Ranken
Mid-Pacific Geothermal, Inc., Honolulu, HI; Rod Moss
Molokai Cares, Kaunakakai, HI; Lyn S. and William Bonk, Crystal Egusa
National Speleological Society, Huntsville, AL; John P. Scheltens
Native Hawaiian Advisory Council, Honolulu, HI; Elizabeth Pa-Martin
Native Hawaiian Legal Corporation, Honolulu, HI; Paul F. N. Lucas, Staff Attorney
Natural Resources Defense Council, Honolulu, HI; Clyde S. Murley
Northwest Economic Associates, Vancouver, WA; Robert McKusick
Oceanic Cablevision, Honolulu, HI; Don E. Carroll
Orchidland Community Assoc., Keaau, HI; Sherri Moore
Pele Defense Fund, Volcano, HI; Ralph Palikapu Dedman, Emmett Aluli
Progressive Economic Alliance Cultivating Energy, Kula, HI; Paul J. von Hartmann
Puna Advisory Council, Pahoa, HI; Toby Hazel
Puna Community Council, Keaau, HI; Ed Clark, William B. Snorgrass
Puna Geothermal Venture, Hilo, HI; Steve Morris, Maurice A. Richard
Puna Orchards, Inc., Pahoa, HI; Gary W. Barnett, V.P. & Manager
R.A. Patterson & Associates, Kailua, HI; Ralph A. Patterson
Rainforest Action Network, Honolulu, HI; Annie Szvetecz
Sane Assessment of Geothermal Energy, Wailuku, HI; Stephen Moser
Sierra Club of Hawaii, Honolulu, HI; Scott Derrickson, Energy Affairs Advisor, Nelson Ho
Sierra Club Legal Defense Fund, Honolulu, HI; Paul P. Spaulding III
State Senator Andrew Levin; Honolulu, HI
State Senator Rich Reed; Honolulu, HI
State Senator Richard Matsuura; Hilo, HI
Stryker Werner Associates, Inc., Honolulu, HI; Karlton Tomomitsu
True Geothermal Energy Co., Honolulu, HI; Alan Kawada
University of Hawaii, Honolulu, HI; Hawaii Natural Energy Inst., Harry Olson, Don Thomas, Gary McMurtry
West Hawaii Sierra Club, Kailua-Kona, HI; Jay Hanson

Videos

Several videos were submitted by commenters. These are

- "No on Geothermal—The People's Decision," Pan Productions, Maui, Hawaii, 1990, submitted by Mary Groode. The video provides a general introduction to geothermal development in Hawaii; describes opposition to geothermal development; identifies opponents' major concerns (i.e., health effects and impacts to the rain forest).
- "Pele's Appeal," "Bulldozers in Paradise," "Geothermal: A Risky Business," and "Heated Issue." These videos identify the major concerns of opponents to geothermal as being the destruction of the rain forest, potential health impacts to nearby residents, and the desecration of Pele; they also document opposition to geothermal development with footage of protest rallies and pickets.
- MacNeil-Lehrer news hour report on HGP, broadcast January 14, 1992, on PBS.

APPENDIX B

SUMMARY OF FEDERAL, STATE, AND COUNTY AGENCY WRITTEN SCOPING COMMENTS

This appendix summarizes written scoping comments that were received from federal, State, and County agencies concerning the Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS).

COUNTY AGENCIES

County of Hawaii

In a March 6, 1992, letter accepting cooperating agency status and in an August 3, 1992, review of the working draft Implementation Plan (IP), the County of Hawaii requested that the following issues be considered in the EIS:

Socioeconomics. Impacts of industrialization of the Island of Hawaii (resulting from geothermal development and power availability) should be investigated in the EIS. An analysis of project costs should include consideration of relocating nearby residents and insurance costs during construction and operation. Utility rates with geothermal development should be compared to rates from alternatives.

Air Quality. The EIS should assess air quality effects of venting during power outages (grid failure) and consider problems associated with fixed monitoring systems.

Health and Safety. The EIS should consider effects from hydrogen sulfide (H_2S) and other pollutants at various concentrations and from possible synergistic effects of pollutants.

Ecological Resources. Impacts of emissions on species other than humans should be considered.

Water Resources. The "fate" (i.e., migration) of reinjected fluids and the impacts thereof should be examined in the EIS. Sources and amounts of well-quenching water should be identified.

Land Use. The EIS should assess impacts of incompatible land uses.

Policy. Federal liability in federally funded projects should be discussed.

Other. The EIS should investigate the interconnection of the Island grid and the interisland grid and discuss priorities under various load-shedding scenarios.

County of Maui

In letters of October 1, 1991, and April 13, 1992, and in responses to the working draft IP, the County of Maui requested that the EIS consider all potential impacts associated with the overland transmission corridor, including possible effects on land use, ecological resources, water resources, scenic resources, cultural and archaeological resources, health and safety, particularly as related to the electromagnetic field, and economic issues, particularly effects on property values. If cable landing on Lanai is a reasonable alternative, the EIS should consider these issues as they relate to Lanai.

The EIS should consider the underwater cable's potential economic, cultural, archaeological, and ecological impacts on the reef and fishpond resources along the south shore of Molokai. Lastly, the EIS should reflect recommendations made in the community plans.

STATE AGENCIES

State of Hawaii

The State of Hawaii offered comments in response to the Advance Notice of Intent (ANOI), the Notice of Intent (NOI), the invitation to become a cooperating agency, and in reviewing the working draft IP. The communications are from the Office of State Planning, the Department of Business and Economic Development, the Office of Hawaiian Affairs, and the Division of Consumer Advocacy and are dated September 26 and September 30 of 1991; March 2, March 23, April 2, April 8, and July 24 of 1992.

Energy Policy. The State of Hawaii would like the EIS to recognize that its current focus to support small-scale geothermal development to satisfy only the Island of Hawaii's power needs differs from the proposed action in the EIS. The EIS should address the State's goal of achieving a dependable, efficient, and economic statewide energy system and reducing its dependency on oil.

Federal, State, and local governments and geothermal developers. The State recommends a discussion of the relationship between Phases 3 and 4 and existing geothermal projects be included in the EIS. The EIS should discuss permitting for these projects and their supporting environmental documents. The State does not consider these projects as part of the HGP. The EIS should also include information about relations between the federal, State, and local governments, developers, and citizens.

Land Use. The EIS should at least estimate the amount of land area that would be required for such a large operation. The discussion should indicate whether the total acreage needed will be concentrated in one central area or scattered throughout the Island of Hawaii. Also, a map should be included to show possible sites for power stations and the geothermal well fields. Other concerns are the implications of land use after the plant is closed. The EIS should explain what will happen to the sites after the plants have surpassed their energy-generating capacities and when that is likely to happen. The EIS should examine the compatibility of geothermal development with existing and planned land uses. The EIS should address the purpose and objectives of the State statute on geothermal resource subzones and compatibility with existing land use.

Air Quality. The EIS should also discuss the effects of well field construction, well venting, accidents, and the smell of hydrogen sulfide (H_2S) and other gases. Although the volcano produces H_2S and causes acid rain effects, H_2S concentrations may be higher in localized areas near the plants. A monitoring and remediation program should be described. A map should also be included to indicate those areas and communities likely to be impacted. People may be able to detect H_2S levels below instrument detection. The relative air quality impacts of geothermal compared to those of possible alternative energy technologies need to be addressed.

Water Resources. The EIS should evaluate the effects of H_2S and other airborne emissions, not just solid and liquid wastes as proposed in the prep notice, on groundwater and surface water (fresh and marine). Water catchment systems should also be considered a potentially affected resource, and the effects of well venting and accidents on them should be determined. The nonpoint source pollution impacts on water quality should also be described. And the proposed monitoring and remediation program should be included and described.

Ecological Resources. The effects from the cable on all marine fauna (not just benthic) including Hawaiian monk seals need to be evaluated. There may be water column impacts, fisheries impacts, impacts on surf sites, swimming, and boating. Reefs, beaches, and other natural resources such as limu may be affected. A monitoring program should be developed to evaluate effects on ecological resources on an ongoing basis throughout the duration of the project. Baseline studies and stress indicators should be identified for monitoring. The EIS should also include a description of the impacts on endemic flora and fauna. Acid rain effects on ecological resources should be considered.

Geological Resources. The EIS should evaluate shoreline and nearshore impacts from the cable, including shore erosion, interference with currents and sand transport, reefs, and surf sites. Impacts from the long-term presence of the cable should be included and not be limited to placement and construction activities.

Noise. The EIS should evaluate long-term effects on flora and fauna and their habitat, as well as on nearby residential communities.

Health and Safety. The EIS should also include long-term health effects due to chronic exposure to noise, air pollution, water pollution, electromagnetic field, and psychological stress incurred from evacuations and the threat of evacuations. The physical and psychological welfare of residents in nearby communities must be evaluated. Public health monitoring should be provided.

Socioeconomic. The effects of lifestyle changes and disruption need consideration. Frequent evacuations and the threat of evacuations have socioeconomic impacts on neighboring communities. The EIS should also include a cost/benefit study that analyzes the likelihood of disruption or destruction of facilities by volcanic activity. Effects on utility and tax rates should be examined, as should impacts on farm employment resulting from loss of farm workers to industrial and tourism sectors.

Cultural Resources. A discussion of the impacts the project may have on the Native Hawaiian religion should be included. The EIS should reference prior court decisions concerning geothermal development and religion.

Scenic and Visual Resources. The EIS should evaluate the appropriateness and compatibility of the plants, roads, transmission lines, and cable with the surrounding environment. A view plane study may be helpful in illustrating the impacts on the scenic and visual resources of the area.

Alternatives. Clear definitions of alternatives should be provided in the EIS. Geothermal energy for the Big Island only should be one alternative. A thorough evaluation of all other available alternative energy technologies and their feasibilities should be done, including consideration of an aggressive conservation program. The EIS should examine impacts of alternative methods of disposing geothermal fluids, including reinjection, surface impoundment, and discharge to surface water bodies. The State Office of Hawaiian Affairs questioned the viability of several alternatives proposed by the public in scoping.

A summary of all new field studies conducted for the EIS and other studies contributing to the EIS, and a comprehensive review of the Phase 4 impacts at all of the possible sites should be included in the EIS.

Federal, State and Local Government and Geothermal Developers. One State office was concerned about the EIS treatment of scoping comments relating to "lack of government concern" and "collaboration between government and developers."

FEDERAL AGENCIES

National Marine Fisheries Service

In a March 6, 1992, letter and in comments on the working draft IP, the National Marine Fisheries Service (NMFS) characterized issues related to the underwater cable as important and sensitive. Two specific issues were identified for consideration in the EIS: impacts of the electromagnetic field on marine biota and impacts from trenching and laying transmission lines on nearshore marine habitats, including coral reefs.

National Park Service

In letters of February 24, 1992 [Hawaii Volcanoes National Park (HVNP)], February 28, 1992 [Pacific Area Office (PAO)], April 14, 1992, and in IP reviews of July 14, 1992 (HVNP), and July 17, 1992 (PAO), the National Park Service (NPS) offered the following comments.

The EIS should address potential impacts to NPS, a Prevention of Significant Deterioration Class I area. NPS is concerned about the potential for air contamination that might affect native plants and animals or might adversely affect the health of visitors and employees. An unbiased analysis of point

source emissions and an evaluation of impacts resulting from emissions of H_2S and criteria and non-criteria air pollutants and particulate emissions should be conducted. Cumulative and long-term effects of emissions and electromagnetic fields should be considered.

The EIS should analyze potential loss of Air Quality Related Values, including vista degradation, noise, and odors, which are important to the NPS's mandate to manage the backcountry for wilderness values. Light contamination should be considered, as should cumulative impacts of noise (including that generated by scenic tour aircraft). Mitigation measures should be discussed.

NPS expresses concern over the introduction of industrial land use in a region characterized by conservation, agricultural, and rural land uses. The EIS should include regional land-use issues, including maintaining buffers around State and national protected areas.

Impacts to the threatened Newell's Shearwater, recently spotted near HVNP, from lights, noise, drill rigs, overhead wires, fences, and emissions should be considered.

NPS reports that emergency remedies to thwart lava flow are not allowed in HVNP.

NPS requests that energy conservation be considered as an alternative.

U.S. Army Corps of Engineers (COE)

In its August 26, 1992, review of the working draft IP, COE noted that it has no plans to do any work on describing the rain forest and will not develop a Geographic Information System (GIS) base for wetlands. In addition, COE raised the following points:

- COE will not consult with DOE, Soil Conservation Service, U.S. Geological Survey, or U.S. Fish and Wildlife Service in the wetland delineation efforts and will not consult with those agencies regarding wetland significance or values as it is DOE's responsibility to carry out these consultations. DOE will make a detailed assessment to satisfy 404(b)(1) guidelines for the discharge of dredged or fill material. DOE should also be aware that the 404(b)(1) sequence involves avoiding fill, minimizing fill, and mitigating for fill.
- DOE must initiate Section 106 Historic Coordination for any discharge of dredged or fill material, as well as for the geothermal development.
- In Table 4.2 of the IP, U.S. Environmental Protection Agency should be added to COE 2; and FWS, NMFS, and Advisory Council on Historic Preservation should be added to COE 6. COE permit may also involve endangered species and historic sites.
- The EIS milestone schedule is very tight. Our experience indicates that 18 months from start of writing to decision point is very fast. COE may not be able to perform with any accuracy with this schedule.

U.S. Environmental Protection Agency (EPA)

EPA responded on April 15, 1992, to the NOI with a three-page letter with nine pages of comments covering nearly the full range of technical issues expected to be addressed in the EIS. Generally, EPA's recommendations about the topics to be covered in the EIS are consistent with DOE's. EPA also raises several issues — primarily regarding procedures and alternatives — which relate to DOE policy. Additional comments were made in their August 18, 1992, review of the working draft IP.

Policy

1. EPA requests that DOE publish a notice of a draft IP and solicit comments on the decisions DOE considers to be within the scope of the EIS. This procedure will provide a chance for public comment prior to the draft EIS (DEIS). EPA believes that DOE intends to use the IP process to make substantive decisions regarding preparation of the DEIS.

Further, EPA states that making the final IP available in public reading rooms would eliminate any further public input into DOE decisions until the DEIS is published, scheduled for early 1993.

2. DOE should be ready to prepare a supplemental environmental document if the decision about specific plant locations is made after the EIS is completed and the decision makes substantial changes in the proposed action or if the decision is relevant to the environmental concerns of the action or its impacts. The EIS should acknowledge the need for environmental documents for specific plants and include plans to prepare them in the EIS.
3. An EIS completion date of "early 1993" should not be cast in concrete; doing so may preclude important studies. Time should be allowed for essential studies to go forward.
4. DOE should conduct scientifically credible studies in a realistic time frame.

Alternatives

1. Objectives for alternatives, as well as the proposed HGP, should be stated clearly and addressed (e.g., partial federal funding for phase 3, reducing reliance on imported oil and increasing the State's energy self-sufficiency, meeting the State's future energy needs). The need for the HGP must be explained — the rationale for the need for geothermal power vs. alternative sources of energy or conservation efforts. The need for 500 MW(e) total or 100 MW(e) on the Big Island should be verified.
2. The EIS should place as much emphasis on alternatives to geothermal development, such as conservation, wind or solar, as it does on the alternative ways to accomplish the geothermal development (e.g., sites and routes).
3. Alternatives should include alternative energy sources, conservation, and how actions other than federal funding would affect HGP development.
4. Consideration should be given to alternatives to geothermal (e.g., sites and routes) and alternative drilling and development alignments for geothermal to minimize environmental and health and safety impacts.
5. Whether oil imports will be reduced because of geothermal development should be ascertained.
6. Reinjection alternatives should be considered.
7. The EIS should address downscaled geothermal program combined with other energy sources (e.g., solar and wind).
8. The EIS should compare per-capita energy consumption in Hawaii relative to other areas and states.
9. The EIS should consider environmental hazards for each alternative energy source.
10. The EIS should discuss pollution prevention measures for geothermal well sites, alternatives to drilling, and development of geothermal resources.
11. The EIS should identify DOE's perception of federal government's role in geothermal development if DOE does "not partially fund" HGP.
12. The EIS alternatives should be distinctly defined to provide a clear basis for decision makers and the public to choose among options.

Cumulative Impacts

1. The EIS should consider cumulative impacts with respect to the past, present, and reasonably foreseeable future actions. Measures to eliminate, minimize, and/or mitigate adverse cumulative impacts should be considered.

Mitigation

1. The EIS should discuss all relevant and reasonable mitigation measures, even if

they fall outside of the jurisdiction of the lead agency.

Air Quality

1. The EIS should consider background ambient air quality.
2. The EIS should address nonattainment of air-quality standards.
3. The EIS should consider the Clean Air Act as amended, which addresses the need to use the most recent and applicable data.
4. The EIS should characterize and quantify all expected air emissions, including hazardous air pollutants.
5. The EIS should consider adverse meteorological conditions that could affect air quality.
6. The EIS should identify sources of fugitive emissions and identify mitigation measures to lessen fugitive emissions.
7. The EIS should consider air-quality-monitoring programs.
8. Mitigation for air quality should not be limited to episodes where standard are exceeded.

Water

1. Identify wetlands and describe the extent of impacts, adhering to the principals set forth in the Clean Water Act, Section 404.
2. Consider erosion potential and control measures.
3. Consider surface- and groundwater-monitoring programs and actions that should be taken if unacceptable conditions occur.
4. Address the detection of well casing leakage and tests to ensure well integrity.
5. Address thermal change and measures to prevent such impacts.
6. Consider water sources necessary to support drilling activities.
7. Consider water quality, geohydrology, and subsurface lithology.
   (a) For subsurface lithology, pay special attention to cinder beds, lava tubes, and fractures that would allow migration of geothermal brine from the surface into groundwater (interconnections between surface- and groundwater).
   (b) Consider the flow direction of groundwater.
   (c) Consider effects of reinjection on seismicity and groundwater flow.
8. Address impacts to the ocean.
9. Identify the constituents of the geothermal brine and chemical constituents of the spent geothermal brine.
10. Identify (on a map) wells within 1 mile of the outer boundary of the HGP area.
11. Work closely with EPA's Underground Injection Control program to identify and protect underground sources of drinking water.
12. Consider EPA's reinjection permit.

Ecological Resources

1. Discuss plans for pollution prevention, maintenance of biodiversity, and minimization of impacts to the environment, including methods of controlling invasion of alien species.
2. Instead of discussing impacts on individual species, discuss ecosystem-level impacts from deforestation and the loss of habitat and from construction and maintenance of the underwater cable. Also, consider impacts on the natural mosaic of the landscape, which is fundamental to the functions of the rain forest.
3. Quantify the amount of rain forest expected to be lost and characterize rain forest flora.
4. Describe land- and ocean-based resources that would be affected by the construction and maintenance of transmission lines and cables.
5. Discuss electromagnetic fields and the effects of these fields on land- and ocean-based fauna.

6. Identify threatened, endangered, and candidate plant and animal species affected by the proposed action and alternatives. Discuss impacts and mitigation.
7. Identify impacts to riparian and ocean habitats and describe management practices to eliminate or minimize these impacts.
8. Explore options to consolidate geothermal activities to minimize disruption to the rain forest and other sensitive ecosystems.
9. Consider "devegetation" areas of the tropical rain forest.
10. Provide for monitoring of erosion and sedimentation control to ensure adequacy of these activities.

Hazardous Materials and Wastes

1. Identify all hazardous materials expected to be used in geothermal development.
2. Identify appropriate permits.
3. Identify constituents in drilling muds and geothermal fluids.
4. Characterize the proposed project's anticipated waste stream.

Health and safety

1. Discuss relative risks and impacts of natural disasters on the operation, control, and transmission technology of the proposed HGP.
2. Identify measures to protect the health and safety of workers and the public from development, operations, and potential accidents.
3. Analyze all potential equipment failures that could result in steam or other emissions venting.
4. Identify and characterize all materials that could be released into the environment.
5. Discuss the human health impacts of electromagnetic fields.

Emergency Preparedness

1. Detail emergency planning and notification procedures in response to geothermal releases.
2. Consider "community right-to-know" provisions of the Superfund Amendments and Reauthorization Act Title III in emergency preparedness planning.

Noise

1. Noise should be assessed in the EIS.
2. Describe noise reduction measures during all stages of geothermal development and operation.

Socioeconomic Impacts

1. The following socioeconomic issues should be addressed: a) changes in employment and population and the resulting demand on housing and transportation; b) worker availability and potential places of residence; and c) indirect impacts on islands receiving geothermal energy.
2. Factor long-term costs of the project, including replacement wells and additional wells.

Cultural Resources

1. Consider the National Historic Preservation Act of 1964, particularly compliance with Section 106.
2. EPA advises close cooperation with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation.
3. Consider the possibility of increased vandalism due to enhanced access into the proposed geothermal resource area and identify proposed measures to minimize such impacts.

Background/Information Resources

1. The U.S. Department of Interior Final EIS for Geothermal Leasing Program (1973) was identified as a resource that should be considered in preparing this EIS. This document addresses environmental impacts and mitigation measures.

Other

1. Provide maps and locations of production and injection wells, roads, piping, and power transmission lines, hazardous material storage areas, earthquake fault zones, and brine impoundments (also, identify the monitoring process).
2. Provide procedures for well-site location and construction, rehabilitation of land damaged by construction activities, plans to protect existing natural resources, and maintenance activities.
3. Identify measures to replace wells whose production has decreased.
4. Discuss what will be done with exploratory wells.
5. Explain relationships among federal, State, and local governments and private developers now with the HGP.
6. Address impacts on speleology.

U.S. Fish and Wildlife Service

In an undated response to the NOI and communication on February 27, 1992, and August 26, 1992, the FWS stated that the EIS should assess effects of fragmentation, predation and competition by exotic species to endangered and threatened species. Impacts of acute and chronic releases of H_2S and other pollutants on wildlife and vegetation should be assessed. FWS recommends an ecosystem-level analysis to determine the effects on the integrity of the native rain forest. The EIS should determine effects of reinjection of geothermal fluids on groundwater flowing into anchialine pools along the Kapoho coastline.

The FWS recommends the following specific studies to assess impacts: studies of the distribution and abundance of the hoary bat; native forest birds, particularly the 'O'u; endangered and candidate plant species; and invertebrates (i.e., endemic land snails and insects that are the food base of native birds). A wetlands study and a post-project analysis of effects of the True/Mid Pacific geothermal facility are also recommended.

U.S. Geological Survey

The USGS provided the following comments in a March 1992 letter. On August 13, 1992, USGS reported no comment on the working draft IP.

The EIS should examine allocation of groundwater resources and the effect of geothermal fluids and waste waters on aquifers.

USGS recommends that eruption conditions be used as baseline data against which expected air emissions can be judged.

USGS asserts that volcanic eruption frequency, lava flow, and airborne lava, as well as deformation hazards from the movement of liquid magma, present hazards for wells, pipelines, generating facilities, and transmission lines. The EIS must consider natural and induced seismic hazards. USGS acknowledges that responsibility for induced seismic hazards is ambiguous.

The EIS should identify the most likely land source for future undersea slides. Economic impacts resulting from potential damage to the undersea transmission cable by rockslides, sand slides, and turbidity-current deposits should be considered in the EIS.

USGS also reviews ongoing research and existing documents and data bases that are relevant to these issues.

U.S. Navy

The U.S. Navy responded on May 1, 1992, to the Notice of Intent and expressed concerns about the submarine power transmission routes, electrical interferences emanating or caused by the cables, and any effects to shipboard operations.

APPENDIX C

OUTLINE FOR THE HAWAII GEOTHERMAL PROJECT ENVIRONMENTAL IMPACT STATEMENT

This appendix presents an outline of the *Environmental Impact Statement for the Hawaii Geothermal Project.* The outline is subject to change as preparation of the EIS progresses.

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- ARCHAEOLOGICAL ASSESSMENT
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APPENDIX D

GLOSSARY OF TERMS USED IN THE IMPLEMENTATION PLAN

aesthetic—related to pleasing the senses, particularly involving visual beauty.

alternating current (ac)—an electric current that reverses direction at regular intervals, usually many times per second.

ambient—encompassing atmosphere; background characteristics.

anchialine ponds or pools—brackish water bodies (transitional between marine and fresh) containing unique flora and fauna.

aquifer—permeable rock, sand, or gravel capable of yielding a large quantity of groundwater.

attainment—meeting environmental standards (e.g., National Ambient Air Quality Standards) set forth by law.

benthic—occurring at or near the bottom of a body of water.

biodiversity—a wide variety of organic life; diverse animal and plant types.

brackish—water that is intermediate in total dissolved salts between marine (~35,000 milligrams per liter) and fresh water (<1,000 milligrams per liter).

catchment basin—a surface or rain water collection facility.

ciguatera—a type of fish poisoning that can occur following ingestion of certain tropical reef and marine species. Ciguatera is found in coral reef belts, is more common in nonmigratory fishes around islands, and is probably due to a combination of several toxins.

climatological—relating to climates and their phenomena.

conservation—a careful preservation and protection of the environment; measures taken to minimize energy consumption.

conversion system—facilities for converting electricity from direct current (dc) to alternating current (ac) and vice versa.

cooperating agency—as defined by CEQ regulations (40 CFR Part 1501.6), any agency, other than the lead agency, that has jurisdiction by law or special expertise with respect to any environmental issue.

cumulative impacts—result from incremental impact of an action when added to other past, present, and reasonably foreseeable future actions.

demand-side management (DSM)—various conservation strategies that reduce electricity demand by improving energy efficiency of consumer equipment and buildings.

deterministic approach—(in risk analysis) determining the magnitude of the maximum credible natural phenomena event (e.g., hurricane, volcanic eruption, earthquake) without regard to its probability of occurrence. An approach to risk analysis that is often used when probabilities are highly uncertain.

developer—one who invests capital to develop new processes, equipment, technologies, or resources such as geothermal facilities.

dewatering—removing or draining water from an excavation, enclosure, or structure; also, removal of water from solid material.

dielectric—a material that is an electric insulator or in which an electric field can be sustained with a minimum dissipation of power.

direct current (dc)—electric current that flows in one direction only, as opposed to alternating current.

dose-response—measure of sensitivity of a biological system to a stimulus.

drilling mud—a mixture of water, bentonite, and barite slurry used for drilling wells; circulating drilling mud is used to bring drill cuttings to the surface and to exert back-pressure in the hole.

ecosystem—a functional system that includes the organisms of a natural community together with their environment.

electrical load (demand)—the electricity consumption by one or more consumers.

electromagnetic field (EMF)—The energy field surrounding electrical charges and currents. In the context of this report, EMFs result from voltages and currents in transmission lines. Radio waves, microwaves, visible light, and those fields from transmission lines are all forms of electromagnetic fields.

endangered species—a species threatened with extinction.

endemic—belonging to or native to a particular people or country.

ethnobotanical—relating to how cultures use plants and plant products; the plant lore of a people.

ethnographic—relating to the systematic recording of human cultures.

ethnohistorical—relating to the study of the development of cultures; the interpretation of the significance of archaeological findings by means of documentary material.

floodplain—area that is periodically inundated by surface waters.

fugitive emissions—non-process emissions (e.g., leaks from pipe joints, dust from traffic on roads).

geodetic—relating to or determined by geodesy, a branch of mathematics that determines the size and shape of the earth and the exact points on its surface.

geologically active—anything subject to change over geologic time; usually refers to land mass movements.

geothermal extraction—recovery of natural heat from rock and fluid beneath the earth's surface.

geothermal power—geothermal energy converted to electrical energy.

geothermal resource—natural heat from the earth that can be economically converted to electrical energy or used directly for heating buildings.

gross capacity—total power generated by a facility.

ground water—all subsurface water, especially that part in the zone of saturation.

grubbing—clearing stumps and roots by digging.

hydrogeology—the science dealing with the occurrence of ground water and its utilization.

hydrology—the science of the occurrence, circulation, distribution, and properties of the waters of the earth and their reaction with the environment.

indigenous—having originated in or naturally occurring in a particular region or environment.

injection well—a well into which water, spent brines, or gases are pumped in order to maintain subterranean pressure or to dispose of waste fluids.

integrated resource planning (IRP)—an approach that attempts to find the lowest cost for meeting energy demand through increasing supply or improving end-use energy efficiency.

invertebrate—species that lack a spinal column, including insects, worms, and the like.

megawatts electrical generation [MW(e)]—1,000,000 watts (1 million watts) electrical generation.

meteorological—of or relating to the science that deals with the atmosphere and its phenomena.

milestone—a significant point in development with the passage of time.

mitigation—refers to measures implemented to reduce an environmental impact to acceptable levels.

non-native species—a species that does not occur naturally where it is found.

particulate—fine solid particle that remains individually dispersed in gases and stack emissions.

petroleum refining residuals—high boiling fraction remaining after removal of more volatile liquids.

potable—refers to water that is suitable for human ingestion.

production well—a well from which geothermal brines or steam is extracted.

rain forest—a tropical woodland with an annual rainfall of at least 100 inches and marked by lofty broad-leaved evergreen trees forming a continuous canopy.

reinjection—the return of water, spent geothermal brines, or gases via an injection well after use in a power plant.

renewable energy—nondepletable energy (e.g., solar, wind).

rift—(geology) refers to (1) the boundary between crustal plates that are separating from one another; and (2) fissures that radiate outward from a volcano into which magma (lava) is injected.

scoping process—refers to the methods by which public and agency input are solicited regarding environmental issues to be addressed in an environmental impact analysis.

seismic—pertaining to energy released by ground motion.

silicates—common minerals in the earth's crust consisting of silicon and oxygen in ratios varying from 1:2 to 1:4.

socioeconomics—relating to or involving a combination of social and economic factors.

solid dielectric cable—one whose insulator is one of several solid materials such as ceramic, mica, glass, plastic film, or paper.

stagnation—absence or cessation of movement, growth, or activity.

subsidence—(geology) lowering of the land surface usually by withdrawal of fluids from below.

subsistence—the condition of remaining in existence; the minimum (as food or shelter) necessary to support life.

subzone—Geothermal Resource Subzone (GRS) (there are 3 subzones: upper, middle and lower) in Kilauea's east rift geothermal resource zone.

synergistic effects—an action where the total effect of two or more components in a mixture is greater than the sum of their individual effects.

tephra—denotes all rocks composed of fragmented volcanic products ejected during eruption. Used in this document to denote the portion of lava released airborne during eruption.

transport pathways—the paths (routes) that contaminants take between contaminant sources and receptors; these contaminant paths may be airborne, water-borne, or groundwater-borne.

tsunami—a long-period sea wave produced by an earthquake, submarine volcanic eruption, or other submarine disturbance.

vog/volcanic smog—a natural aerosol containing a mixture of volcanic dust particles and volcanic gases, mainly water vapor, carbon dioxide, and sulfur dioxide.

volcanic dike—a tabular body of rock, congealed from magma (lava) injected into fissures or rift zones.

well blowout—uncontrolled venting of liquids and/or gases from a well.

well casing—tubing inserted into a drill hole to serve as a liner.

well quenching—introducing cool water into a well that is out of control to reduce the production of steam, thereby bringing the well under control.

well venting—release of well fluid to the atmosphere, either controlled or uncontrolled.

wetlands—areas such as swamps, marshes, bogs, and estuaries; to be considered under the "wetlands" Army Corps of Engineers legal definition, an area must possess three characteristics: hydrophytic vegetation, hydric soils, and wetland hydrology.

APPENDIX E

ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS

ac	alternating current
ACHP	Advisory Council on Historic Preservation
ANOI	Advance Notice of Intent
CCH	City and County of Honolulu
CEQ	President's Council on Environmental Quality
CFR	*Code of Federal Regulations*
CG	U.S. Coast Guard
COE	U.S. Army Corps of Engineers
DBEDT	(State of Hawaii) Department of Business and Economic Development and Tourism
dc	direct current
DLNR	(State of Hawaii) Department of Land and Natural Resources
DOE	U.S. Department of Energy
DOH	State of Hawaii Department of Health
DOI	U.S. Department of the Interior
DSM	demand-side management
EIS	Environmental Impact Statement
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency
ESCP	Erosion and Sedimentation Control Plan
Fed Reg.	*Federal Register*
FHA	U.S. Federal Highway Administration
ft	feet
FWS	U.S. Fish and Wildlife Service
GIS	Geographic Information System
GRS	geothermal resource subzone
H_2S	hydrogen sulfide
HC	Hawaii County
HDWC	Hawaii Deep Water Cable Program
HECO	Hawaiian Electric Company, Inc.
HELCO	Hawaii Electric Light Company, Inc.
HGP	Hawaii Geothermal Project
HRS	Hawaii Revised Statutes
HVAC	high-voltage alternating current
HVDC	high-voltage direct current
HVNP	Hawaii Volcanoes National Park
IP	Implementation Plan
IRP	integrated resource planning
KERZ	Kilauea East Rift Zone
kV	kilovolt
MC	Maui County
MECO	Maui Electric Company, Ltd.
MOU	Memorandum of Understanding
MW(e)	megawatt (electrical generation)
NAAQS	National Ambient Air Quality Standards

ACRONYMS AND ABBREVIATIONS (*continued*)

NAV	U.S. Navy
NEPA	National Environmental Policy Act
NIOSH	National Institute for Occupational Safety and Health
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPS	National Park Service
NSF	National Science Foundation
ORNL	Oak Ridge National Laboratory
OSHA	U.S. Occupational Safety and Health Administration
OSP	(State of Hawaii) Office of State Planning
Pub. L.	Public Law
PSD	Prevention of Significant Deterioration
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SCS	U.S. Soil Conservation Service
USGS	U.S. Geological Survey
vog	volcanic smog

APPENDIX F

COPIES OF THE ADVANCE NOTICE OF INTENT AND NOTICE OF INTENT

Federal Register / Vol. 56, No. 170 / Tuesday, September 3, 1991 / Notices 43585

National Technical Information Service

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The National Technical Information has implemented a new Patent Licensing Bulletin Board (PLBB) to assist companies in finding new Government owned inventions which are available for licensing. The PLBB is a bulletin board system designed to provide electronic and early access to information on hundreds of new Government patents and pending patent applications available for licensing—often exclusively—under the regulations for the Licensing of Government Owned Inventions (37 CFR part 404).

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- Environmental Protection Agency,
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- National Institutes of Health.

The PLBB summarizes each invention and identifies supporting material which may be ordered for more complete information. There is no charge for the use of the PLBB, the only cost is that of the phone call to the PLBB which is placed through a microcomputer modem.

For additional information and a User's Manual on the PLBB, please call CUFT at (703) 487–4738 or write to: Director, Center for the Utilization of Federal Technology P.O. Box 1423, Springfield, VA 22151.

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Douglas J. Campion,

Patent Licensing Specialist, Center for the Utilization of Federal Technology, National Technical Information Service, U.S. Department of Commerce.

[FR Doc. 91–20963 Filed 8–30–91; 8:45 am]

BILLING CODE 3510–04–M

DEPARTMENT OF ENERGY

Advance Notice of Intent To Prepare an Environmental Impact Statement for the Hawaii Geothermal Project, Phases 3 and 4: Resource Verification and Characterization, and Construction and Operation of Geothermal Powerplants

AGENCY: U.S. Department of Energy (DOE).

ACTION: Notice is hereby given that the Department of Energy (DOE) intends to prepare an environmental impact statement (EIS) for the development of a geothermal wellfield on the island of Hawaii (Big Island), State of Hawaii; the subsequent construction and production of up to 500 MW(e) of power; and the transmission of this power by overland and submarine cable to Oahu, and possibly, one or more of the other Hawaiian Islands.

SUMMARY: As part of the National Environmental Policy Act (NEPA) of 1969 planning process, DOE announces its intent to prepare an EIS that evaluates the significance of environmental impacts associated with the proposed Hawaii Geothermal Project (HGP). The HGP is the culmination of research and development efforts begun in the mid-1970's to explore the feasibility of using Hawaii's indigenous geothermal resource as an alternative energy source for the production of electricity. Currently, the State of Hawaii uses petroleum for approximately 90 percent of its power production, the highest usage among all 50 states.

The four-phase HGP, as defined by the State of Hawaii, consists of (1) exploration and testing of the geothermal resource beneath the slopes of the active Kilauea volcano on the island of Hawaii (Big Island), (2) demonstration of deep-water cable technology in the Alenuihaha Channel between the Big Island and Maui, (3) verification and characterization of the geothermal resource identified in Phase 1, and (4) construction of commercial geothermal power production facilities on the Big Island, with the potential for overland and submarine transmission of electricity from the Big Island to Oahu and other islands. Phases 1 and 2 have been completed; DOE prepared appropriate NEPA documentation for separate federal actions related to early research projects. Future activities under Phases 3 and 4 will be the subject of this EIS.

The purpose of this Advance Notice of Intent (NOI) is to encourage early public involvement in the NEPA process and to solicit comments on the proposed scope and content of the EIS. Comments are expected regarding potential sites for geothermal development; alternatives to geothermal power; and environmental issues, such as land use, habitat disturbance, effects on cultural resources, air quality degradation, and impacts to the terrestrial and marine environment. The precise location of sites for geothermal power plants will not be known until the State completes currently planned resource verification and characterization activities on the Big Island. Land areas having the greatest potential for development, as defined by past research and exploration, are located within three designated Geothermal Resource Subzones on 22,000 acres in the lower and middle Kilauea East Rift Zone in the Puna District on the Big Island.

DOE will publish a NOI in the fall of 1991 to solicit further public input and to announce a schedule for public scoping meetings to be held prior to the completion of an EIS Implementation Plan and initiation of EIS preparation.

DATES: Comments related to the preparation of this EIS are requested by October 3, 1991.

ADDRESSES: Written comments or questions should be directed to: Dr. Lloyd Lewis, CE–121, Office of Conservation and Renewable Energy, U.S. Department of Energy, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585, Telephone: (202) 586–6263.

FOR FURTHER INFORMATION CONTACT: General information on the Hawaii Geothermal Project may be obtained from Dr. Lloyd Lewis at the above address. General information on the procedures followed by DOE in complying with the requirements of NEPA may be obtained from: Ms. Carol Borgstrom, Director, Office of NEPA Oversight (EH–25), U.S. Department of Energy, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585, Telephone: (202) 586–4600.

SUPPLEMENTARY INFORMATION:

Background

As defined by the State of Hawaii, the four-phase HGP consists of (1) assessment of the geothermal resource present beneath the slopes of the active Kilauea volcano on the Big Island, (2) demonstration of deep-water cable technology in the Alenuihaha Channel between the Big Island and Maui, (3) verification and characterization of the geothermal resource identified in Phase 1, and (4) construction of commercial

geothermal power production facilities on the Big Island, with the potential for overland transmission and submarine transmission to Oahu and other islands. Phases 1 and 2 have been completed. Future activities under Phases 3 and 4 will be the subject of this EIS.

Geothermal exploration began in Hawaii in 1972 with funding from the National Science Foundation (NSF). A potential geothermal resource site was identified on the Kilauea East Rift on the Big Island. Subsequent exploratory drilling (also funded by NSF) between December 1975 and April 1976 resulted in a productive geothermal well at a depth of approximately 6000 ft. In 1976, the Energy Research and Development Administration (ERDA), a predecessor to DOE, funded testing of the geothermal well, which was named HGP-A. Subsequently, DOE was established, and it funded the development of a 3-MW(e) demonstration power plant at the HGP-A site. In 1986, the HGP-A well and power plant were transferred by DOE to the State of Hawaii to be used for further research. The State has referred to this early exploration and testing of the geothermal resource as Phase 1 of the HGP.

DOE also provided funds for the Hawaii Deep Water Cable Program, referred to by the State of Hawaii as Phase 2 of the HGP, which was initiated in 1981. The goal of the program was to determine the technical and economic feasibility of constructing and operating a deepwater submarine power transmission cable that would link the islands of Hawaii and Oahu and would operate for a 30-year period. This project was completed in 1991 and proved the feasibility of a deepwater transmission cable. In all, over an 11-year period, DOE has provided approximately $33 million for geothermal and cable research in Hawaii.

In April 1989, the State of Hawaii requested additional federal funding for what it defined as Phase 3 of the HGP, Resource Verification and Characterization. Congress subsequently appropriated $5 million for use in Phase 3. Because Phase 3 work is by nature "research" rather than development or project construction, Congress indicated to the Secretary of Energy that it is not a "major federal action" under NEPA and would not typically require an EIS. However, because the project is highly visible, somewhat controversial, and involves a particularly sensitive environmental resource in Hawaii, Congress directed that "* * * the Secretary of Energy shall use such sums as are necessary from amounts previously provided to the State of Hawaii for geothermal resource verification and characterization to conduct the necessary environmental assessments and/or environmental impact statement (EIS) for the geothermal initiative to proceed." In addition to the Congressional directive, the U.S. District Court of Hawaii rendered a judgment, in response to litigation filed by several environmental groups, that requires the federal government to prepare an EIS for Phases 3 and 4 prior to disbursement of additional funds to the State. This Advance NOI is being issued to begin the NEPA process for Phases 3 and 4.

Scope of Phases 3 and 4

The State of Hawaii considers the unknown extent of the resource as the primary obstacle to private investment and commercial development of geothermal power production facilities and cable system. The State and private industry experts estimate that at least twenty-five commercial-scale exploratory wells will need to be drilled to verify the generating potential of the resource. Phase 3 activities would include well drilling, logging of cores from holes, measuring temperatures, collecting and analyzing geothermal fluid samples, and taking downhole geophysical and geochemical measurements.

Once the geothermal resource has been characterized, the construction of from ten to twenty separate geothermal power plants of from 25–30 MW(net) each is forecast by the State of Hawaii. The actual number of geothermal plants will depend on the extent of the resource defined in Phase 3. The exact location of the plants will not be known until Phase 3 is completed and facility design and layout are underway. Based on current knowledge of the resource (i.e., flow, pressure, temperature), the State of Hawaii estimates a total of about 125 production wells and 30 injection wells may be needed. The plants would most likely be connected by a network of roads, plumbing, and overland transmission lines in the East Rift area. Overland and underwater transmission lines (300 kV AC or DC) would be constructed to distribute power across the Big Island and to the other Hawaiian Islands, in particular, Oahu.

The current timetable for Phases 3 and 4 of the HGP calls for the State of Hawaii to initiate permitting and financing in 1991, with resource verification to be conducted after NEPA documentation is completed. Procurement and installation of power plants by the State of Hawaii and other non-federal entities is anticipated to begin in the 1994–1996 period, with initial transmission to Oahu no sooner than 1995. The State hopes to have 500 MW(e) of geothermal power on-line by 2005.

EIS Content and Identification of Environmental Issues

The EIS format and content will correspond to that which is recommended in the CEQ regulations and DOE guidelines. Chapter 1 of the EIS will discuss the purpose of and need for the action, provide background on the proposed project, and define the scope of the EIS. In chapter 2, the activities to be carried out as part of the proposed action and alternative actions will be described, the project location will be defined, and a tabular summary comparison of impacts of alternatives will be presented. Chapter 3 will describe the environment that could be affected by the proposed action. In chapter 4, the environmental consequences of alternatives will be discussed.

DOE has conducted a preliminary screening of environmental issues that could arise as a result of the HGP. The EIS will include, as appropriate, consideration of the following categories of impacts at alternative sites for power plant construction and operation and for alternative cable routings over land and in the marine waters of the Hawaiian Islands.

- *Land Use:* Conflicts with plans, policies, and controls resulting from wellfield development, power plant siting, and overland transmission lines;
- *Air Quality:* Impacts of fugitive dust from construction and vehicle and equipment operation, atmospheric emissions from geothermal plants, and cooling tower drift;
- *Water Resources:* Effects of spills, solid waste disposal, and injection of spent geothermal fluids on groundwater and surface water (freshwater and marine);
- *Ecological Resources:* Effects of habitat disturbance, atmospheric emissions, and changes in surface water quality on terrestrial and aquatic ecosystems, including the lowland rain forest, benthic marine fauna, wetlands, and threatened and endangered species;
- *Geological Resources:* Changes in physiography, topography, geology, soils, volcanic activity, and seismic activity;
- *Noise:* Effects of well-drilling and well-venting noise on sensitive receptors and fauna;
- *Health and Safety:* Hazards to occupational and public health and

safety, including well blowouts, subsidence, toxic emissions, hazardous materials, and electromagnetic effects on terrestrial and aquatic life;

• *Socioeconomics:* Effects of commercialization on population growth, economic base, agriculture, labor pool, housing, transportation, utilities, public services, education, recreation, tourism, and historic, archaeological and cultural resources; and

• *Scenic and Visual Resources:* Effects of industrialization on aesthetics in the tropical environment.

NEPA and the Scoping Process

In preparing the EIS, DOE will conduct the NEPA process as prescribed in the Council on Environmental Quality "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act" (40 CFR parts 1500–1503) and the DOE "Guidelines for Compliance with the National Environmental Policy Act" (52 FR 47662, December 15, 1987), as amended.

After consideration of comments received in response to this Advance NOI, DOE will publish a NOI and will initiate preparation of a preliminary EIS Implementation Plan to serve as guidance for the impact analysis. Anticipated topics to be addressed include: Scope of the EIS, purpose of and need for the action, development of alternatives to the proposed action, and categorizing of environmental and institutional issues. The EIS Implementation Plan will be further refined subsequent to the comment period that follows the NOI. Scoping meetings to be held in Hawaii will be announced in the NOI. The schedule for publication of the draft EIS will depend on the degree of effort foreseen based on the issues raised during the scoping process. A 45-day comment period will follow publication of the draft EIS and will include public hearings as a forum for oral comments. Availability of the draft EIS, the timeframe of the public comment period, and the schedule for public hearings will be announced in the **Federal Register** and in local news media upon release of the draft.

A final EIS, which will include DOE's responses to public comments received on the draft EIS, will be announced in the **Federal Register** upon publication.

Signed in Washington, DC, this 27th day of August 1991, for the United States Department of Energy.

Peter N. Brush,

Acting Assistant Secretary, Environment, Safety and Health.

[FR Doc. 91–21012 Filed 8–30–91; 8:45 a.m.]

BILLING CODE 6450–01–M

Atlanta Support Office; Noncompetitive Award of Financial Assistance: The Association for Commuter Transportation

AGENCY: U.S. Department of Energy.

ACTION: Notice of noncompetitive financial assistance award.

SUMMARY: The Department of Energy (DOE), announces that pursuant to DOE Financial Assistance Rules 10 CFR 600.7(b)(2), it intends to award a grant to the Association for Commuter Transportation (ACT) in support of a national conference focusing on transportation management associations. The anticipated overall objective of this project is to provide a forum for transportation management associations, Federal officials and State officials to address issues of joint concern.

SUPPLEMENTARY INFORMATION: The proposed award will serve the public purpose of increasing energy efficiency in the transportation end-use sector through stimulation of improvements in the operation of existing Transportation Management Associations and through encouragement and guidance of those seeking to establish new Transportation Management Associations. This conference is of particular significance since no other conference has ever been held which is specifically devoted to the needs of the rapidly growing area of Transportation Management Associations.

The grant application is being accepted by DOE because it knows of no other organization which is conducting or planning to conduct this type of conference. The project period for the grant award is a one-year period, expected to begin in September 1991. DOE plans to provide funding in the amount of $10,000 for this project period.

FOR FURTHER INFORMATION CONTACT: Warren Zurn, U.S. Department of Energy, Atlanta Support Office, 730 Peachtree Street, NE., Atlanta, Georgia 30308, (404) 347–1047.

Issued in Chicago, Illinois on August 22, 1991.

Timothy S. Crawford,

Assistant Manager for Administration.

[FR Doc. 91–21008 Filed 8–30–91; 8:45 am]

BILLING CODE 6450–01–M

Cooperative Agreement

AGENCY: U.S. Department of Energy (DOE).

ACTION: Notice of intent.

SUMMARY: The U.S. Department of Energy Field Office, Idaho announces that pursuant to the DOE Financial Assistance Rules 10 CFR 600.14(e) it intends to award a Cooperative Agreement to National Food Processors Association. The objectives of the work to be supported by this Cooperative Agreement provide for research and development of a sonic temperature sensor for food processing. Phases II and III.

FOR FURTHER INFORMATION CONTACT: Mary V. Willcox, U.S. Department of Energy, DOE Field Office-Idaho, 785 DOE Place MS 1129, Idaho Falls, Idaho 83402–1129, 208/526–2173.

SUPPLEMENTARY INFORMATION: The statutory authority for the proposed award is Public Law 93–577, the "Federal Non-Nuclear Energy Research and Development Act of 1974 (ERDA). The unsolicited proposal meets the criteria for "justification for acceptance of an unsolicited proposal (JAUP)," as set forth in 10 CFR 600.14(e). The second phase will focus on the further investigation of the design of a sonic sensor to measure the temperature of food particles inside food containers and the determination of the physical properties of various food materials. For this purpose a prototype sensor will be developed, used and modified as more knowledge of the technology is obtained. The third phase will be the development of a pilot scale unit which is suited for installation in a food processing plant for verification of the prototype developed in the second phase. The anticipated total project period is two (2) years, completion of the individual phases will be on a twelve (12) month basis. The total cost of the project (all shares) is estimated at $1,136,254.00. Total project costs will be shared (85%/15%) $996,740.00 for DOE and $139,500.00 for NFPA. The estimated

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AUTHORITY FOR MAINTENANCE OF THE SYSTEM:

5 U.S.C. 301, Departmental Regulations; 37 U.S.C. 601–604; and 44 U.S.C. 3101.

PURPOSE(S):

To provide nonjudicial financial management of military pay and allowances payable to active duty, fleet reserve, and retired Navy and marine Corps members for the period during which they are medically determined to be mentally incapable of managing their financial affairs.

ROUTINE USES OF RECORDS MAINTAINED IN THE SYSTEM, INCLUDING CATEGORIES OF USERS AND THE PURPOSES OF SUCH USES:

To officials and employees of the Department of Justice when there is reason to suspect financial mismanagement and no satisfactory settlement with the surety can be reached.

To officials and employees of the Department of Veterans Affairs in connection with programs administered by the agency.

The "Blanket Routine Uses" that appear at the beginning of the Department of the Navy's compilation of system of record notices also apply to this system.

POLICIES AND PRACTICES FOR STORING, RETRIEVING, ACCESSING, RETAINING, AND DISPOSING OF RECORDS IN THE SYSTEM:

STORAGE:

Papers records in file folders stored in file cabinets or other storage devices.

RETRIEVABILITY:

By name of the member.

SAFEGUARDS:

Files are maintained in file cabinets and other storage devices under the control of authorized personnel during working hours; the office space in which the file cabinets and storage devices are located is locked outside official working hours.

RETENTION AND DISPOSAL:

Five years after closure of case, files are transferred to the Federal Records Center, Suitland, MD 20409 for permanent retention.

SYSTEM MANAGER(S) AND ADDRESS:

Assistant Judge Advocate General (Civil Law), Office of the Judge Advocate General, Navy Department, 200 Stovall Street, Alexandria, VA 22332–2400.

NOTIFICATION PROCEDURE:

Individuals seeking to determine whether this system of records contains information about themselves should address written inquiries to the Assistant Judge Advocate General (Civil Law), Office of the Judge Advocate General, Department of the Navy, 200 Stovall Street, Alexandria, VA 22332–2400. Request should contain the full name of the individual concerned and should be signed.

RECORD ACCESS PROCEDURES:

Individuals seeking access to records about themselves contained in this system of records should address written inquiries to the Assistant Judge Advocate General (Civil Law), Office of the Judge Advocate General, Department of the Navy, 200 Stovall Street, Alexandria, VA 22332–2400.

CONTESTING RECORD PROCEDURES:

The Department of the Navy rules for accessing records and contesting contents and appealing initial determinations by the individual concerned are published in Secretary of the Navy Instruction 5211.5; 32 CFR part 701; or may be obtained from the system manager.

RECORD SOURCE CATEGORIES:

Components within the Department of the Navy, medical doctors, approved trustees, prospective trustees, surety companies, and the Department of Veterans Affairs.

EXEMPTIONS CLAIMED FOR THE SYSTEM:

None.

[FR Doc. 92–3593 Filed 2–13–92; 8:45 am]

BILLING CODE 3810–01–F

DEPARTMENT OF ENERGY

Intent to Prepare an Environmental Impact Statement and Conduct Public Scoping Meetings for Phases 3 and 4 of the Hawaii Geothermal Project

AGENCY: U.S. Department of Energy (DOE).

ACTION: Notice of intent to prepare an environmental impact statement and conduct public scoping meetings for Phases 3 and 4 of the Hawaii Geothermal Project.

SUMMARY: Notice is hereby given that the Department of Energy (DOE) intends to prepare an environmental impact statement (EIS) for Phases 3 and 4 the Hawaii Geothermal Project (HGP) as defined by the State of Hawaii in its April 1989 proposal to Congress. Five scoping meetings will be held in Hawaii from March 7 through March 18, 1992, to afford the public an opportunity to raise environmental issues and concerns related to the proposed project. This Notice of Intent (NOI) follows an Advance NOI (ANOI) that was published in the **Federal Register** on September 3, 1991. Both the ANOI and NOI will be available for public review in reading rooms in Hawaii and the continental United States listed at the end of this NOI.

ADDRESSES: Requests for copies and questions about the Draft and/or Final EIS should be directed to: Dr. Lloyd Lewis, CE–121, Office of Conservation and Renewable Energy, U.S. Department of Energy, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585, Telephone: (202) 586–6263.

For general information on the DOE NEPA process, please contact: Ms. Carol Borgstrom, Director, Office of NEPA Oversight (EH–25), U.S. Department of Energy, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585, Telephone: (202) 586–4600 or (800) 472–2756.

SUPPLEMENTARY INFORMATION: DOE further announces its intent to prepare an EIS that identifies and evaluates the environmental impacts associated with the proposed HGP, as defined by the State of Hawaii in its April 1989 proposal to Congress. The EIS will be prepared pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA), as implemented by the President's Council on Environmental Quality regulations (40 CFR parts 1500–1508) and the DOE NEPA guidelines (52 FR 47662).

The four-phase HGP, as defined by the State of Hawaii, consists of (1) exploration and testing of the geothermal resource beneath the slopes of the active Kilauea volcano on the Big Island, (2) demonstration of deep-water power cable technology in the Alenuihaha Channel between the Big Island and Maui, (3) verification and characterization of the geothermal resource on the Big Island, and (4) construction and operation of commercial geothermal power production facilities on the Big Island, with overland and submarine transmission of electricity from the Big Island to Oahu and other islands. Phases 1 and 2 have been completed: DOE prepared appropriate NEPA documentation for separate Federal actions related to Phase 1 and 2 research projects. This EIS will consider Phases 3 and 4, as well as reasonable alternatives to the HGP. In this regard, in addition to considering non-geothermal alternative energy resources for power production (including, but not necessarily limited to, coal, solar,

biomass, and wind), the HGP EIS will consider the reasonable alternatives among submarine cable technologies; geothermal extraction, production, and power generating technologies; pollution control technologies; overland and submarine power transmission routes; and sites reasonably suited to support project facilities in a safe and environmentally acceptable manner.

The purpose of this Notice of Intent (NOI) is to again invite public participation in the DOE NEPA process and to solicit public comments on the proposed scope and content of the EIS.

INVITATION TO COMMENT: To ensure that the full range of issues related to the HGP are addressed, DOE invites comments on the proposed scope and content of the EIS from all interested parties. Written comments or suggestions to assist DOE in identifying significant environmental issues and the appropriate scope of the EIS should be mailed to: Dr. Lloyd Lewis, CE-121, Office of Conservaion and Renewable Energy, U.S. Department of Energy, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585. Telephone: (202) 586-6263.

Written comments should be postmarked by April 15, 1992 to ensure consideration. Late comments will be considered to the extent practicable.

In addition to soliciting written comments on the HGP EIS, DOE plans to hold scoping meetings in Hawaii at which agencies, organizations, and the general public will be invited to present oral comments or suggestions about the scope and content of the HGP EIS. The locations, dates, and times of meetings are described in a subsequent section of this NOI. Please note that written and oral comments will be given equal consideration during scoping of the EIS. All comments received during the scoping period will be summarized and responded to in an EIS Implementation Plan (IP) prepared by DOE. The IP will be made available for public review in reading rooms listed at the end of this NOI. The IP will list those issues and alternatives to the HGP identified during scoping that are within the scope of the EIS, and that therefore will be assessed in the EIS. The IP will also list those issues and alternatives that are outside the scope of the EIS and that therefore will be eliminated from further consideration. Further, the IP will provide a detailed outline for the Draft HGP EIS and will discuss the approach that DOE will take in its preparation, including proposed schedules and identification of cooperating agencies. The Draft EIS is expected to be completed by early 1993, at which time its availability will be announced in the Federal Register and in local media. The Draft EIS will be placed in the reading rooms listed at the end of this NOI. A public comment period will follow the release of the Draft EIS, during which time written comments will be accepted. Also, public hearings will be held in Hawaii at which DOE will receive oral comments on the Draft EIS. Comments on the Draft EIS will be addressed within the Final EIS.

Background

Description of the Proposed Action

The HGP, as defined by the State of Hawaii, is the culmination of research and development efforts begun in the mid-1970's to explore the feasibility of using Hawaii's indigenous geothermal resource for the production of electricity. Currently, the State of Hawaii uses petroleum for approximately 90 percent of its power production, which is the highest percentage usage of petroleum among the 50 states.

Geothermal exploration began in Hawaii in 1972 with funding from the National Science Foundation (NSF). A high-potential geothermal resource site was identified on the east rift of the Kilauea volcano on the Big Island. Subsequent exploratory drilling (also funded by NSF) between December 1975 and April 1976 resulted in a productive geothermal well at a depth of approximately 6000 feet. In 1976, the Energy Research and Development Administration (ERDA), a predecessor to DOE, funded the testing of the geothermal well, which was designated as the HGP-A well. DOE succeeded ERDA, and in 1979 it funded the development of a 3-MW(e) demonstration power plant at the HGP-A site. In 1986, the HGP-A well and power plant were transferred by DOE to the State of Hawaii to be used for further research. The State has referred to this early exploration and testing of the Big Island geothermal resource as Phase I of the HGP.

DOE also provided funds for the Hawaii Deep Water Cable Program, referred to by the State of Hawaii as Phase 2 of the HGP, which was initiated in 1981. The goal of the program was to determine the technical and economic feasibility of constructing and operating a deep water submarine power transmission cable that would serve the island of Oahu and would operate for a 30-year period. This project, which was completed in 1991, demonstrated the feasibility of the deep water power transmission cable. Over an 11-year period, DOE has provided approximately $33 million for geothermal and deep water cable research in Hawaii.

The State of Hawaii considers the unknown extent of the geothermal resource as the primary obstacle to private investment and commercial development. State and private industry experts estimate that at least 25 commercial-scale exploratory wells will need to be drilled to verify the generating potential of the resource. To that end, Phase 3 activities would include well drilling, logging of cores from holes, measuring temperatures, collecting and analyzing geothermal fluid samples, and making downhole geophysical and geochemical measurements.

After resource characterization, the State of Hawaii plan forecasts that from 10 to 20 separate geothermal power plants of from 25-30 MW(net) each could be developed. The actual number of plants will depend on the extent of the resource defined in Phase 3. The exact location of plants will not be known until Phase 3 is complete. Therefore, the EIS will have to rely on best available data and information to predict development sites. Based on current knowledge of the physical characteristics of the resource and contemporary geothermal energy development practice, the State estimates that about 125 production wells and 30 injection wells may be needed to produce 500 MW(e). The plants would most likely be connected by a network of roads, piping, and overland power transmission lines. Overland and underwater transmission lines (500 kV AC or DC) would be constructed to distribute power.

In April 1989, the State projected that permitting and financing for Phases 3 and 4 would occur in 1991 and that 500 MW(e) of power could be on-line by 2005. Based on the current schedule of State and Federal environmental reviews, these projections are not likely to be met.

DOE Participation in HGP

In April 1989, the State of Hawaii requested additional Federal funding for what is defined by the State as Phase 3 of the HGP: Resource Verification and Characterization. Congress appropriated $5 million for the State's use in Phase 3. Because Phase 3 work is essentially "research," not development or project construction, Congress indicated that this funding would not be considered a major Federal action under NEPA and would not typically require an EIS. However, because the project is highly visible, somewhat controversial, and involves a particularly sensitive

environment in Hawaii, Congress directed that "* * * the Secretary of Energy shall use such sums as are necessary from amounts previously provided to the State of Hawaii for geothermal resource verification and characterization to conduct the necessary environmental assessments and/or environmental impact statement (EIS) for the geothermal initiative to proceed." In addition to the Congressional directive, the U.S. District Court of Hawaii, in litigation filed by several environmental groups, ruled that the Federal government must prepare an EIS for Phases 3 and 4 of the HGP prior to any further disbursement of Federal funds to the State for the HGP.

An ANOI regarding preparation of the HGP EIS was issued in the **Federal Register** by DOE on September 3, 1991. It announced the initiation of planning and scoping of the HGP EIS and solicited public input regarding scope and content of the EIS. DOE received 55 comment letters on EIS-related topics, all of which will be considered during preparation of the IP for the EIS. In addition to the ANOI, DOE held informal information exchange meetings during September, October, and November 1991 with Federal, State and local agencies and officials and with public interest groups as well as utilities and geothermal developers.

Alternatives

DOE is requesting public comment on reasonable alternatives related to the HGP. The basic alternatives available to DOE are to partially fund or to not partially fund Phase 3, as defined by the State, with the funds remaining from the $5 million Congressional appropriation after EIS expenditures; not funding Phase 3 would be considered as the 'no-action' alternative. Under the 'no-action' alternative, DOE would not contribute funds to future State-planned geothermal development in Hawaii, but this would not preclude the State's continuation of the HGP.

Based on preliminary scoping, other alternatives related to project implementation include, but are not limited to: (1)Alternative sites for geothermal development and construction of power plants, including sites on Maui; (2) alternative routes for transmission lines on land and in the sea; (3) alternative geothermal power generating technologies; (4) alternative submarine cable technologies; (5) alternative power production technologies, such as coal, solar, wind, and biomass; (6) non-supply alternatives such as demand-side management and conservation; (7) integrated resource planning by Hawaiian utilities and the State, which would afford consideration of both supply-side and demand-side alternatives to meet long-term power generating needs; and (8) continued reliance on oil-fired power plants.

Potential Environmental Issues

Based on public comments on the Advance NOI and information exchange meetings held with the Federal, State, and local agencies, civic and environmental interest groups, and utilities and geothermal developers, DOE has identified an array of potential environmental issues associated with the HGP. This list will be modified based on further input received during the scoping process. The following list is not organized in order of relative importance, nor is there presently a commitment by DOE to address all these issues to the same level of detail in the HGP EIS. The future IP, prepared after scoping is completed, will categorize issues and describe those that are within the scope of analysis in the EIS.

Land Use

The compatibility of geothermal development with other current and planned land uses will be considered. Phases 3 and 4 of the HGP, as defined by the State, will require land for resource verification, power plant(s) and related support facilities, roads, transmission lines, waste disposal areas, etc. Potential impacts related to the Wao Kele O Puna rainforest, native Hawaiian homelands, residential areas, and any other unique land resources will also be considered.

Air Quality

The effect on air quality on the Big Island from atmospheric emissions from well drilling and testing, geothermal power plant operations, and construction associated with facilities, roads, and transmission lines will be considered. Air pollutants from geothermal power plant operation may include hydrogen sulfide, ammonia, methane, carbon dioxide, radon, arsenic, boron, mercury, benzene, and particulate matter. Receptors in the proximity of the proposed HGP include residential areas, agricultural crops, vegetation, and bird populations. The contribution of the HGP, if any, to the national and world-wide issues of global climate change and ozone depletion will be considered. The contribution, if any, of power plant emissions of hydrogen sulfide to acid precipitation will also be considered.

Water Resources

Effects on the quality, use, and availability of surface waters (marine and fresh) and groundwater from geothermal well drilling, disposal of liquid and solid wastes, construction of transmission lines, and installation of the submarine cable will be considered. Erosion and sedimentation, deposition of permitted air pollutants, permitted point and permissible non-point discharges from power plants and support facilities, radiological levels associated with brine impoundments, reinjection and/or impoundment of geothermal fluids/brine, all as a result of normal operation, will be considered. The EIS also will consider the risks of certain accidents associated with water resources, such as well blowouts, and with spills of hazardous or toxic materials.

Ecological Resources

The effect on habitats and indigenous species of atmospheric emissions, effluent discharges, waste disposal, electromagnetic fields, and noise associated with the HGP will be considered. Such habitats include the Wao Kele O Puna rainforest, wetlands, coral reefs, the marine water column, especially the benthic community, and the commercial fisheries in the Hawaiian Islands. Federal- and State-protected aquatic species include the humpback whale, which has seasonal calving grounds in Hawaii, the hawksbill and green sea turtles, and the Hawaiian monk seal. Numerous protected bird species and the protected hoary bat are found in the vicinity of planned development.

Geologic Issues

Hazards associated with development of the geothermal resource on the site of an active volcano will be considered. The effects of geothermal well drilling, production, and reinjection on regional seismicity and local subsidence will be examined. The effect of well development and construction on soils, agriculture, and paleontolcgical resources in areas proposed for development will be considered. Geothermal fluid withdrawal, reinjection, and the potential for resource depletion will be examined. Underwater and oceanic geologic hazards, such as tsunamis and landslides, and their subsequent effects on cable reliability and function will also be considered.

Noise

Increased ambient sound levels may result from well drilling, construction

equipment and machinery operation, and well venting. The effects of such levels on residents in nearby developments will be considered, including any adverse effects on occupational and public health. The effect of elevated sound levels on wildlife reproductive capabilities and susceptibility to predation will be considered as well.

Health and Safety

Health and safety issues will be considered associated with the following: (1) Well blowout; (2) exposure to gaseous emissions from power plant operation, especially hydrogen sulfide and radon gases and trace elements/compounds, such as arsenic, boron, selenium, and benzene; (3) elevated ambient sound levels; and (4) evacuations of nearby residences because of well venting or hydrogen sulfide releases.

Socioeconomic Issues

Issues that will be considered include those associated with the effects of population growth stimulated by additional power production, such as effects on public services, education, taxes, property values, insurance rates, and the economy (in particular, tourism). Another issue is the cost of the HGP compared to other alternatives.

Cultural Resources

Construction on land and at sea and plant operations may affect historic, archeological, and cultural resources such as native Hawaiian religious practices and beliefs (e.g., worship of the goddess Pele), burial sites, subsistence hunting and gathering, ocean gathering and fishing rights, and homelands.

Visual Effects

Issues that will be considered include those related to clearing and development within a pristine environment, and the visual effects of industrial facilities, such as geothermal plants and transmission lines, which can, in turn, affect tourism, the economy, and native Hawaiian religious practices.

Scoping Meetings

DOE plans to conduct public scoping meetings to assist in identifying further potential environmental impacts associated with the HGP. The meeting schedule is as follows:

Hawaii–March 7, 1992, Pahoa High and Elementary School, 15–3038 Puna Road, Pahoa, Hawaii 96778, 2 p.m.-5:30 p.m. and 7 p.m.-10:30 p.m.

Maui–March 9, 1992, Maui County Council Chambers, 8th Floor, County Building, 200 S. High St., Wailuku, Hawaii 96793, 2 p.m.-5:30 p.m. and 7 p.m.-10:30 p.m.

Molokai–March 12, 1992, Mitchell Pauole Center, 90 Ainoa Street, Kaunakakai, Hawaii 96748, 2 p.m.-5:30 p.m. and 7 p.m.-10:30 p.m.

Oahu–March 14, 1992, Roosevelt High School, 1120 Nehoa St., Honolulu, Hawaii 96822, 2 p.m.-5:30 p.m. and 7 p.m.-10:30 p.m.

Hawaii–March 16, 1992, Hawaiian Homes Meeting Hall, P.O. Box 125, Kamuela (Waimea), Hawaii 96743, 2 p.m.-5:30 p.m. and 7 p.m.-10:30 p.m. Location: The 55 miles marker Mamalahoa Highway, east edge of Waimea.

These meetings are intended to afford the public an opportunity to offer suggestions as to the scope and content of the EIS. There will be afternoon and evening meetings at each location. Individuals may speak at any one of the meetings, and should note their preference for speaking at either the afternoon or evening session. Those who do not register in advance to speak may register at the public meeting, and they will be afforded an opportunity to speak after preregistered speakers as time allows. On-site registration will begin one hour before each meeting. Requests to speak at any of the meetings should be directed to:

Thelma Patton, Oak Ridge National Laboratory, P.O. Box 2008, Building 4500N, Oak Ridge, TN 37831–6200, Telephone: (615) 574–6096, Facsimile: (615) 574–5788

or, in Hawaii: U.S. Department of Energy, Pacific Site Office, Prince Kuhio Building, rm. 4322, 300 Ala Moana Blvd., Honolulu, HI 96813, Contact: Irene Asato, Telephone: (808) 541–2561, Fax: (808) 541–2562

and should be postmarked no later than March 2, 1992. Letters should be sent via air mail.

A presiding officer will be designated by DOE for the scoping meetings, which will not be conducted as evidentiary hearings, and there will be no questioning of the speakers. However, the presiding officer may ask for clarification of statements to ensure that the comments are fully understood. The presiding officer will establish the order of speakers, which most likely will be public officials first followed, in turn, by group representatives and individuals. The presiding officer will provide any additional procedures necessary for the conduct of the meetings. To ensure that all persons wishing to make a presentation are given the opportunity, a 5-minute limit will be enforced for each speaker, with the exception that public officials and representatives of groups will be allotted 10-minutes each. Speakers will be limited to one presentation at one of the five scoping meetings. Speakers who wish to provide further information for the record should submit such information to: Dr. Lloyd Lewis, CE–121, Office of Conservation and Renewable Energy, U.S. Department of Energy, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585, Telephone: (202) 586–6263 and postmarked by April 15, 1992, to ensure consideration. Late comments will be considered to the extent practicable.

DOE reserves the right to change dates, times, locations of meetings, and the procedures for conducting the meetings, if necessary. Notification of changes will be announced in the local media.

DOE will prepare transcripts of all scoping meetings after their completion. The public may review transcripts and other HGP EIS references at the following locations:

Department of Business, Economic Development & Tourism, Library, 220 South King Street, Fourth Floor, Honolulu, Hawaii 96804, Contact: Anthony Oliver, Telephone: (808) 586–2425, Fax: (808) 586–2452.

Department of Business, Economic Development & Tourism, Hilo Office, Century Building, 80 Pauahi Street, room 207, Hilo, Hawaii 96720, Contact: Michelle Wong-Wilson, Telephone: (808) 933–4600, Fax: (808) 933–4602.

Department of Business, Economic Development & Tourism, Information Office, 220 South King Street, suite 1100, Honolulu, Hawaii 96813, Contact: Norman Reyes, Telephone: (808) 586–2405 or 586–2408, Fax: (808) 586–2427.

Department of Business, Economic Development & Tourism, Geothermal Office, Financial Plaza of the Pacific, 130 Merchant Street, suite 1060, Honolulu, Hawaii 96813, Contact: Maurice Kaya, Telephone: (808) 587–3812, Fax: (808) 587-3820.

Department of Business, Economic Development & Tourism, Energy Division, Publications Section, 335 Merchant Street, room 110, Honolulu, Hawaii 96813, Contact: Steven Kam, Telephone: (808) 548–4080 Fax: (808) 531–5243.

Hana Public and School Library, Hana Highway, Hana, Hawaii 96713, Contact: Jeremy Kindred, Telephone: (808) 248–77[illegible] Fax: (808) 248–7438.

Hawaii State Library, Hawaii Document Center Unit, 634 Pensacola Street, Honolulu, Hawaii 96814, Telephone: (808) 586–3535, Fax: (808) 586–3584.

Hawaii Energy Extension Service, Hawaii Business Center, 99 Aupuni Street, room 214, Hilo, Hawaii 96720, Contact: Andrea Beck, Telephone: (808) 933–4558, Fax: (808) 933–4602.

Hilo Public Library, 300 Waianuenue Avenue, Hilo, Hawaii 96721–0647, Contact: Claudine

Fujii. Telephone: (808) 953-5467. Fax: (808) 933-4658.
Kahuku Public and School Library, 56490 Kam Highway, Kahuku, Hawaii 96731. Contact: Jean Okimoto. Telephone: (808) 293-9275. Fax: (808) 293-5115.
Kahului Public Library, 90 School Street, Kahului, Hawaii 96732. Contact: Lani Scott Telephone: (808) 877-5048. Fax: (808) 871-9032.
Kailua-Kona Public Library, 75-138 Hualalai Road, Kailua-Kona, Hawaii 96740. Contact: Irene Horvath. Telephone: (808) 329-2196. Fax: (808) 326-4115.
Kauai Office of Economic Development, 4444 Rice Street, room 230, Lihue, Hawaii 96766. Contact: Glenn Sato. Telephone: (808) 245-7305. Fax: (808) 245-6479.
Lihue Public Library, 4391-A Rice Street, Lihue, Hawaii 96766 Contact: Karen Ikemoto. Telephone: (808) 245-3617. Fax: (808) 246-0159.
Maui Energy Extension Service 200 South High Street, Wailuku, Hawaii 96793. Contact: Kalvin Kobayashi. Telephone: (808) 243-7832. Fax: (808) 243-7870.
Molokai Public Library, Ala Maloma Street, Kaunakakai, Hawaii 96748. Contact: Sri Tencate. Telephone: (808) 553-5483. Fax: (808) 553-5958.
Mountain View Public and School Library, Highway 11, Mountain View, Hawaii 96771. Contact: Evelyn Garbo. Telephone: (808) 968-6300 Fax: (808) 968-6056.
Pahala Public and School Library, Pakalana Street, Pahala, Hawaii 96777. Contact: Lisa Cabudol. Telephone: (808) 928-8032. Fax: (808) 928-6199.
Pahoa Public and School Library, 15-3038 Puna Road, Pahoa, Hawaii 96778. Contact: Laura Ashton. Telephone: (808) 965-8574. Fax: (808) 965-7170.
Pearl City Public Library, 1138 Waimano Home Road, Pearl City, Hawaii 96782. Contact: Marilyn Van Gieson. Telephone: (808) 455-4134. Fax: (808) 456-4407.
U.S. Department of Energy, Freedom of Information Public Reading Room, room 1E 190, 1000 Independence Ave., SW., Washington, DC 20585. Contact: Mr. Ed McGinnis. Telephone: (202) 586-6020. FTS: 896-6020.
U.S. Department of Energy, Pacific Site Office, Prince Kuhio Building, room 4322, 300 Ala Moana Blvd., Honolulu, Hawaii 96813 Contact: Eilleen Yoshinaka. Telephone: (808) 541-2563. Fax: (808) 541-2562.
U.S. Department of Energy, San Francisco Field Office Public Reading Room, 1333 Broadway, Oakland, CA 94612. Contact: Ms. Estella Angel. Telephone: (510) 273-4428 FTS: 536-4428.
Waimanelo Public and School Library, 41-1320 Kalanianaole Highway, Waimanalo, Hawaii 96795. Contact: Nina O'Donnell Telephone: (808) 259-9925. Fax: (808) 259-8209.

Signed in Washington, DC, this 11th day of February, 1992, for the U.S. Department of Energy.

Paul L. Ziemer,

Assistant Secretary, Environment, Safety and Health.

[FR Doc. 92-3644 Filed 2-13-92; 8:45]

BILLING CODE 6450-01-M

Financial Assistance Award; Keystone Center

AGENCY: Department of Energy.

ACTION: Notice of unsolicited financial assistance award to the Keystone Center.

SUMMARY: The Department of Energy (DOE) announces that pursuant to 10 CFR 600.14(e)(1)(i), it is making a financial assistance award based on an unsolicited application under grant number DE-FG01-92PE79105. The grant is to determine the different positions of interest groups on key issues and to narrow the difference through dialogues. This effort will have a total estimated cost of $60,000 (cost sharing) to provided by DOE.

SCOPE: The grant will provide funding to the Keystone Center to select a working group of experts from affected constituents to discuss clarification and resolution of present uncertainties concerning Federal and State jurisdiction in the economic regulation of electric utilities and to address the subject of utility planning using least cost principles.

The project is meritorious because of its relevance to the accomplishment of an important public purpose—development of consensus on critical issues concerning the existing allocation of State/Federal regulatory authority to (1) govern evolving bulk power markets, and (2) provide the consumer with necessary energy services through utility planning based on least-cost dialogue that can be translated into legislation or regulatory policy.

ELIGIBILITY: Based on the evaluation of relevance to the accomplishment of a public purpose, it is determined that the proposal represents an innovative method and approach to determine the different positions of interest groups on key issues and to narrow the difference through dialogue. The proposed project represents a unique idea that would not be eligible for financial assistance under a recent, current, or planned solicitation.

FOR FURTHER INFORMATION CONTACT: Please write the U.S. Department of Energy, Office of Placement and Administration, ATTN: Mary Braxton, PR-321.1, 1000 Independence Ave. SW., Washington, DC 20585.

Jeffrey Rubenstein,

Director, Operations Division "A", Office of Placement and Administration.

[FR Doc. 92-3645 Filed 2-13-92; 8:45 am]

BILLING CODE 6450-01-M

Federal Energy Regulatory Commission

[Project Nos. 10944-002, 10962-001, 10963-001, 10964-001, 11127-001, 11172-001, 11173-001, 11198-001 Oregon]

Portland General Electric Co.; Surrender of Preliminary Permits

Dated: February 7, 1992

Take notice that Portland General Electronic Company, Permittee for the following projects has requested that its preliminary permits be terminated.

All projects would have been located within the Mount Hood National Forest, in Clackamas County, Oregon.

Project No.	Project name	Creek name	Issued	Expires
10944-002	Cripple Creek	Cripple Creek	10/29/90	9/30/93
10962-001	Timothy Lake	Anvil Creek, Stone Creek	01/28/91	12/31/93
10963-001	South Fork Cripple Creek	South Fork Cripple Creek	10/31/90	09/30/93
10964-001	Bull Creek	Bull Creek	10/30/90	09/30/93
11127-001	Cot Creek	Cot Creek	06/28/91	05/31/94
11172-001	Deer Creek	Deer Creek	01/22/92	12/31/94
11173-001	Dinner Creek	Dinner Creek	01/23/92	12/31/94
11198-001	Three Lynx Creek	Three Lynx Creek	01/23/92	12/31/94

The Permittee filed the request on January 21, 1992, and the preliminary permits shall remain in effect through the thirtieth day after issuance of this notice unless that day is a Saturday, Sunday or holiday as described in 18 CFR 385.2007, in which case the permit shall remain in effect through the first business day following that day. New applications involving these project sites, to the extent provided for under 18

APPENDIX G

CONTRACTOR DISCLOSURE STATEMENTS

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF ENVIRONMENTAL IMPACT STATEMENT FOR THE HAWAII GEOTHERMAL PROJECT

CEQ Regulations at 40 CFR 1506.5 (c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981, guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations", 46 FR 18026-18038 at Question 17a and b.

"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)". 46 FR 18026-18038 at 18031.

In accordance with these requirements, Martin Marietta Energy Systems, Inc. (COMPANY NAME) hereby certifies as follows: check either (a) or (b),

(a) [X] Martin Marietta Corp. (COMPANY NAME) has no financial or other interest in the outcome of the Hawaii Geothermal Project.

(b) [ ] _____ (COMPANY NAME) has the following financial or other interest in the outcome of the Hawaii Geothermal Project and hereby agrees to divest itself of such interest prior to initiating any technical analyses in support of this Project.

Financial or Other Interests

1.

2.

3.

Certified by:

Gary J. Draper
SIGNATURE

Gary J. Draper
NAME

Manager, Contracts
TITLE

May 27, 1992
DATE

NEPA DISCLOSURE STATEMENT FOR
PREPARATION OF ENVIRONMENTAL IMPACT STATEMENT
FOR THE HAWAII GEOTHERMAL PROJECT

CEQ Regulations at 40 CFR 1506.5 (c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981, guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations", 46 FR 18026-18038 at Question 17a and b.

"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)". 46 FR 18026-18038 at 18031.

In accordance with these requirements, Energy, Environment + Resource Center, Univ. of Tennessee hereby certifies as follows: check either (a) or (b),
COMPANY NAME

(a) ☒ Energy, Environment + Resource Center has no financial or other interest in the outcome of the Hawaii Geothermal Project.
COMPANY NAME

(b) ☐ _____ has the following financial or other interest in the outcome of the Hawaii Geothermal Project and hereby agrees to divest itself of such interest prior to initiating any technical analyses in support of this Project.
COMPANY NAME

Financial or Other Interests

1.

2.

3.

Certified by:

Jack Barkenbus
SIGNATURE

JACK BARKENBUS
NAME

Acting Director
Energy, Environment + Resources Center
TITLE

May 28, 1992
DATE

HAWAII GEOTHERMAL PROJECT

ENVIRONMENTAL IMPACT STATEMENT

MAILING LIST

APRIL 2, 1993

UNITED STATES DEPARTMENT OF ENERGY
OFFICE OF ENERGY EFFICIENCY AND
RENEWABLE ENERGY
WASHINGTON, D.C.

PREFACE

The Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS) mailing list contains the names and addresses of parties that the U.S. Department of Energy has identified as being interested in the HGP EIS. The list identifies reading rooms where the public has access to HGP EIS documents. It also includes media contacts; Federal, State, and local agencies; businesses and special interest groups; community, environmental, and Native Hawaiian organizations; geothermal developers; utilities; and concerned individuals. Each of the entries on the mailing list will receive notices regarding the HGP EIS such as announcements of public meetings and the availability of the draft EIS.

The HGP EIS mailing list is a living document; names and addresses will be added and deleted during the course of EIS preparation. This version includes names and addresses the U.S. Department of Energy has received as of April 2, 1993. In compliance with the Privacy Act, addressees in the "concerned individuals" category have been offered the opportunity to have their names and addresses removed from the mailing list.

To add your name to the mailing list, or to make corrections to the existing list, please contact:

Mr. Roland Kessler
Office of Renewable Energy Conversion
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Telephone: (202) 586-8084
Fax: (202) 586-5124

TABLE OF CONTENTS

MAILING LIST FOR HAWAII GEOTHERMAL PROJECT EIS

I. READING ROOM LOCATIONS

Hawaii

Hawaii Energy Extension Service
Hawaii Business Center
99 Aupuni Street, Room 214
Hilo, HI 96720
Contact: Andrea Beck
Telephone: (808) 933-4558
Fax: (808) 933-4602

Hilo Public Library
300 Waianuenue Avenue
Hilo, HI 96721-0647
Contact: Claudine Fujii
Telephone: (808) 935-5407
Fax: (808) 933-4658

Kailua-Kona Public Library
75-138 Hualalai Road
Kailua-Kona, HI 96740
Contact: Irene Horvath
Telephone: (808) 329-2196
Fax: (808) 326-4115

Mountain View Public and School Library
Highway 11
Mountain View, HI 96771
Contact: Evelyn Garbo
Telephone: (808) 968-6300
Fax: (808) 968-6056

Pahala Public and School Library
Pakalana Street
Pahala, HI 96777
Contact: Lisa Cabudol
Telephone: (808) 928-8032
Fax: (808) 928-6199

Pahoa Public and School Library
15-3038 Puna Road
Pahoa, HI 96778
Contact: Laura Ashton
Telephone: (808) 965-8574
Fax: (808) 965-7170

State of Hawaii
Department of Business, Economic Development & Tourism
Hilo Office
99 Aupuni Street, Room 212
Hilo, HI 96720
Contact: Michelle Wong-Wilson
Telephone: (808) 933-4600
Fax: (808) 933-4602

Lanai

Lanai Public and School Library
Fraser Avenue
P.O. Box A-149
Lanai City, HI 96763
Contact: Peggy Fink
Telephone: (808) 565-6996
Fax: (808) 565-6171

Kauai

Kauai Office of Economic Development
4444 Rice Street, Room 230
Lihue, HI 96766
Contact: Glenn Sato
Telephone: (808) 245-7305
Fax: (808) 245-6479

Lihue Public Library
4391-A Rice Street
Lihue, HI 96766
Contact: Karen Ikemoto
Telephone: (808) 245-3617
Fax: (808) 246-0519

Maui

Hana Public and School Library
Hana Highway
Hana, HI 96713
Contact: Head Librarian
Telephone: (808) 248-7714
Fax: (808) 248-7438

Kahului Public Library
90 School Street
Kahului, HI 96732
Contact: Lani Scott
Telephone: (808) 877-5048
Fax: (808) 871-9032

Maui Planning Department
Energy Division
250 S. High Street
Wailuku, HI 96793
Contact: Kalvin Kobayashi
Telephone: (808) 243-7832
Fax: (808) 243-7634

Molokai

Molokai Public Library
Ala Maloma Street
Kaunakakai, HI 96748
Contact: Sri Tencate
Telephone: (808) 553-5483
Fax: (808) 553-5958

Oahu

Hawaii State Library
Hawaii Document Center Unit
634 Pensacola Street
Honolulu, HI 96814
Telephone: (808) 586-3535
Fax: (808) 586-3584

Kahuku Public and School Library
56490 Kam Highway
Kahuku, HI 96731
Contact: Jean Okimoto
Telephone: (808) 293-9275
Fax: (808) 293-5115

Pearl City Public Library
1138 Waimano Home Road
Pearl City, HI 96782
Contact: Marilyn Van Gieson
Telephone: (808) 455-4134
Fax: (808) 456-4407

State of Hawaii
Department of Business, Economic
Development & Tourism
Energy Division, Publications Section
335 Merchant Street, Room 110
Honolulu, HI 96813
Contact: Maurice Kaya
Telephone: (808) 547-3800
Fax: (808) 587-3812

State of Hawaii
Department of Business, Economic
Development & Tourism
Geothermal Office
Financial Plaza of the Pacific
130 Merchant Street, Suite 1060
Honolulu, HI 96813
Contact: Dean Nakano
Telephone: (808) 586-2353
Fax: (808) 586-2536

State of Hawaii
Department of Business, Economic
Development & Tourism
Information Office
220 South King Street, Suite 1100
Honolulu, HI 96813
Contact: Marsha Anderson
Telephone: (808) 586-2408
Fax: (808) 586-2427

State of Hawaii
Department of Business, Economic
Development & Tourism
Library
220 South King Street, Fourth Floor
Honolulu, HI 96804
Contact: Anthony Oliver
Telephone: (808) 586-2422
Fax: (808) 586-2452

U.S. Department of Energy
Pacific Site Office
Prince Kuhio Building
Room 4322
300 Ala Moana Boulevard
Honolulu, HI 96813
Contact: Eilieen Yoshinaka
Telephone: (808) 541-2563
Fax: (808) 541-2562

Waimanalo Public and School Library
41-1320 Kalanianaole Highway
Waimanalo, HI 96795
Contact: Nina O'Donnell
Telephone: (808) 259-9925
Fax: (808) 259-8209

Mainland

U.S. Department of Energy
Freedom of Information Public Reading Room
Room 1E 190
1000 Independence Avenue, SW
Washington, DC 20585
Contact: Ed McGinnis
Telephone: (202) 586-6020
Fax: (202) 586-0575

U.S. Department of Energy
San Francisco Field Office Public Reading
Room
1333 Broadway
Oakland, CA 94612
Contact: Estella Angel
Telephone: (510) 273-4428
Fax: (510) 273-6316

II. PRESS CONTACTS

Newspapers

Associated Press
P.O. Box 2956
Honolulu, HI 96802
Contact: Howard Graves, Bureau Chief
Telephone: (808) 536-5510
Fax: (808) 531-1213

Environment Hawaii
928 Mokielua Drive
Kailua, HI 96734
Contact: Patricia Tummons
Telephone: (808) 261-7194

Hawaii Business
P. O. Box 913
Honolulu, HI 96808
Contact: Diane Chang, Editor
Telephone: (808) 946-3978
Fax: (808) 947-8498

Hawaii Investor
36 Merchant Street
Honolulu, HI 96813
Contact: Bill Wood, Editor
Telephone: (808) 524-7400
Fax: (808) 531-2306

Hawaii Tribune-Herald
P.O. Box 767
Hilo, HI 96720
Contact: Editor
Telephone: (808) 935-6621
Fax: (808) 969-9100

Honolulu Advertiser
P. O. Box 1956
Hilo, HI 96720
Contact: Hugh Clark
Telephone: (808) 525-8000
Fax: (808) 935-7855

Honolulu Advertiser
P. O. Box 524
Lihue, HI 96766
Contact: Jan Tenbruggecate
Telephone: (808) 245-3074
Fax: (808) 246-9107

Honolulu Advertiser
P. O. Box 156
Wailuku, HI 96793
Contact: Edwin Tanji
Telephone: (808) 244-4880
Fax: (808) 242-1520

Honolulu Star-Bulletin
P.O. Box 3080
Honolulu, HI 96802
Contact: Helen Altonn/City Desk
Telephone: (808) 525-8642 City Desk
Fax: (808) 523-8509

Honolulu Star-Bulletin-Hawaii Bureau
688 Kinoole Street, Room 208
Hilo, HI 96720
Contact: Rod Thompson
Telephone: (808) 935-1012
Fax: (808) 935-1012

Honolulu Star Bulletin-Kauai Bureau
2959 Uni Street, #102
Lihue, HI 96766
Contact: Lester Chang
Telephone: (808) 245-4146
Fax: (808) 245-4146

Honolulu Star-Bulletin-Maui Bureau
132 N. Church Street, Apt. B
Wailuku, HI 96793-1627
Contact: Lila Fujimoto
Telephone: (808) 244-3207
Fax: (808) 244-3207

The Honolulu Weekly
1200 College Walk, Suite 212
Honolulu, HI 96817
Contact: Julia Steele
Telephone: (808) 578-1286
Fax: (808) 578-1475

Kauai Times
P. O. Box 3272
Lihue, HI 96766
Contact: Peter Wolf, Editor
Telephone: (808) 245-8825
Fax: (808) 246-9195

Maui News
P. O. Box 550
Wailuku, HI 96793
Contact: Editor
Telephone: (808) 242-9164
Telephone: (808) 244-3981 after hrs.
Fax: (808) 242-9087

Maui Press
Suite 204
1063 Lower Main Street
Wailuku, HI 96793
Contact: Robert McCabe, Editor
Phone: (808) 244-8880
Fax: (808) 244-7047

Molokai Advertiser-News
SR Box 329
Kaunakakai, HI 96748
Contact: George Peabody, Managing Editor
Telephone: (808) 558-8253
Fax: (808) 558-8253

Pacific Business News
P. O. Box 833
Honolulu, HI 96808
Contact: Rod Smith, Editor
Telephone: (808) 521-0021
Fax: (808) 526-3273

Sun Press
45-525 Luluku Road
Kaneohe, HI 96744
Contact: Bill Stone, Editor
Telephone: (808) 235-5881
Fax: (808) 247-7246

The Garden Island
P. O. Box 231
Lihue, HI 96766
Contact: Editor
Telephone: (808) 245-3681
Fax: (808) 245-5286

The Honolulu Advertiser
605 Kapiolani Boulevard
Honolulu, HI 96813
Contact: City Desk
Telephone: (808) 525-8090
Fax: (808) 525-8037

West Hawaii Today
P. O. Box 789
Kailua-Kona, HI 96745
Contact: Editor
Telephone: (808) 329-9311
Fax: (808) 329-3659

Radio Stations

KAIM-AM & FM
3555 Harding Avenue
Honolulu, HI 96816
Telephone: (808) 735-2424
Fax: (808) 735-2428

KCCN-AM
900 Fort Street Mall, #400
Honolulu, HI 96813
Telephone: (808) 536-2728
Fax: (808) 536-2528

KDEO-AM & FM
94-1088 Farrington Highway
Waipahu, HI 96797
Telephone: (808) 671-2851
Fax: (808) 671-4701

KGU-AM
2153 North King Street
Suite 376
Honolulu, HI 96819
Telephone: (808) 841-7600
Fax: (808) 847-2855

KIKI-AM & FM
345 Queen Street, Suite 601
Honolulu, HI 96813
Telephone: (808) 531-4602
Fax: (808) 531-4606

KISA-AM
904 Kohou Street, Suite 204
Honolulu, HI 96817
Telephone: (808) 841-4555
Fax: Unavailable

KNDI-AM
1734 South King Street
Honolulu, HI 96826
Telephone: (808) 946-2844
Fax: (808) 947-3531

KNUI-AM & FM
311 Ano Street
Kahului, HI 96732
Telephone: (808) 877-5566
Fax: (808) 871-0666

KOHO-AM
1142 Twelfth Avenue
Honolulu, HI 96816
Telephone: (808) 947-2133
Fax: (808) 942-7945

KPOI-FM
741 Bishop Street
Honolulu, HI 96813
Telephone: (808) 524-7100
Fax: (808) 523-9464

KQMQ-AM & FM
711 Kapiolani Boulevard, #1193
Honolulu, HI 96813
Telephone: (808) 539-9369
Fax: (808) 539-9339

KSSK-AM/KXPW-FM
1505 Dillingham Boulevard
Honolulu, HI 96817
Telephone: (808) 841-8300
Fax: (808) 841-9259

KTUH-FM
University of Hawaii at Manoa
Hemenway Hall, Suite 202
Honolulu, HI 96822
Telephone: (808) 956-7431
Fax: None

KUMU-AM & FM
441 North Nimitz Highway
Honolulu, HI 96817
Telephone: (808) 531-4511
Fax: (808) 538-6425

KZOO-AM
250 Ward Avenue, Suite 209
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Telephone: (916) 758-2360
Fax: (916) 758-2839

Global Environmental
Management Services
Address: 2862 Arden Way, Suite 215
Sacramento, CA 95825
Contact: Dr. James A. Roberts, Partner
Telephone: (916) 483-1564
Fax: (916) 483-1567

Goddard and Goddard Engineering
Address: 6870 Frontage Road
Lucerne, CA 95458-8504
Contact: Dr. Wilson B. Goddard, Chief
Engineer
Telephone: (707) 274-2172
Fax: (707) 274-2172

Hawaii County Economic
Opportunity Council
Address: 34 Rainbow Drive
Hilo, HI 96720-2098
Contact: Max Goldberger, Deputy Director
Science and Technology
Telephone: (808) 961-2681

Hawaii Island Chamber of Commerce
Address: 180 Kinoole Street, Room 118
Hilo, HI 96720
Contact: Ronald Higashi, President
Telephone: (808) 935-7178

Hawaii Island Contractors
Association
Address: 494C Kalanikoa Street
Hilo, HI 96721
Contact: Walt Southward, Executive Director
Telephone: (808) 935-1316

Hawaii Island Economic
Development Board
Address: 75-5737 Kuakini Highway, Suite 206
Kona, HI 96740
Contact: Frank Hicks
Telephone: (808) 329-4713

Hawaii Island Geothermal Alliance
Address: P.O. Box 2338
Kamuelo, HI 96743
Contact: Bill Cook, Executive Director
June Curtis, President
Telephone: (808) 885-7502
Fax: (808) 885-9691

Hawaii Speleological Society
Address: P. O. Box 1526
Hilo, HI 96721
Contact: William R. Halliday, Chairman

Hawaiian Dredging and
Construction Company
Address: Box 4088
Honolulu, HI 96812-4088
Contact: Frank A. McHale
Manager Advanced Projects
Telephone: (808) 735-3211
Fax: (808) 735-7416

International Longshoremen's and
Warehousemen's Union
Hawaii Division, Local 142
Address: 100 West Lanikaula Street
Hilo, HI 96720
Contact: Fred Galdones, Director
Telephone: (808) 985-3727
Fax: (808) 961-2490

Japanese Chamber of Commerce
and Industry
Address: 476A Hinano Street
Hilo, HI 96721
Contact: Clifton Tsuji, President
Telephone: (808) 961-6123

Kanoelehua Industrial Area
Association
Address: P.O. Box 4742
Hilo, HI 96720
Contact: Randolph Ahuna
Telephone: (808) 961-5422
Fax: (808) 935-9740

Kona-Kohala Chamber of Commerce
Address: 75-5737 Kuakini Highway, #207
Kailua-Kona, HI 96740
Contact: Marni Herkes
Telephone: (808) 329-1758

Makai Ocean Engineering, Inc.
Address: P.O. Box 1206
Kailua, HI 96734
Contact: Dr. Joseph Van Ryzin, President
Telephone: (808) 259-5940

Matson Navigation Company
Address: Pier 1
Hilo, HI 96720
Contact: Tom Hanley
Telephone: (808) 935-5781
Fax: (808) 961-3558

MCM Planning
Address: 703 Honua Street
Honolulu, HI 96816
Contact: Marilyn Metz
Telephone: (808) 732-7143

National Speleological Society
Address: 1 Cave Avenue
Huntsville, AL 35810
Contact: John Scheltens, President
Telephone: (205) 852-1300

Edward K. Noda and Associates
Address: 615 Pii Koi Street, Suite 1100
Honolulu, HI 96814
Contact: Dr. Edward K. Noda, President
Telephone: (808) 533-0553
Fax: (808) 538-6515

Northwest Economic Associates
Address: 13101 N.E. Highway 99, Suite 200
Vancouver, WA 98686-2786
Contact: Robert McKusick, President
Telephone: (206) 574-2554
Fax: (206) 574-7083

Oceanic Cablevision
Address: 2669 Kilihau Street
Honolulu, HI 96819
Contact: Don Carroll
Telephone: (808) 836-2888

Oceanit Laboratories, Inc.
Address: 1188 Bishop Street, Suite 1801
Honolulu, HI 96813
Contact: Dr. Patrick Sullivan, President
Telephone: (808) 531-3017

Ogden Environmental & Energy Services
Address: 680 Iwilei Road, Suite 660
Honolulu, HI 96817
Contact: Frank Kingery, Vice President
Telephone: (808) 545-2462
Fax: (808) 528-5379

Pacific International Center for High Technology Research
Address: 2800 Woodlawn Drive, Suite 180
Honolulu, HI 96822-1843
Contact: Andrew Trenka, Energy Division
Telephone: (808) 539-3900
Fax: (808) 539-3899

R. A. Patterson and Associates
Address: 1274 Kika Street
Kailua, HI 96734-4521
Contact: Ralph Patterson
Telephone: (808) 262-5651
Fax: (808) 262-5350

Pro-Geothermal Alliance
Address: 737 Bishop Street, Suite 2860
Honolulu, HI 96813
Contact: Clint Churchill, Chairperson
Telephone: (808) 523-8808
Fax: (808) 521-6141

Puna Orchards, Inc.
Address: P.O. Box 947
Pahoa, HI 96778
Contact: Gary Barnett
Telephone: (808) 965-8390

Randorff and Associates, Inc.
Address: P. O. Box 270630
2 Greenway Plaza, Suite 620
Houston, TX 77277-0630
Contact: Jack Randorff
Telephone: (713) 965-2939
Fax: (713) 965-2938

SAIC
Address: 7600A Leesburg Pike
Fall Church, VA 24403
Contact: Bob Wheeler
Telephone: (703) 821-4786

Stryker-Weiner Associates, Inc.
Address: 737 Bishop Street, Suite 2860
Honolulu, HI 96813
Contact: Karlton Tomomitsu, Account Executive
Telephone: (808) 523-8802
Fax: (808) 521-6141

Waimana Enterprises, Inc.
Address: Pauahi Tower, Suite 1520
1001 Bishop Street
Honolulu, HI 96813
Contact: Albert S. N. Hee, President
Telephone: (808) 599-4441
Fax: (808) 599-4653

West Hawaii Mediation Services
Address: P.O. Box 1890
Kamuela, HI 96743
Contact: Richard Spiegel, Executive Director
Telephone: (808) 885-5525
Fax: (808) 885-6957

Western Pacific Regional Fishery Management Council
Address: 1164 Bishop Street, Suite 1405
Honolulu, HI 96813
Contact: Ms. Kitty Simonds
Executive Secretary
Telephone: (808) 523-1368
Fax: (808) 526-0824

Zond Pacific, Inc.
Address: 485 Waiale Drive
Wailuku, HI 96753
Contact: Keith Avery
Telephone: (808) 244-9389

VII. COMMUNITY, ENVIRONMENTAL AND NATIVE HAWAIIAN ORGANIZATIONS

American Lung Association
Address: 245 North Kukui Street
Honolulu, HI 96817
Contact: Jim Morrow, Director of Environmental Health
Telephone: (808) 537-5966
Fax: (808) 537-5971

Arizona Rainforest Alliance
Address: 738 North 5th Avenue, Suite 214
Tucson, AZ 85705
Contact: Julia M. Schivone
Telephone: (602) 620-6401

Big Island Rainforest Action Group
Address: P. O. Box 1840
Pahoa, HI 96778
Contact: Russell Ruderman, Spokesperson
Telephone: (808) 965-8039

Blue Ocean Preservation Society
Address: 908 Hana Highway
Haiku, HI 96708
Contact: Carl Freedman, President
Telephone: (808) 572-6729

Citizens Advocating Responsible Education (C.A.R.E.)
Address: 1235 Center Street
Honolulu, HI 96816
Contact: Wally Bachman, Science Advisor
Telephone: (808) 737-1842

Citizens for Responsible Energy Development with Aloha Aina (CREDAA)
Address: P. O. Box 358
Mountain View, HI 96771
Contact: Earl Dunn
Patrice Monfreda/Stuart Marks
Telephone: (808) 968-6278

Coral Reef Foundation
Address: P.O. Box 1107
Makawao, HI 96768
Contact: Ann Fielding
Telephone: (808) 572-8437

Council of Energy Resource Tribes
Address: 1999 Broadway, Suite 2600
Denver, CO 80202
Contact: A. David Lester, Executive Director
Telephone: (303) 297-2378
Fax: (303) 296-5690

Friends of the Hana Coast, Inc.
Address: S.R. 96
Hana, HI 96713
Contact: Evelyn Dana
Telephone: (808) 248-7769
Fax: (808) 248-7762

Greenpeace Hawaii
Address: P. O. Box 10909
Hilo, HI 96721
Contact: Denver Leaman, Director
Lynn Goldstein, Project Coordinator
Telephone: (808) 935-0770

Hana Community Association
Address: P.O. Box 202
Hana, HI 96713
Contact: Dawn Lono, Chair
Telephone: (808) 248-8049

Hawaii Audubon Society
Address: 212 Merchant Street, Suite 320
Honolulu, HI 96813
Telephone: (808) 522-5566

Hawaii La'i'ei Kawai Association, Inc.
Address: P.O. Box 720
Ka'a'awa, HI 96730
Contact: Dr. James Anthony
Telephone: (808) 237-7339

Hui Kahakai Community Association
Address: 15-242 Puni Makai
Pahoa, HI 96778
Contact: Virginia Aste
Telephone: (808) 965-9869

Ka Lahui Hawaii O'ahu
Address: 1450 A'ala Street, #1403
Honolulu, HI 96817
Contact: Ao'Pohaku and Luckie Rodenhurst
Telephone: (808) 845-4440
Fax: (808) 373-1424

Kapoho Community Association
Address: P. O. Box 537
Pahoa, HI 96778
Contact: Jennifer Perry, President
Jane Hedtke
Telephone: (808) 965-8699

Kaupo Ranch
Address: 487 Olinda Road
Makawao, HI 96768
Contact: David Young, Manager
Telephone: (808) 572-0636

Kipahulu Community Association
Address: S.R. 156
Hana, HI 96713
Contact: Rich von Wellsheim, President
Telephone: (808) 248-8411

Kohala Estates Community Association
Address: P.O. Box 44617
Kawaihae, HI 96743
Contact: Susan Wells Fischer, Secretary/Treasurer
Telephone: (808) 882-7611

Kohala Ranch Property Owners Association
Address: P.O. Box 44584
Kawaihae, HI 96743
Contact: Kelly Pomeroy
Telephone: (808) 880-1033

Kona Palisades Estates Community Association
Address: P.O. Box 2223
Kailua-Kona, HI 96745-2223
Contact: Roy Mushrush, President
Telephone: (808) 325-7936
Fax: (808) 325-6430

Lani Puna Gardens Association
Address: 13617 Hinalo
Pahoa, HI 96778
Contact: John Olson
Karla Tajima
William Conrad Zydervelt
Telephone: (808) 965-9579, (808) 965-6648

Leilani Estates Community Association
Address: P.O. Box 361
Pahoa, HI 96778
Contact: James Curley, President
Telephone: (808) 965-9745

Malu Aina Center for Non-Violent Education Action
Address: P. O. Box AB
Kurtistown, HI 96760
Contact: Jim Albertini
Telephone: (808) 966-7622

Maui Tomorrow
Address: P.O. Box 261
Wailuku, HI 96793
Contact: Anthony Ranken
Telephone: (808) 244-7011
Fax: (808) 242-4387

Molokai CARES
Address: P.O. Box 1919
Kaunakakai, HI 96748
Contact: Crystal Egusa
Telephone: (808) 553-5595

Native Hawaiian Advisory Council
Address: 1088 Bishop Street
Honolulu, HI 96813
David Penn, Declaration Assistant
Contact: Elizabeth Pa Martin, President
Telephone: (808) 523-1445
Fax: (808) 599-4380

Native Hawaiian Legal Corporation
Address: 1270 Queen Emma Street, Suite 1004
Honolulu, HI 96813
Contact: Paul Nahoa Lucas, Attorney
Alan T. Murakami, Litigation Director
Telephone: (808) 521-2302
Fax: (808) 557-4268

Natural Resources Defense Council
Address: 212 Merchant Street, Suite 213
Honolulu, HI 96813
Contact: Susan Miller, Regional President
Telephone: (808) 533-1075

Oahu Rainforest Action Group
Address: 1711 East West Road
Hale Manoa, Room 901-G
Honolulu, HI 96848
Contact: Noel Ludwig
Laurie Veatch
Telephone: (808) 944-7861

Orchidland Community Association
Address: SR 6014
Keaau, HI 96749
Contact: Sherri Moore
Telephone: (808) 966-8060

Pele Defense Fund
Address: 1942 Naio Street
Honolulu, HI 96817
Contact: Dr. Davianna McGregor
Telephone: (808) 956-7068
Fax: (808) 956-9494

Pele Defense Fund
Address: P.O. Box 39
Kaunakakai, HI 96748
Contact: Dr. Emmett Aluli
Telephone: (808) 553-5353
Fax: (808) 553-3385

Pele Defense Fund
Address: P. O. Box 404
Volcano, HI 96785
Contact: Ralph Palikapu Dedman, President
Telephone: (808) 935-1663
Fax: (808) 935-3551

Progressive Economic Alliance
Cultivating Energy (PEACE)
Address: P.O. Box 623
Kula, HI 96790
Contact: Paul J. von Hartman, Director
Telephone: (808) 878-3630

Puna Community Council
Address: P. O. Box 1294
Pahoa, HI 96778
Contact: Ed Clark
P.O. Box 1458
Keaau, HI 96749
Telephone: (808) 966-7966

Puna Outdoor Circle
Address: RR 2, Box 2298
Pahoa, HI 96778
Contact: Toby Hazel
Telephone: (808) 965-9799

Puni Hui Ohana
Address: P. O. Box 611
Pahoa, HI 96778
Contact: Everett Kinney
Telephone: (808) 965-9140

Rainforest Action Network (RAN)
Address: 301 Broadway, Suite A
San Francisco, CA 94133
Contact: Randall Hayes, Executive Director
Telephone: (415) 398-4404

Rainforest Action Network (RAN)
Address: 1520 Spreckles Street
Apartment # 402
Honolulu, HI 96822
Contact: Annie Szvetecz
Telephone: (808) 941-2402

	Sane Assessment of
	Geothermal Energy (SAGE)
Address:	C/O 1883 Mill Street
	Wailuku, HI 96793
Contact:	Steven Moser
Telephone:	(808) 244-3788

	Sierra Club, Hawaii
Address:	212 Merchant Street, Room 201
	Honolulu, HI 96813
Contact:	Nelson Ho, Regional Vice-President
Telephone:	(808) 538-6616

	Sierra Club, Hawaii
	Hawaii Energy Coalition
Address:	44-155-4 Laha Street
	Kane'ohe, HI 96744
Contact:	Scott A.K. Derrickson
Telephone:	(808) 587-2805

	Sierra Club Legal Defense Fund
Address:	212 Merchant Street, Room 202
	Honolulu, HI 96813
Contact:	Paul P. (Skip) Spaulding III, Attorney
Telephone:	(808) 599-2436

	United National Environmental Program
Address:	2 United Nations Plaza, Room 803
	New York, NY 10017
Contact:	Dr. Noel J. Brown, Regional Director
Telephone:	(212) 963-8319
Fax:	(212) 963-7341

	West Hawaii Sierra Club
Address:	78-6622 Alii Drive
	Kailua-Kona, HI 96740
Contact:	Jay Hanson
Telephone:	(808) 329-6647
Fax:	(808) 329-6523

VIII. GEOTHERMAL DEVELOPERS

Baltimore Gas and Electric Company
Address: Legal Department, 17th Floor
P.O. Box 1475
Baltimore, MD 21203
Contact: Janet McHugh, Counsel
Telephone: (410) 234-5613

Campbell Estate
Address: 828 Fort Street Mall, Suite 500
Honolulu, HI 96813
Contact: Clint Churchill
Chief Executive Officer
Dave McCoy
Chief Operating Officer
Telephone: (808) 536-1961
Fax: (808) 544-3111

Campbell Estate
Address: P.O. Box 1051
Hilo, HI 96720
Contact: Bill DeMent, Geothermal Administrator
Telephone: (808) 959-5734
Fax: (808) 959-5734

Mid-Pacific Geothermal, Inc.
Address: 900 Fort Street Mall, Suite 1777
Honolulu, HI 96813
Contact: Rod Moss, Vice-President
Telephone: (808) 521-9004
Fax: (808) 536-7646

Mission Energy Company
Address: 18101 Von Karman Avenue
Irvine, CA 92715-1007
Contact: Dan Chase, Regional Manager
Telephone: (714) 752-5588
Fax: (714) 752-5624

Puna Geothermal Venture
(Ormat Energy Systems, Inc.)
Address: 101 Aupuni Street, Suite 1014B
Hilo, HI 96720
Contact: Steve Morris
Regional Development Manager
Telephone: (808) 961-2184
Fax: (808) 961-3531

True Geothermal Energy Company
Address: Central Pacific Plaza
220 South King Street, Suite 868
Honolulu, HI 96813
Contact: Allan Kawada, Hawaii Project Manager
Telephone: (808) 528-3496
Fax: (808) 528-1772

IX. UTILITIES

	Hawaiian Electric Company, Inc.
Address:	900 Richards Street P.O. Box 2750 Honolulu, HI 96840-0001
Contact:	Mr. William Bonnet, Manager Environmental Department
Telephone:	(808) 543-5673
Fax:	(808) 543-7023

	Hawaiian Electric Company, Inc.
Address:	900 Richards Street P.O. Box 2750 Honolulu, HI 96840-0001
Contact:	George T. Iwahiro Vice-President of Engineering
Telephone:	(808) 543-7333
Fax:	(808) 543-7707

	Hawaii Electric Light Company, Inc.
Address:	1200 Kilauea Avenue (Mail: P.O. Box 1027) Hilo, HI 96721 Warren Lee, President
Contact:	Clyde Nagata, Manager of Engineering
Telephone:	(808) 969-0321
Fax:	(808) 969-0256

	Maui Electric Company, Inc.
Address:	210 West Kamehameha Avenue (Mail: P.O. Box 398) Kahului, HI 96732
Contact:	Tom Jezierny, President Edward Reinhardt, Manager of Engineering
Telephone:	(808) 871-2364
Fax:	(808) 871-2322

X. CONCERNED INDIVIDUALS

Don Abdul
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Shelley L. Aboud
[redacted]

Nilufer Abrahim
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Michael Ackerman
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John David Adamski
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Ms. Deni Adaniya
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Thomas Adcock
[redacted]

Kaeo M. Adolpho
[redacted]

Matthew K. Adolpho, Jr.
[redacted]

Carol Aiken
[redacted]

Thomas L. Aitken
[redacted]

Imai and Pua Aiu
c/o Pele Defense Fund
[redacted]

Lawrence Aki
c/o Ohanu
[redacted]

Louella Opuielani Albino
c/o Aloha Association
[redacted]

Bobby Alcain
SR 450
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[redacted]

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Pahoa, HI 96778

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Kaunakakai, HI 96748

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John Geddie
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Elisabeth Gern
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January 26, 1993

MEMORANDUM

TO: Mr. Manabu Tagomori, DLNR
Mr. Paul Aki, DOH
Ms. Lynn Lee, OHA
Mr. T. Seng Yang, DOA
Mr. Sam Wilson, DHS
Ms. Julie-Ann Cachola, OSP
Mr. Hugues Ogier, PUC
Mr. Gary Noda, DLIR
Mr. Brian Choy, OEQC

FROM: Maurice H. Kaya
Energy Program Administrator

SUBJECT: Minutes of Meetings Held by the U.S. Department of Energy on the Hawaii Geothermal Project Environmental Impact Statement (EIS)

Thank you for your continued cooperation and assistance in the U.S. Department of Energy's (DOE) in their efforts to prepare a federal EIS on the Hawaii Geothermal Project (HGP).

Transmitted for your review are the minutes of the DOE meetings with agencies and organizations held in Hawaii relative to the HGP EIS. Much of the information generated from these meetings has been incorporated in the preparation of the draft Implementation Plan (IP) distributed to you earlier for review and comment.

It is our understanding that the IP is in its final stages and will be published shortly for distribution to the cooperating agencies. Copies of the final IP will be made available to all commenting agencies upon its receipt by DBEDT.

The State of Hawaii, as a cooperating agency, has been providing information and assistance to DOE in its preparation of the federal EIS for a conceptual 500-megawatt (MW) geothermal/inter-island cable project identified as the "Hawaii Geothermal Project."

Notwithstanding this participation, it should be clearly recognized that the State of Hawaii is not proposing a large-scale geothermal project for the export of electrical energy to the other islands, and that the federal EIS document will be prepared exclusively to fulfill federal EIS requirements.

From 1987 through early 1990, the State of Hawaii actively supported a 500 MW geothermal/inter-island cable project. However, since January 1990, the State's focus has been on commercial geothermal development to first serve the energy needs of the Big Island. The State's support has been limited to those projects which contribute to the assessment, exploration and development of geothermal energy exclusively for the Big Island.

Also attached for your information is the State's current geothermal energy policy as reaffirmed by the Governor in December 1992. Recognizing the possible public misconception relative to the ongoing preparation of the federal HGP EIS, we respectfully request that your agency's future geothermal related communications accurately reflect the State's position on geothermal development.

Attachments

December 1992

GEOTHERMAL ENERGY POLICY STATEMENT

The State of Hawaii currently supports geothermal energy as a potential energy source exclusively for the Island of Hawaii. As such, the State supports the efforts of Puna Geothermal Venture and True/Mid-Pacific Geothermal Venture to explore, develop and generate geothermal electricity in a safe and environmentally acceptable manner limited for use to the Big Island.

The State of Hawaii is not taking any action to support a large-scale geothermal and undersea cable transmission project to export electrical energy to the other islands, and is not aware of any present efforts, public or private, to undertake such a project.

The federal government has been mandated by the federal court to prepare an Environmental Impact Statement (EIS) for a conceptual "Hawaii Geothermal Project (HGP)" consisting of a large-scale (i.e., 500 megawatts) development of geothermal power on the Island of Hawaii for transmission to Oahu and one or more of the other islands in the State.

While the State will continue to provide information and cooperate with the federal government in the preparation of the EIS, the State's position is that there is no such project under consideration at the present time.

Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS)
Cooperating Agency Meeting
State of Hawaii (SOH), Department of Business, Economic Development and Tourism (DBED)

October 3, 1991

Location: Energy Division, DBED, 335 Merchant Street, Honolulu
Contact: Mr. Maurice Kaya, Director, Energy Division DBED (808) 587-3812
Attendees: Mr. Maurice Kaya, DBED
Dr. Lloyd Lewis, DOE-HQ

SOH Role: Mr. Kaya noted that the SOH would most likely accept a cooperating agency role. They were aware of the Council on Environmental Quality (CEQ) letter opposing DOE granting the SOH a co-lead agency role in the EIS preparation. Dr. Lewis noted that part of the delay in DOE responding to an earlier SOH inquiry dealt with the CEQ position. Dr. Lewis gave Mr. Kaya examples of DOE and other cooperating agency Memoranda of Understanding (MOUs) - that can be used to document a cooperating agency relationship for an EIS.

Energy Division Staffing: Mr. Kaya noted that he was trying to recruit a replacement for Mr. Anderson to head his Geothermal Energy Division. He also thought that his current geothermal aide, Mr. Lesperance, would retire by January 1, 1992. For now, Mr. Kaya would be the DBED point of contact for the HGP EIS.

SOH Participation: Mr. Kaya encouraged the use of SOH agencies and expertise in the HGP EIS. Dr. Lewis suggested that DBED prepare a list of relevant SOH contacts, data, etc., to refer to or append to the proposed Memorandum of Understanding (MOU) between SOH and DOE.

DOE Image: Mr. Kaya suggested that DOE might be perceived as pro-geothermal in Hawaii based on DOE's past and current research roles. Dr. Lewis agreed that it was critical for DOE to convince interested parties that this HGP EIS would be public, impartial and objective.

Planned Meetings:

- Regarding DOE's cooperating agency meeting with the County of Hawaii on October 7, 1991, DBED may ask to send a representative of SOH.
- Regarding DOE's October 8, 1991 cooperating agency meeting with collected and individual SOH agencies, Mr. Kaya has set up a proposed agenda (attached) which should be final by the morning of October 8. Mr. Kaya also agrees with Dr. Lewis that only SOH and DOE people would be present (i.e., no consultants or contractors) at the initial collected SOH agencies meeting on October 8.

ACTION ITEMS:

1. DBED is to prepare a list of relevant SOH contacts, data sources, etc. for DOE use in the HGP EIS.

Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS)
Cooperating Agency Meeting
State of Hawaii (SOH) Collected Agencies
October 8, 1991

Location: SOH Dept. Business, Economic Development and Tourism (DBED) Conf. Room, 11th Floor, 220 S. King Street, Honolulu
Contact: Mr. Maurice Kaya, Dir. DBED Energy Division (808) 587-3812
Attendees: Ms. Lynn Lee, Office of Hawaiian Affairs (OHA)
Mr. Murray Towill, Director, DBED
Mr. Maurice Kaya, DBED Energy Division
Ms. Lois Sagatis, DBED Public Affairs
Mr. Brian Choy, Office of Environmental Quality Control (OEQC) Director
Mr. Jeyan Thrugnanam, OEQC
Mr. Dick Poivier, Office of State Planning (OSP)
Mr. Manabu Tagomori, Acting Dep. Dir., Dept. Land & Natural Resources (DLNR)
Mr. Thomas Arizumi, Dept. of Health (DOH)
Mr. Mark Ingoglia, DOH
Dr. Lloyd Lewis, DOE-HQ
Ms. Patricia Phillips, DOE-OR

Meeting Note: Dr. Lewis presented "Hawaii Geothermal Project: Environmental Impact Statement Information Meetings with Hawaii Agencies, Hilo and Honolulu, HI, October 1991". The meeting was opened to questions and discussion. All questions/observations were made by Mr. Kaya unless otherwise noted:

EIS Funding: What funding is available to cooperating agencies? Dr. Lewis described the $5M congressional appropriation and its use limitations as stated by Congress (i.e. balance to go to the SOH for HGP Phase 3) and the federal court decision (i.e. no federal support of HGP until the EIS is completed). He also noted that in EIS work, DOE (if requested) normally funds only that portion of an agency's effort which is outside their normal funding and mission. He described planned work at the U.S. Geological Survey and the Fish and Wildlife Service. In both cases, the work is HGP EIS specific, beyond their funded programs, within their capabilities, and could be funded by DOE.

SOH Energy Plans: Will DOE, in its alternatives analyses, be planning the SOH energy future? Dr. Lewis answered by noting that the EIS is a "body of fact" and that alternatives to geothermal would be considered and compared to HGP as required by the National Environmental Policy Act guidelines. He stated that DOE is not making energy choices and/or decisions for the SOH.

Record of Decision (ROD): Asked to clarify the ROD, Dr. Lewis noted that it, as perceived today, would be "whether or not to partially fund HGP Phase 3" as stated in the Advance Notice of Intent (ANOI). That decision would not necessarily preclude the SOH and/or private funding of HGP.

Community Interactions: What is DOE's intended involvement with community groups? Dr. Lewis noted that given the expressed level of interest in the HGP EIS and requests for meetings, DOE plans to conduct information exchange meetings with interested parties and groups; environmental, civic, progeothermal, native Hawaiian, etc. organizations; and utilities, etc. This level of interaction is commonly undertaken with controversial EISs.

Current Geothermal Developments: How does the present geothermal activity (i.e. Puna Geothermal Ventures-PGV and True-Mid Pacific) relate to this EIS? Dr. Lewis noted that present developments are difficult to separate from the HGP, especially given the SOH inclusion of them in their 1990 proposal to Congress for HGP funding. Nevertheless, DOE agrees that they can be considered as not part of the "intended action" of this EIS, but they will clearly be a good source of background and "cumulative impacts" information. There was general agreement among meeting participants with this approach.

Utility Role: What role will the Hawaiian Electric Company (HECO) play in the EIS? Dr. Lewis noted that HECO is an important information source since they issued the HGP request for proposals, funded the transmission cable program, etc. He noted that a meeting with HECO and DOE was planned for November 1991.

Maui County Interest: (unidentified questioner) What interests (i.e. resource, development, etc.) has Maui expressed in the HGP EIS? Dr. Lewis responded that Maui County was concerned about the added power, development of the geothermal resource subzone near the southwest part of Haleakala Volcano National Park, alternative energy developments, etc. DOE has current plans to meet with Maui County officials as well as Maui-based interest groups in November 1991.

ACTION ITEMS:

1. DOE/ORNL to add all attending SOH agencies to HGP EIS mailing list.

2. DOE to meet individually with OHA, OEQC, DOH, DLNR and OSP 10/8-10/91.

Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS)
Cooperating Agency Meeting
State of Hawaii (SOH) Dept. Business, Economic Development & Tourism (DBED)
October 8, 1991

Location: SOH, DBED Conf. Room, 11th Floor, 220 South King Street, Honolulu
Contact: Mr. Murray Towill, Director, DBED (808) 586-2355
Attendees: Mr. Towill, DBED
Dr. Lloyd Lewis, DOE-HQ

Meeting Note: Mr. Towill and Dr. Lewis agreed to a short, ad hoc, meeting to discuss selected topics.

State EIS: Mr. Towill noted that the SOH is still evaluating pursuit of a SOH EIS on the HGP and that their contractor, ERCE, had in fact initiated such an effort. DOE should work through Mr. Kaya, DBED Energy Director, to obtain details of this effort.

SOH Co-lead Status: Mr. Towill stated that the SOH would not continue to try to obtain co-lead cooperating agency status with DOE for preparation of the HGP EIS.

ACTION ITEM:

1. Dr. Lewis to ask Mr. Kaya, DBED, to arrange a meeting with ERCE this week to discuss prior SOH HGP EIS support work, data, etc.

Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS)
Cooperating Agency Meeting
State of Hawaii (SOH) and County of Hawaii (COH)
October 8, 1991

Location: SOH Dept. Business, Economic Development and Tourism Energy Div. Conf. Room, 336 Merchant Street, Honolulu
Contact: Mr. Maurice Kaya, DBED Energy Div. Director (808) 587-3812
Attendees: Mr. Maurice Kaya, SOH DBED
Mr. John Wong, SOH Deputy Attorney General
Mr. Barry Mizuno, COH Managing Director
Mr. Mike Matsukawa, COH Corporation Counsel
Dr. Lloyd Lewis, DOE-HQ
Ms. Patricia Phillips, DOE-OR

Meeting Note: At the request of Mr. Kaya, DOE agreed to attend this ad hoc SOH-COH meeting to discuss current geothermal developments in Hawaii and their relationship to the HGP EIS, if any.

Current Geothermal Developments: Mr. Mizuno asked how the HGP EIS would impact current geothermal developments (i.e. Puna Geothermal Venture-PGV, True-Mid Pacific) in Puna? Mr. Kaya noted that PGV was not a respondent to Hawaiian Electric Company's request for proposals, that they had no role in the SOH "scientific observation hole" (S-O-H) program, etc. Dr. Lewis noted that current developer roles are confused by the SOH 1990 proposal to Congress for HGP funding which showed them as cost sharing participants in HGP Phase 3. Nevertheless, DOE agrees that they can be considered as not part of the "intended action" of this EIS, but they will clearly be a good source of background and "cumulative impacts" information.

U.S. Geological Survey (USGS) Role: Mr. Kaya observed that the SOH could now be deprived of using USGS in its geothermal resources work (i.e. S-O-H) because of the federal court decision prohibiting federal support of HGP. Dr. Lewis agreed that DOE understands the Judge's order to prohibit any federal involvement in HGP except for EIS preparation, but could not speak for USGS. Dr. Lewis suggested that federal agencies could look at historical data, and even collect new data from an environmental impacts perspective. It was also noted that Judge Ezra, in his decision, had suggested that the prohibition on HGP participation could be extended to other governmental levels (i.e. the SOH). SOH and COH attendees noted that plaintiffs could also choose to bring a similar case against the SOH (or COH) in State court.

HGP Definition: Mr. Kaya noted that the SOH no longer considers its 1990 proposal to Congress as a relevant HGP definition and that the public perception could be confused by DOE's adoption of this definition in its HGP EIS. Dr. Lewis noted that the federal court decision could not be violated, but that alternative geothermal development scenarios could be examined in the EIS as alternatives to HGP. He also observed that the federal defendant agencies (through Dept. Justice) had decided not to challenge the federal court decision (and associated project definition).

SOH Role: Mr. Wong observed that because the outcome of this EIS could impact future energy plans and policies of the SOH, cooperating agency status was desirable.

COH Responsibilities: Mr. Mizuno asked if the COH would have to pick up the costs of the currently Environmental Protection Agency funded SOH Dept. of Health (DOH) air and water quality monitoring program for the current geothermal developments, given the federal court decision prohibiting federal involvement in HGP? Neither the SOH nor DOE had a ready answer to this question. Dr. Lewis suggested that the COH should check directly with the SOH DOH, and/or EPA (since DOE could speak for neither).

HGP EIS Cooperating Agency Meeting, COH 10/8/91 (Cont'd)

COH EIS Role: Mr. Kaya noted that an advantage of COH cooperating agency status for the HGP EIS would be early involvement in document reviews, etc. He suggested a possible disadvantage of being allied with DOE, who could be considered a pro-geothermal agency due to its prior support of geothermal research in Hawaii. Dr. Lewis noted DOE's EIS approach of open, public communications, impartiality and objectivity. Mr. Kaya also asked if DOE would fund the COH to address mitigation measures for the current developments? Dr. Lewis responded that this had not been proposed, and he could not answer without further DOE evaluation. Mr. Matsukawa expressed concern about the COH acting to advocate geothermal energy development (i.e. current energy shortages in the COH), and at the same time playing an EIS role for geothermal energy. He also stated that he thought the advantages of COH cooperating agency status outweighed any disadvantages. Dr. Lewis again noted the advantage of early insight into the EIS products, etc.

Cooperating Agency Agreements: Mr. Kaya, with all in agreement, noted that DOE should propose separate cooperating agency agreements with SOH and COH (and possibly Maui County). The consensus was that both the SOH and COH would continue to evaluate their roles.

ACTION ITEM:

1. DOE to draft separate cooperating agency agreements (Memoranda of Understanding) for SOH and COH (and possibly Maui County) for their consideration.

Hawaii Geothermal Project (HGP) Environmental Impact Statements (EIS)
Cooperating Agency Meeting
State of Hawaii (SOH) Dept. Business, Economic Development and Tourism (DBED)
October 8, 1991

Location: ERCE, Inc., Suite 1550, 900 Fort Street Mall, Honolulu
Contact: Mr. Maurice Kaya, DBED Energy Director (808) 587-3812
Attendees: Mr. Maurice Kaya, DBED
Mr. Frank Kingery, ERCE
Mr. Tom Morrison, ERCE
Dr. Lloyd Lewis, DOE-HQ
Ms. Patricia Phillips, DOE-OR

Master Development Plan (MDP): Mr. Kaya explained that ERCE holds a DBED contract to develop a MDP and Programmatic EIS for HGP. This SOH effort included transmission line routing ("corridor studies"), public involvement and geothermal meetings in Hilo, Puna, Kona and on Maui and Oahu. Answering a status question, Mr. Kaya noted that the SOH EIS for HGP was only in the "embryonic stage".

SOH Revised Plan: Mr. Kaya explained that in mid-1990, the governor made a public policy statement that geothermal energy would be developed first for the Big Island, and if warranted (i.e. power resources, economic benefits, etc. were favorable) would later consider a larger geothermal project for energy export by cable. This revised policy came about partly from geothermal public meetings, and was expressed in the 1991 State of the State address by the Governor. Subsequently, ERCE was told to stop "corridor studies" of transmission line routes.

ERCE Tasks: Mr. Kingery explained that about $200k was spent on MDP and environmental baseline studies. ERCE examined:

- Geothermal development areas
- Threatened and endangered species
- Cultural resources
- Geology
- Land use (existing, designated, planned, etc.)
- Mitigation

ERCE came up with about 150 recommended policy guidelines for the SOH to follow if the HGP were developed. All public meetings were recorded and transcripts appended to the draft MDP. The latter remained in draft form and were delivered only to DBED as of December 1990. Mr. Kaya noted that this MDP is on hold pending the outcome of the federal EIS, but in draft form it could have utility to DOE in preparing that EIS. Dr. Lewis requested copies for DOE and ORNL. (Note: Subsequently, Mr. Kaya decided not to release this unapproved draft to DOE.) Mr. Kingery offered to produce a list of available reports ERCE holds which could be of use to DOE.

ACTION ITEMS:

1. DOE-HQ to follow up on documentation search for revised SOH HGP policy.

2. DOE/ORNL to obtain from DBED/ERCE a list of available references including public meeting transcripts related to the SOH MDP/EIS for HGP.

Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS)
Cooperating Agency Meeting
State of Hawaii (SOH) Office of Environmental Quality Control (OEQC)
October 8, 1991

Location: SOH OEQC, 4th Floor, 220 South King Street, Honolulu
Contact: Mr. Brian Choy, Director, OEQC (808) 586-4185
Attendees: Mr. Brian Choy, OEQC
Mr. Jeyan Thrugnanam, OEQC
Dr. Lloyd Lewis, DOE-HQ
Ms. Patricia Phillips, DOE-OR

SOH Role: Mr. Choy said that the stage of HGP development had not been reached which would trigger the SOH EIS process. He felt that the federal EIS should encompass SOH EIS requirements to avoid having to do duplicate EISs. Dr. Lewis indicated that DOE planned to cover both SOH and federal EIS requirements, and that this was mandated by federal EIS guidelines. Mr. Choy indicated that the SOH needs to be a cooperating agency on the federal EIS, and that the SOH Office of State Planning might be a logical SOH lead agency for that purpose.

Interest Groups: Mr. Choy gave DOE a list of suggested agencies and groups in HI who might have an interest in DOE scoping meetings, etc. He also gave DOE a recently published guidebook (from the Environmental Center of the Univ. of Hawaii) on SOH EIS requirements. He offered to provide DOE his mailing list of some 800 contacts in HI for EIS notices.

Additional Meetings: Mr. Choy encouraged DOE to hold meetings with both the SOH Office of Hawaiian Homelands and with Maui County officials. Dr. Lewis stated that both were scheduled for November 1991.

ACTION ITEMS:

1. DOE/ORNL to add agencies/interest groups to HGP EIS mailing list.

2. DOE/ORNL to request 800-name contact list from OEQC.

3. DOE to ensure that SOH EIS requirements are satisfied in HGP EIS.

Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS)
Cooperating Agency Meeting
State of Hawaii (SOH) Dept. Land and Natural Resources (DLNR)
October 8, 1991

Location: SOH DLNR, 1151 Punchbowl Street, Honolulu
Contact: Mr. Manabu Tagomori, Acting Dep. Director, DLNR (808) 587-2150
Attendees: Mr. Manabu Tagomori, DLNR
Ms. Janet Swift, DLNR
Dr. Lloyd Lewis, DOE-HQ
Ms. Patricia Phillips, DOE-OR

SOH Role: DLNR recommended that the SOH be a cooperator on the federal EIS, but noted that DLNR was short on both staff and funds to support that cooperation.

Geothermal Leasing: Mr. Tagomori explained that in HI, all geothermal resources are SOH owned and managed by DLNR's Board of Directors. DLNR, in turn, leases geothermal development rights. Two such leases have been granted on the Big Island: One to Campbell Estates (where True-Mid Pacific is carrying on an exploration effort); one to Kapoho Land Company (which eventually was transferred to Puna Geothermal Ventures-PGV). Lessees are required to file Geothermal Management Plans with DLNR prior to drilling.

Geothermal Advisory Board (GAB): DOE was encouraged by DLNR to talk to members of the DLNR GAB:

- Dr. Jim Alexander, U.HI, Hilo
- Dr. Harry Olson, U. HI, Manoa
- Dr. Peterson, U. HI, Manoa
- Mr. Jim Kauahikaua, US Geological Survey

The GAB members have current information on current geothermal resources in Puna.

Land Swap: Mr. Tagomori explained a recent 25,000 acre land exchange between the SOH and Campbell Estates. This resulted in higher elevation, pristine rainforest being placed in conservation status and forming a no-developmental buffer adjacent to Hawaii Volcanoes National Park. The lower elevation, less pristine acreage became (almost entirely) a part of the designated geothermal resource subzone (GRS).

GRSs: There are four GRSs in HI. They are on the Big Island (three GRSs) and Maui. The southwest rift of Kilauea was proposed for GRS designation, but never received such designation. Exploration for geothermal resources can occur in any of the four categories of land in HI (i.e., urban, agricultural, rural and conservation), but production is only allowed in a designated GRS. It takes about two years to complete a GRS designation (note: details of GRS designation process are given in a reference provided DOE by DLNR). DLNR is currently re-evaluating the geothermal resource in the Kilauea East Rift Zone (KERZ) and may redraw the 90 percent resource occurance probability lines after acquiring data from the current developers. These data can be made available to DOE (note: only PGV data currently releasable) after the one year confidentiality period expires.

Current Developments: DLNR described the current geothermal developments in Puna, probable distribution of expected royalties, a possible assets fund for relocation of residents, the SOH-County of Hawaii (COH) task force investigating the KS-8 well venting incident of June 1991, etc. It was noted that the SOH Dept. of Health (DOH) licenses reinjection wells while DLNR licenses production wells.

HGP Licensing: Ms. Swift described the SOH "one stop licensing" process established by legislation in HI for HGP and associated transmission cable permits. So far, there have been no applications for this service. Developing this licensing service involved the federal, SOH and COH task force referred to in the federal court decision.

Future Meetings: DLNR recommended that DOE meet with HELCO to discuss the current electrical power shortages on the Big Island. Dr. Lewis noted that DOE is scheduled to meet with the utilities in November 1991.

ACTION ITEMS:

1. DOE/ORNL to obtain GMPs for current developments in Puna from DLNR.

2. DOE/ORNL to follow up contacts with DLNR GAB for geothermal resources information.

3. DOE/ORNL to request geothermal well data from current developers through DLNR.

4. DOE to meet with HELCO during utilities meetings in November 1991.

Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS)
Cooperating Agency Meeting
State of Hawaii (SOH) Office of Hawaiian Affairs (OHA)
October 10, 1991

Location: SOH OHA, Suite 1500, 1600 Kapiolani Blvd., Honolulu
Contact: Ms. Lynn Lee, OHA EIS Planner, (808) 586-3777
Attendees: Ms. Lynn Lee, OHA
Dr. Lloyd Lewis, DOE-HQ
Ms. Patricia Phillips, DOE-OR

OHA Role: Ms. Lee described OHA as a quasi-SOH agency which is legally responsive to the beneficiaries of OHA services (but not to SOH government). About one half of OHA funds come from management of ceded lands and one half comes from the SOH legislature. OHA serves in an advocacy roles for native Hawaiian interests and organizations. It has a nine-member elected Board of Trustees who each serve for four year terms. OHA has existed for about ten years and has no independent rule-making authorities. Ms. Lee stated that the OHA Board had decided that they do not want a cooperating agency role with DOE on the HGP EIS, but that OHA could facilitate information exchange and coordinate meetings with native Hawaiians. She stated that she could also provide DOE draft guidance on OHA roles and responsibilities. Ms. Lee noted that there are tens of native Hawaiian groups and most are currently caught up in the sovereignty movement. She recommended that DOE have a cooperating agency agreement with the SOH, and suggested that the Office of State Planning might be a logical choice for the SOH lead agency. She also urged DOE to develop a separate agreement with Maui County.

Native Hawaiian Religion: Ms. Lee noted the importance of religion to native Hawaiians, and urged DOE to give religious groups free access to the EIS process. She also recognized the difficulty in dealing with religious issues.

Additional Contacts: Ms. Lee recommended that DOE meet with:

- Native Hawaiian Legal Corporation (NHLC), Mr. Alan Moracombi (808) 521-2302
- State Historic Preservation Officer (SHPO), Mr. Don Hibbard
- Pele Defense Fund (PDF)

Archeological Sites: Ms. Lee noted the discovery of "significant" archeological sites in the rainforest near the current True-Mid Pacific geothermal development. These discoveries have resulted in exploration permit limitations pending site investigations.

Office of Hawaiian Homelands (OHH): Ms. Lee recommended that DOE meet with OHH, which office has oversight of a federal land trust setup in the 1920s for native Hawaiians. She expects the HGP transmission lines may well cross OHH lands.

OHA EIS Position: Ms. Lee summarized by stating OHA Board opposition to cooperating agency status on HGP, but that the Board may reconsider at a later date, if asked. DOE should emphasize the EIS treatment of both alternatives and mitigation of impacts if they pursue an agreement with OHA. She stated that OHA would want the right to comment on the EIS issue by issue, but not be placed in a project recommendation role.

ACTION ITEMS:

1. DOE/ORNL should request an OHA role guidelines report.

2. DOE should meet with NHLC, SHPO, PDF, and OHH.

Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS)
Cooperating Agency Meeting
State of Hawaii (SOH) Office of State Planning (OSP)
October 10, 1991

Location: OSP, State Capital, Room 410, Honolulu
Contact: Mr. Dick Poirier, OSP (808) 587-2839
Attendees: Mr. Dick Poirier, OSP
Mr. Scott Derrickson, OSP
Ms. Julie-Ann Cachola, OSP
Dr. Lloyd Lewis, DOE-HQ
Ms. Patricia Phillips, DOE-OR

SOH Role: Dr. Lewis briefly described issues under discussion with SOH pertaining to a proposed cooperating agency agreement:

- Whether two EISs would be written for HGP (1 by SOH, 1 by DOE) or a combined EIS
- If SOH would be granted co-lead cooperating agency status by DOE
- The role of existing geothermal developments, SOH oversight, etc.

Mr. Poirier noted that SOH would likely be a cooperating agency, and the OSP position is that DBED is and shall remain the SOH lead agency unless DBED requests a change. He also described the SOH production of an integrated energy plan. This plan is currently in draft, has been reviewed by environmental groups, and has been a topic of several public meetings and extensively reviewed. (Note - DBED reports that plan is still in too early a draft version to release; should be available by 1/1/92.)

IRP Process: Mr. Derrickson characterized the current Public Utilities Commission (PUC) mandated Integrated Resource Planning (IRP) exercise underway by utilities in HI. The PUC framework will be issued soon (by 1/1/92) and will give utilities approximately one year to file draft IRPs (although the responses may be staggered with HECO and HELCO coming in early). From a cost comparison perspective, geothermal may not come out as a top choice. Mr. Derrickson suggested DOE contact the intervenors in the IRP process for EIS (i.e., alternatives, IRP, DSM, etc.) inputs. Dr. Lewis briefly described the DOE supported, SOH (DBED) cost shared, current IRP research effort underway in HI.

Cultural/Socioeconomis Issues: Ms. Cachola urged DOE coordination with native Hawaiian groups, especially dealing with cultural and religious issues. DOE might even consider convening a panel of several Hawaiian cultural experts. She mentioned that several Hawaiian religions were recognized by the U.S. Department of Interior, but not all by Congress. Her list of issues included:

- Impact on Pele and volcano worship
- Impact on Amakua (natural objects worship)
- Gathering (i.e., medicinal plants) and subsistence harvest rights
- Forms of land ownership, especially ceded lands and Hawaiian Homelands
- Preservation of species diversity and abundance
- Current sovereignty movement

HGP EIS Cooperating Agency Meeting, OSP 10/10/91 (Cont'd)

- Sanctity of lava tubes as burial sites and impact on well siting
- Lifestyles choices (noting Puna district is not tourist based - more independent thinking)

Cost Consideration: Mr. Derrickson noted that certain added costs from socioeconomic issues may have to be borne by the ratepayer. He noted that costing methodology will be addressed in the PUC IRP framework. Even though there may be a high risk of physical damage to wells, plants, transmission lines, etc. from volcano/seismic hazards, ratepayers may be obligated to pay for these losses once the utility has signed contracts. Mr. Derrickson stated that the total HGP costs need to be known - that certain unknown "hidden costs" leaves the public a false cost impression. Also, to date there has been little basis in technology used to make these cost estimates. He noted the need to add in cost of both backup facility on Oahu and redundant submarine transmission cables and the resultant impact of both on utility rates on each island. He noted possible threats to the submarine cable from lava flows, strong currents, rough ocean floor, and submarine landslides, as well as cable impacts like electromagnetic field effects on whales. Dr. Lewis noted that he understood the transmission cable and the number of geothermal wells to have redundancy built into their estimate. Mr. Derrickson wondered if early contractual agreements (like PURPA) with developers would unnecessarily raise already high rates. All possible financing mechanisms need assessment, including rate, susidy and royalties distribution considerations. It is possible that local utility planning flexibility could be reduced by premature HGP commitment. This could provide disincentives for energy efficiency measures to be emplaced. (i.e., set the State on a local growth path). He also noted that DBED provided population projections may be "desired" rather that "actual" and based on incorrect growth projections.

Geothermal Resource Subzones (GRS): Ms. Edmunds inquired whether only the current GRSs under development would be considered viable by DOE? Dr. Lewis noted that DOE would examine all reasonably foreseeable geothermal sites which could include the Maui GRS if it could support geothermal electricity development. She recommended contacting Bonnie Degale of Hawaii County Planning for a copy of the Puna Community Development Plan (note - Ms. Degale claims that this plan is in draft and not available for distribution).

Current Geothermal Developments: Ms. Edmunds noted that the public perception (negative) is that DBED supports the current geothermal developments (i.e., PGV), in spite of health and safety problems associated with PGV operations, she noted current problems with the citizen emergency evacuation plans and we should talk to Harry Kim, Hawaii County Civil Defense. She questioned the performance standards being applied, the company safety record prior to their permitted HI operations, and suggested DOE examine this data base in preparing its "risk of credible accident" section of the EIS. Dr. Lewis agreed that DOE/ORNL would examine the record for standards applicable to geothermal development (i.e., ASME, Geothermal Resource Council, etc.).

Water Use: Ms. Cachola suggested DOE check with Hawaii County and U.S. Geological Survey regarding water use plans and their compatibility with geothermal development. These county plans are now mandated (since 1988) by SOH law.

Whale Sanctuary: Mr. Poirier asked if DOE was considering the proposed humpback whale sanctuary in the lee of Maui and Molokai in relation to possible cable routing? Dr. Lewis confirmed that with NMFS help, DOE would review whale sanctuary plans. Mr. Poirier offered to provide DOE a copy of the recent HI whale sanctuary designation EIS.

HGP EIS Cooperating Agency Meeting, OSP 10/10/91 (Cont'd)

Alternative to HGP: Mr. Derrickson suggested that DOE examine at least three alternatives to HGP.

- No action - continued reliance on conventional fossil fuels and increased energy efficiency.
- Centralized solar plus storage - systems similar to the LUZ system in California
- Aggressive energy conservation - possibly with addition of small renewable facility increments.

OSP ANOI Comments: Mr. Poirier closed the meeting by thanking DOE for their time and providing a copy of OSP's ANOI comments of 9/30/91 which are similar to those given at this meeting. Dr. Lewis thanked OSP and those present for their comprehensive review of the DOE ANOI.

ACTION ITEMS:

1. DOE/ORNL should acquire SOH integrated energy plan when first available.
2. DOE should plan to meet with group of IRP intervenors.
3. DOE should coordinate with native Hawaiian groups and use local expert native Hawaiians as consultants on cultural and religous issues.
4. DOE/ORNL should acquire the PUC IRP framework asap.
5. DOE/ORNL should acquire population projections from OSP.
6. DOE should meet with Harry Kim of Hawaii County Civil Defense.
7. DOE/ORNL should look for applicable geothermal industry standards.
8. DOE/ORNL should check with Hawaii County and USGS water use plans.
9. Mr. Poirier to provide DOE/ORNL copy of the whale sanctuary EIS.

Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS)
Cooperating Agency Meeting
State of Hawaii (SOH) Department of Health (DOH)
October 10, 1991

Location: DOH, 1250 Punchbowl Street, Honolulu
Contact: Dr. Bruce Anderson, Dep. Director DOH (808) 586-4424
Attendees: Dr. John Lewin, Director DOH
Dr. Bruce Anderson, DOH
Dr. Lloyd Lewis, DOE-HQ
Ms. Patricia Phillips, DOE-OR

SOH Role: Dr. Anderson observed that the SOH should work to obtain a cooperating agency/co-lead agency role in the HGP EIS, possibly with the Office of State Planning or the Office of Environmental Quality Control as the lead SOH agency. His plan is to meet with Mr. Towill, Director of DBED, on next Friday to discuss this approach further. He further noted that it was on the advice of DOH that the Governor had recently changed the HGP proposal to developing geothermal energy for the Big Island only initially and to hold off on adding a cable for energy export until proven economically feasible in the future.

Health/Safety/Mitigation: Mr. Anderson noted that geothermal facilities ought to be located away from residential areas and to include sufficient buffer distance. DOH has a high interest in air quality permits, human health effects, water quality, etc. He suggested possible land swaps or other compensation (i.e., free electricity, etc.) to help mitigate these impacts. There was some discussions of DOH and the County of Hawaii involvement in permitting of current geothermal developments.

Future Development: Dr. Lewis noted that DOH is aware that geothermal energy development might facilitate industrial development on the Big Island and DOH would be concerned about additional health/safety issues.

ACTION ITEMS: None

NOTES FROM THE HAWAII GEOTHERMAL PROJECT EIS INFORMATION EXCHANGE/COOPERATING MEETINGS, NOVEMBER 12-18, 1991

November 14, 1991

Cooperating Agency Meeting with the State Office of Consumer Advocacy.

Location: 1010 Richard St., 2nd Floor, Honolulu, Hawaii.
Contact: Chuck Totto, (808) 586-2770.
Attendees: Dr. Lloyd Lewis, DOE, Washington, D.C.
Ralph Burr, DOE, Washington, D.C.
Patricia Phillips, DOE, Oak Ridge
Andrea Campbell, Oak Ridge National Laboratory
James Saulsbury, Oak Ridge National Laboratory
Chuck Totto, State Office of Consumer Advocacy

Meeting Notes: Dr. Lewis presented "Hawaii Geothermal Project: Environmental Impact Statement Information Meetings with Hawaii Agencies and Interest Groups--November, 1991" (cooperating agencies version). After the presentation by Dr. Lewis, participants discussed the HGP EIS as follows:

1. Dr. Lewis stated that we need to look at geothermal in the context of alternatives identified in Hawaii's ongoing Integrated Resource Planning (IRP) process. Dr. Lewis asked Mr. Totto if he thought the IRP process would be accomplished during the EIS timeframe. Dr. Lewis asked if we would be able to rely on the Hawaii's IRP or if we should be looking for some of the same information on our own. Mr. Totto answered that the framework for the State's IRP should be out later this year, and that the first draft of the IRP is due one year after the framework is released. Mr. Totto said that the collaborative group and the utilities that are working on the IRP should be willing to provide information, even if the collaborative had to cajole the utilities into providing information.

2. Dr. Lewis stated that the EIS shouldn't replicate the IRP process in Hawaii, and that he hoped the IRP and EIS schedules would coincide. Dr. Lewis said that the EIS needed information from the IRP to identify reasonably foreseeable, near-term alternatives for energy sources on each of the islands. Mr. Totto replied that scheduling would depend on the IRP framework chosen by the Public Utilities Commission (PUC). He said that the framework would tell each utility exactly what they have to do to put together a 20-year IRP and a 3-year implementation plan. Mr. Totto said that the main question is how specific the PUC will be in its requirements and guidelines, because the PUC is trying to force the utilities into a new, more consistent way of doing IRP.

3. Mr. Totto said that the PUC called for written proposals on the IRP framework. He said that the collaborative group of 20 individuals and organizations (with Carl Freedman) submitted proposals, as did the State Office of Consumer Advocacy, each of the individual utilities, and the Department of Defense (DOD submitted one because of the amount of

energy they consume in Hawaii). He recommended strongly that we work closely with the collaborative group. He said that the PUC will consider all of these proposed IRP models in selecting the new framework that will define IRP in Hawaii.

4. Mr. Totto said that the State Office of Consumer Advocacy would help us any way it could in examining IRP issues, especially by providing information. He said his office could provide a different perspective as well as substantial information. At this point, he agreed to mail copies of some of the IRP model framework proposals to ORNL (see Action Item #1).

5. Mr. Totto explained that the PUC has the authority to establish the IRP framework, and that the Department of Business and Economic Development (DBED) wanted to have a leading role in developing the framework. Mr. Totto said that his office looked at IRP options that would give the PUC the most flexibility, while DBED looked at options that would give utilities the most flexibility. He added that the PUC choice of framework will determine which approach to follow.

6. Mr. Totto said that we should go to the utilities for information on reasonable, near-term alternatives in energy planning.

7. Mr. Totto offered two reasons why Demand Side Management (DSM) has become so popular in energy planning in Hawaii: 1) there is a shortage of land on which to build power plants in Hawaii (and the land that is available is very expensive), and 2) the strong environmental groups in Hawaii are calling for DSM.

8. Mr. Totto said that if the PUC framework allows utilities to do business as usual, the utilities will do it. He feels that the framework will not be this lenient, although he thinks that in deference to the utilities it will not contain as much DSM as many groups and individuals want.

9. Mr. Totto said that his office had suggested using an "adder" of about 20% to calculate the cost of externalities in the IRP. He said that this was one area in which the EIS might be able to help the IRP process (by providing information on the cost of externalities, etc.). Dr. Lewis said that we need to use the collaborative parties as a source of information on the IRP process and the cost of externalities in Hawaii. Dr. Lewis and Ms. Campbell also said that the Lawrence Berkley Lab might be used as a subcontractor on IRP and alternative energy sources. Mr. Totto responded that 5-8 of the collaborators would be keenly interested in the EIS preparation while most of the collaborators would be willing to serve in a review role.

10. In response to a question from Dr. Lewis, Mr. Totto noted that utilities are not required to have spinning reserve capacity on neighbor islands.

NOTES FROM THE HAWAII GEOTHERMAL PROJECT EIS INFORMATION EXCHANGE/COOPERATING MEETINGS, NOVEMBER 12-18, 1991

Action Item: One action item was identified during the meeting with the State Office of Consumer Advocacy.

1. Mr. Totto agreed to mail copies of some of the IRP model proposals to ORNL.

NOTES FROM THE HAWAII GEOTHERMAL PROJECT EIS INFORMATION EXCHANGE/COOPERATING MEETINGS, NOVEMBER 12-18, 1991

November 15, 1991

Cooperating Agency Meeting with the State Office of Hawaiian Homelands.

Location: 335 Merchant St., Suite 307, Honolulu, Hawaii.
Contact: John Rowe (808) 586-3801.
Attendees: Dr. Lloyd Lewis, DOE, Washington, D.C.
Ralph Burr, DOE, Washington, D.C.
Patricia Phillips, DOE, Oak Ridge
Andrea Campbell, Oak Ridge National Laboratory
James Saulsbury, Oak Ridge National Laboratory
John Rowe, Deputy Director, State Office of Hawaiian Homelands
Keoni Agard, State Office of Hawaiian Homelands

Meeting Notes: Dr. Lewis presented "Hawaii Geothermal Project: Environmental Impact Statement Information Meetings with Hawaii Agencies and Interest Groups--November, 1991" (cooperating agencies version). After the presentation by Dr. Lewis, participants discussed the HGP EIS as follows:

1. Mr. Rowe gave a brief history of the State Office of Hawaiian Homelands, which is one of ten State agencies under the executive branch. He said the Federal Hawaiian Homes Commission Act of 1921 (HHCA) was the founding legislation for the Hawaiian Homelands program. He said that the HHCA was originally a Federal program, but that it had been transferred to the State with statehood in 1959, and is so identified in the Hawaii State Constitution. Nevertheless, he indicated that the Federal government (the Department of Interior) still has a trust responsibility in the program, and that the DOI must approve changes in the program and the sale, exchange, or lease of Hawaiian Homelands. Since 1984, Congress has been approving changes in benefits under the act. Mr. Rowe stated that the HHCA had set aside 188,000 acres on five islands, and that 107,982 acres were on the Big Island. He said that the program had been controversial in recent years because the State had sold, exchanged, and leased many acres of Hawaiian Homelands to outside interests in order to raise revenue for the program (it only recently became funded through the State budget). He said the program's primary objective was "putting people on the land" by providing acreage for Native Hawaiians (50% or more Hawaiian) to homestead and build residences, ranches, etc. He added, however, that the program had not been successful because most of the land was not suitable for development, and that only 18% of the total acreage had been homesteaded. Mr. Rowe said that the waiting list for lands (a 99-year lease) is up to about 18,000, and that even the lands that are given away cannot be developed because they lack the necessary infrastructure (i.e., sewer, water, access, etc.). He added that it would take approximately $2.5 billion to complete the infrastructure improvements necessary to meet the demands of placing some 14,000 families over the next ten years. The State has about $100 million set aside at present. The HHCA Commission (9 Commissioners, each appointed for

four years, the head is Ben Henderson) plans to improve lots and homestead the initial 2,500 applications in the near term. Once the infrastructure is in place, Hawaiians could build a liveable residence for $70,000 to $80,000. The Commission has reduced the _____ and believes that the needs of individual Native Hawaiians outweigh the "public good."

2. Mr. Rowe indicated that the HGP's overland transmission corridor could affect Hawaiian Homelands near the Kawaihae, Humuula, and Pihonua land holdings on the Big Island, and near the Kahikinui land holding on Maui. He indicated that HHCA administrative rules (sections 203-204 of the Hawaii State Statutes) would govern whether the State can lease or swap other land for any of the Hawaiian Homelands in the proposed transmission corridor area.

3. Mr. Rowe described the difference between Hawaiian Homelands and ceded lands. He said that ceded lands were Royal Hawaiian Kingdom Lands that had been ceded to the U.S. Government in 1898. These lands were then ceded back to Hawaii with statehood in 1959. He said that about 90% of the State's 1.4 million acres are ceded lands; the rest are: 1.) State lands acquired after 1898, 2.) private lands, 3.) Hawaiian Homelands, and 4.) lands owned by the Federal government. Mr. Rowe said that the State Admission Act of 1959 outlines the differences in Hawaiian land designations. There are still some 60,000 acres that are in question regarding designation in Hawaii and the Governor's task force is working on the issue.

4. Mr. Rowe said that Native Hawaiians have now established a "burial council" on each island to deal with potential impacts of development on burial sites. He said that Eddie Ayau(?) with the Department of Land and Natural Resources had been involved with this and might be a point of contact. Another contact is Ed Kanahele (see Action Item #1).

5. Mr. Agard described the movement for Native Hawaiian sovereignty with which he is affiliated. One of the reasons for the sovereignty movement is to get action on the Homelands issue. He said that 33 Native Hawaiian groups have formed a coalition called Hui Na' Auoa to work for Native Hawaiian sovereignty. He said that two proposals are being forwarded, at the state level (by State Senator Russell) and at the federal level (by U.S. Senator Inouye). The proposals call for a provision in the State constitution which would allow for a Native government within the context of the existing State government. Mr. Agard agreed to provide Mr. Saulsbury with a list of the 33 groups that make up the Hui Na' Auoa (see Action Item #2). The Hui Na' Auoa executive committee phone number is (808) 586-3825. He also described a State Association of Hawaiian Homes Community Associations as primarily Native Hawaiians and suggested Kamake Kanahele as a contact (see Action Item #3).

Action Items: Three action items were identified during the meeting with the State Office of Hawaiian Homelands:

NOTES FROM THE HAWAII GEOTHERMAL PROJECT EIS INFORMATION EXCHANGE/COOPERATING MEETINGS, NOVEMBER 12-18, 1991

1. Mr. Rowe suggested that ORNL contact Eddie Ayau(?) of the Department of Land and Natural Resources and Ed Kanahele for information on Native Hawaiian "burial councils."

2. Mr. Agard agreed to provide Mr. Saulsbury with a list of the 33 groups that make up the Hui Na' Auoa.

3. Mr. Agard suggested Kamake Kanahele of the State Association of Hawaiians Homes Community Associations as a contact.

NOTES FROM THE HAWAII GEOTHERMAL PROJECT EIS INFORMATION EXCHANGE/COOPERATING MEETINGS, NOVEMBER 12-18, 1991

November 15, 1991

Cooperating Agency Meeting with the State Historic Preservation Office (SHPO).

Location: 33 South King St., 6th Floor, Honolulu, Hawaii.
Contact: Ross Cordy (808) 587-0012.
Attendees: Dr. Lloyd Lewis, DOE, Washington, D.C.
Ralph Burr, DOE, Washington, D.C.
Patricia Phillips, DOE, Oak Ridge
Andrea Campbell, Oak Ridge National Laboratory
James Saulsbury, Oak Ridge National Laboratory
Ross Cordy, Hawaii SHPO, Branch Chief for Archaeology

Meeting Notes: Dr. Lewis presented "Hawaii Geothermal Project: Environmental Impact Statement Information Meetings with Hawaii Agencies and Interest Groups--November, 1991" (cooperating agencies version). After the presentation by Dr. Lewis, participants discussed the HGP EIS as follows:

1. Mr. Cordy said that we should not rely solely on State and Federal registers of historic and archaeological resources in Hawaii because they are not complete (i.e., there are at least 25,000 known sites that are not on any register). He added, however, that we should use available State and Federal registers for criteria on evaluating sites. He also noted the importance of the National Historic Preservation Act, the Native American Graves Act, the Native American Freedom Act, and Chapter 6E of Hawaii Revised Statutes. He noted the archaeologist for Hawaii County is Kanalei Shaun and that Holly MacEldowny of his office is on extended leave (see Action Item #1).

2. Mr. Cordy stated that there are many sites that might not be considered formal "sites" in the strictest sense. For instance, he said that traditional plant gathering places could be important historical sites, and that lava tubes could be historic sites, even if they were not used for burials, because they might have been used by feather collectors. Cinder cone locations older than 50 years are also examined for site status. He described the ancient system of mountain top to sea land ownership (ahupua'a) under the control of a chief.

3. Mr. Cordy stated that the density of sites is lower in forest areas than elsewhere. He said that there are temporary camp sites in the forests, but that they are difficult to find and of little value because most of them are deteriorated. He said that temporary camp sites set up in caves are easier to find and are in better condition, and added that there may be some sites in the caves near the HGP location. Sites were often used by feather collectors in addition to camps.

4. Mr. Cordy indicated that there is a system of traditional trails, dating back to the days of the Hawaiian Monarchy, that are maintained by the State to provide Native Hawaiians with

access to traditional gathering places, etc. He indicated that this trail system could be impacted by the construction and presence of the HGP plants and overland transmission line corridor.

5. Mr. Cordy indicated that one of his biggest concerns with the HGP is potential impacts to Native Hawaiian burial sites in lava tubes, caves, and cinder cones. He said that there had not been a great deal of conflict over this issue in connection with the HGP so far, but that it could become more important. Mr. Cordy said that State law requires an operator to stop drilling and send cameras down into a drillhole any time a drill hits an eight-foot void (i.e., to determine if it might be a burial site). He said the problem is that no one knows how many burial sites there are, or where the sites are located. He added that even if a researcher has information about the original location of a burial site, the bodies may have been moved by lava flows and the researcher might never find the site. Mr. Cordy stated that residents in the Puna area had helped the SHPO prepare a recent report on the locations of many burial sites, and that we could have access to this report (see Action Item #2).

6. Mr. Cordy indicated his concern over impacts to traditional Native Hawaiian spiritual sites and gathering places that might be deemed historic sites. He stated that these places are difficult to protect because there usually is no documentation (i.e., only oral histories remain) to prove that they are legitimate sites. Mr. Cordy noted that as we do our EIS archaeological studies, we should announce our need for site-specific documentation. A discussion ensued as to who would be responsible for proving that the spiritual sites do or do not exist (i.e., must the Native Hawaiians prove that the sites are legitimate, or must the developer prove that they are not). Dr. Lewis asked Mr. Saulsbury to investigate the matter (see Action Item #3).

7. Mr. Cordy stated that his three largest concerns were impacts to: 1.) archaeological sites; 2.) traditional Native Hawaiian gathering areas, and; 3.) traditional Native Hawaiian ceremonial/religious worship areas. He said that forest resources (caves, trails, gathering places, etc.) are the primary concern near the HGP, and that archaeological sites are the primary concern along the transmission corridor route. Mr. Cordy said that this same general pattern (many shoreline sites, then an "empty zone" with few sites, then densely occupied field sites as one moves inland from the shore) would be true on Maui. He stated that we might get some guidance on sites from the Denver, Colorado, based U.S. Advisory Council on Historic Preservation (see Action Item #4).

8. Mr. Cordy indicated that the general area through which the overland transmission corridor would pass is densely occupied with archaeological sites, both on the shoreline and in the field areas above the shoreline. He said that ERCE was preparing a study of the area, and that they had obtained land settlement information on many of the field areas where sites exist. The point of contact at ERCE is Mr. Al Schliz (see Action Item #5). He said that the SHPO needs to review and approve the study, but that we could access the information after

that approval was granted. Mr. Cordy suggested that the transmission corridor go south of Kawaihae Bay to avoid the very important historic sites along the northwest coast of the Big Island. He said it was especially important to avoid the National Park Service shrine at the Puukohola Heiau National Historic Site, and that the transmission line should not even be visible from this point.

9. Mr. Cordy suggested that the EIS examine the State's Conservation District Use Act procedures in conjunction with the proposed HGP plant site (see Action Item #6).

10. Mr. Cordy stated that there could be impacts to traditional Native Hawaiian fishing and gathering rights on reefs. He referred again to ahupua'a, the traditional land division system in which tenants had rights to use land from wading depth in the reef regions inland to the rainforest area.

11. Mr. Cordy suggested Feathered Gods and Fishhooks by Patrick Kirch as a good introduction to Hawaiian archaeology and land division systems. Mr. Saulsbury agreed to purchase a copy for the project library (see Action Item #7).

12. Mr. Cordy indicated that the Bishop Museum had strength in archaeological research but had recently laid off some of its research staff and was raising its fees in an effort to restore some financial stability. He added that the Museum's emphasis had switched from research to being a public display museum. Mr. Cordy provided Mr. Saulsbury with a list of Hawaiian archaeological consulting firms.

13. Mr. Cordy said that the key to establishing our credibility would be to work with credible consultants and the SHPO in an effort to persuade Native Hawaiians to come forward and identify their sites and concerns. He further noted that traditional tenant rights under ahupua'a are maintained by occupancy.

Action Items: Seven action items were identified during the meeting with the Hawaii State Historic Preservation Office:

1. Mr. Cordy suggested that ORNL work within the guidelines of the National Historic Preservation Act, the Native American Graves Act, and Chapter 6E of Hawaii Revised Statutes. He also suggested that ORNL contact Kanalei Shaun and Holly MacEldowny.

2. Mr. Saulsbury agreed to obtain the SHPO's report on the locations of Native Hawaiian burial sites in lava tubes on the Big Island.

3. Mr. Saulsbury agreed to ascertain who would be responsible for proving the legitimacy of claims that an area is a Native Hawaiian spiritual site or gathering place (i.e., must the Native Hawaiians prove that the sites are legitimate, or must the developer prove that they are not).

4. Mr. Cordy suggested that ORNL consult the U.S. Advisory Council on Historic Preservation.

5. Mr. Cordy suggested that ORNL obtain the ERCE transmission corridor route study for information on field areas where archaeological sites might exist. The point of contact at ERCE is Al Schliz.

6. ORNL agreed to obtain a set of Conservation District Use Act (CDUA) regulations and procedures and review them for application to the HGP EIS.

7. Mr. Saulsbury agreed to obtain a copy of Patrick Kirch's Feathered Gods and Fishhooks for the project library.

Tour, Moloka'i's Fishponds, Southeast Moloka'i
12 March 1992, 8:30 AM.

Contact:	Walter Ritte, Jr., DBED, Moloka'i
Attendees:	Carol Borgstrom, DOE, Washington DC
	Carl Freedman, Blue Ocean Preservation Society
	Mary Hunt, Lawrence Berkeley Lab, Berkeley CA
	Jerry Lesperance, DBED, Honolulu HI
	Annie Szvetecz, Rain Forest Action Network
	Virginia Tolbert, ORNL, Oak Ridge TN
	Amy Wolfe, ORNL, Oak Ridge TN

Walter Ritte gave an interesting discussion of the use of fishponds on Moloka'i. He explained their uses in ancient times and then described his plans to use them to provide a more extensive food supply and economic base on Moloka'i. He first stopped at a loko kuapa that has been completely refurbished for mariculture using ancient techniques preserved using an oral tradition. At the same site they are developing a capacity at the same site for mariculture using modern techniques. Next we stopped at a site where an experiment with loko i'a kalo is being conducted. At this farm, taro fields will be used to grow a number of fish. The fishponds along this coast have religious and cultural significance; many are on the SHPO list of eligible, nominated or registered sites.

Cooperating Agency Meeting: State of Hawaii
13 March 1992, 8:30 AM

Location:	DBED Offices, Honolulu
Contact:	Maurice Kaya
Attendees:	Carol Borgstrom, DOE, Washington DC
	Andrea Campbell, DOE-OR, Oak Ridge TN
	William Dennison, DOE Washington DC
	Mary Hunt, Lawrence Berkeley Lab, Berkeley CA
	Maurice Kaya, DBED
	Jerry Lesperance, DBED
	Lloyd Lewis, DOE, Washington DC
	Dean Nakano, DBED
	Virginia Tolbert, ORNL, Oak Ridge TN
	Amy Wolfe, ORNL, Oak Ridge TN
	Tak Yoshihara, DBED

Agreement for Cooperating Agency Status. Dr. Lewis described the functions of a cooperating agency, including the fact that CAs will receive all documents to review prior to public distribution; CAs provide, as early as possible, their issues and concerns; they provide input for the implementation plan, and help increase public awareness. He also provided examples of other simple form (no fund transfer) CA agreements. Carol Borgstrom detailed the operations of her office with respect to NEPA compliance. She noted that DOE guidelines for NEPA compliance will be incorporated in 10 CFR 1021. When asked by Maurice Kaya about the new regulations, Ms. Borgstrom replied that Secretary Watkins wanted the DOE NEPA process more formalized. DOE wants to err on the side of full disclosure and public participation. The Secretary is well informed on NEPA affairs and is committed to institutionalizing the NEPA process. CEQ has agreed fully with the DOE NEPA regulations. These rules and regulations will govern the preparation of the HGP EIS.

Ms. Borgstrom said that DOE is seeking help from the State so that DOE can do its job properly and not duplicate efforts (which is both cost- and time-effective). As both the federal government and the State have EIS and permitting requirements, she would like to have a single document that fulfills them both. She noted that DOE will need ready access to data and that DOE would need to work with several components of the State.

Concerns re: Current and Prior Geothermal Activities in Puna. Maurice Kaya expressed concern that the HGP EIS would interfere with development currently underway in Puna. He stated that earlier geothermal operations in Puna had had appropriate EIS review.

Ms. Borgstrom offered to give some perspective on the on-going work. She stated that DOE would not do an EIS for HGP(A), PGV or the True/Mid-Pacific operations that have already had environmental review as required, but that DOE must review what is already there as part of the baseline from a perspective of cumulative impacts.

Tak Yoshihara asked how this review would affect State efforts to supply power to the Big Island. Would the State have to close down those operations? Ms. Borgstrom replied that DOE does not have the decision authority. Dr. Lewis clarified that the ROD for the HGP EIS will be whether to partially fund phase 3. Mr. Dennison mentioned that with respect to the next 25 MW, if a federal agency needs to issue a permit, then that agency would need to examine their NEPA obligations. Dr. Lewis asked whether DOH would have a role and Mr. Kaya agreed that DOH in meeting its delegated role from EPA would have permitting obligations.

Separation of State and Federal EIS. Maurice Kaya reiterated his concerns about understanding the CA status. With regard to State plans for geothermal development for the Big Island only, he reemphasized that the State wanted to do an EIS that was entirely separate from the DOE effort (ref. State Ch. 343).

Dr. Lewis asked for a confirmation that the State would help DOE with the DOE EIS, but DOE is not to fulfill State statutes while preparing the federal HGP EIS. Kaya agreed.

Tak Yoshihara stated unequivocally that the State want to reserve the right to do their own EIS if they have a configuration different from that described in the 1989 State proposal to congress.

- They do not want DOE to meet State statutes for whatever the next step.
- The whole premise is that the State is not in a position to say there will be a 500 MW_e geothermal plus cable development.

Carol Borgstrom pointed out that DOE is compelled by NEPA and its own and CEQ guidelines to address the proposed action and its reasonably foreseeable alternatives. Alternatives 1 and 2 are the proposed action and "no action." If there is a current favored State action, it is reasonably foreseeable and therefore must be addressed. DOE would like State input concerning alternatives.

Tak Yoshihara asked if this EIS would provide a data base for the future. He noted that the EIS looked as if it was becoming programmatic in nature. Dr. Lewis agreed that with the resource not verified, DOE would need to make the assumption that a sufficient, recoverable resource existed, and that DOE is required by the Congress and the District Court to address a facility that provides 500 MW_e geothermal power to Oahu via submarine cable.

Maurice Kaya asked what the benefits would be of having the State 343 statutes fulfilled by a federal EIS. Ms. Borgstrom reiterated that it would be expeditious, as well as cost- and time-effective for the State. Maurice Kaya then asked (re: the Court Case) if the plaintiffs would accept the federal EIS. When answered in the affirmative, he concluded that that would also be an advantage to the State. He noted that this might be an option for the future pending the outcome of the court case, but not at the present.

Carol Borgstrom asked if State procedures gave the State the option to do separate documents. She stated that Secretary Watkins is committed to a State/Federal document. If the decision is made to do separate documents now, it may, at some time, be too late to fulfill State requirements.

Tak Yoshihara again stated, for the record, that Governor Waihee has said "yes," to cooperate in helping DOE do the federal EIS, to accepting Cooperating Agency status, but that the State does not want a joint federal/State EIS.

Ms. Borgstrom reminded the State representatives that DOE was proposing an economy of effort. Mr. Yoshihara asked if separation created a problem. Ms. Borgstrom said only in the duplication of effort in both time and money. Mr. Kaya asked if therefore it was the State's decision to make. Ms. Borgstrom indicated her initial agreement but indicated that she wanted to check further at DOE headquarters. Mr. Kaya agreed that the State would be fully cooperating.

Dr. Lewis said one more time that the federal government would be paying for the EIS and that it was to the State's advantage to have a joint EIS. Maurice Kaya said that they wanted nothing to do with a 500 MWe HGP plus cable EIS.

Mr. Dennison inquired whether the State also must address alternatives and suggested that the State may want to use some of our alternatives analysis. Ms. Borgstrom agreed that the lower level of geothermal development (*i.e.* 100 MWe) proposed by the State must be examined in the federal EIS as a reasonably-foreseeable alternative, as is required by DOE and CEQ. She also stated that DOE has a responsibility to present opposing

points of view when experts disagree on a topic.

Maurice Kaya stated that the cumulative impacts of 100 MWe on the Big Island would be very different from 500 MWe plus cable. Dean Nakano reserved the right for the State to supplement their own EIS process at a later date. He said that the State would take a pro-active role in doing an EIS for 100 MWe and supplement it later.

Tak Yoshihara restated that the Governor wishes the State to be a Cooperating Agency to the fullest, but they reserve the right to do their own EIS on their own project.

Specifics and Logistics. The State proposed that Maurice Kaya, DBED, be the point of contact.

- All State representatives present agreed that DOE would have access to the DBED library and access to their data. However, in the case of documents with limited availability, the meaning of "access" is not entirely clear. The problem is further exacerbated, as pointed out by Ms. Borgstrom, because documents which provide significant information for the DOE EIS must be in DOE hands and made available in reading rooms. This point remained unresolved.

- DBED agreed (for the State) to provide copies of all applicable rules and regulations.

- DOE requested that a readily accessible point of contact be assigned and requested that preparers be allowed to make their own contacts within the State keeping DBED fully informed. DBED insisted that all contacts be made through DBED (point of contact: Maurice Kaya) and that any meetings could be attended by a DBED representative.

- OHA was suggested as a possible exception. Dr. Lewis explained that the EIS would treat Native Hawaiians, to the degree possible (although not formally), as a cooperating agency. OHA has endorsed this concept, but prefers that DOE deal directly with Native Hawaiian groups and keep OHA apprised.

- OHH has said that they would deal through DBED.

- DBED requests a reasonable time to contribute and review DOE-provided HGP EIS documents. Dr. Lewis agreed. With regard to timeliness, Dr. Lewis reviewed the proposed schedule, expressed a firm desire to meet that schedule but noted that due to the complexity of the project and the number of Cooperating Agencies, he may be optimistic.

- With respect to status meetings, DOE would call them as needed, at appropriate locations.

- Kaya expressed concern about definition of Alternatives. Dr. Lewis said that this problem would be addressed during IP preparation. The State will be privy to IP for comment. Ms. Borgstrom concurred.

- Maurice Kaya asked about timeliness. Dr. Lewis described the proposed schedule.

- Dr. Lewis suggested that DOE would find someone in Hawaii who is scientifically cognizant of the HGP, the submarine cable and related issues, unbiased, and acceptable to all parties, to serve as facilitator in residence for the DOE EIS project. Maurice Kaya agreed that this was a good idea and would work with Dr. Lewis on such a selection. Dr. Lewis also noted that DOE remains open to suggestions for the contractors and consultants to assist in the HGP EIS effort.

Cooperating Agency Letter - Memorandum of Understanding. With regard to access to both people and data, Dr. Lewis stated that a workable arrangement needed to be derived. He thanked Dean Nakano for being so helpful recently in helping to arrange the Oahu scoping meetings. Tak Yoshihara stated that as the Governor

had said that the State wished to be a fully cooperating agency, the State has already prepared a letter describing such a relationship.

In an effort to better understand how the cooperating agency agreement would function in practice, the agreement proposed by DBED was examined by Dr. Lewis, Ms. Borgstrom and Mr. Dennison. These DOE representatives stated that the review was advisory and that no agreements could be made until the proposed agreement was examined in detail at DOE Headquarters. Appendix A is a copy of the State proposed agreement. Appendix B details the discussion about it.

APPENDIX A

DRAFT REVISED 03/06/92

MEMORANDUM OF AGREEMENT
BETWEEN THE STATE OF HAWAII AND THE
U.S. DEPARTMENT OF ENERGY REGARDING THE
PREPARATION OF A NEPA ENVIRONMENTAL IMPACT STATEMENT
FOR GEOTHERMAL DEVELOPMENT IN HAWAII

This Memorandum of Agreement ("MOA") is entered into this _____ day of _____, 1991, by and between the State of Hawaii ("State") and the U.S. Department of Energy ("DOE").

RECITALS OF FACTS

A. DOE has announced its intent to prepare an Environmental Impact Statement ("EIS") meeting the requirements of the National Environmental Policy Act (NEPA) of 1969 for a large-scale geothermal and interisland transmission project in Hawaii. In 1991 the U.S. District Court of Hawaii ruled that the Federal government must prepare an EIS for Phase 3, verification and characterization of the geothermal resource on the Island of Hawaii, and Phase 4, construction and operation of commercial geothermal power production facilities on the Island of Hawaii, with overland and submarine transmission of electricity from the Island of Hawaii to Oahu and other islands ("Project").

B. From 1985 through 1989, State had envisioned a large-scale 500 megawatt geothermal/interisland submarine cable project as an alternative to the State's 90% dependence on imported oil for our electricity generation. However, as of January 1990, the State has redefined its geothermal goal to a planning level that seeks to have geothermal development first meet the requirements of the

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people of the Island of Hawaii. This downsized project does not include an interisland submarine cable system. If this goal is successful, only then, would the State consider a large-scale geothermal and interisland cable project.

C. The DOE has assumed lead agency (Ref. 40 CFR, Sect. 1501.5) responsibility for the preparation of a NEPA EIS. Although the State's request to share co-lead agency status has been denied, DOE has offered State a Cooperating Agency role (Ref. 40 CFR, Sect. 1501.6) in the preparation of the NEPA EIS. Other Federal and County agencies have been offered similar Cooperating Agency status.

NOW, THEREFORE, the State and DOE agree as follows:

1. Preparation of a NEPA EIS. DOE as lead agency and State as a Cooperating Agency shall prepare an EIS for the project that satisfies the requirements of NEPA. The project will be as defined in DOE's Notice of Intent.

2. The Department of Business, Economic Development & Tourism ("DBED") will represent State throughout the execution of this MOA. It will be DBED's responsibility to ensure the appropriate participation of all applicable agencies of the State. The Director of DBED will execute this MOA and implement policy decisions on behalf of the State. The Director of DBED will also designate a State Project Manager responsible for non-policy matters.

3. DOE as the lead agency, and in recognition of the State as a Cooperating Agency, will:

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a. Provide for the State's participation in the EIS process immediately.

b. Provide State a major role in developing the scope of the energy policies and plans for the State of Hawaii.

c. Within _____ months from the date of this MOA, develop a timeline for the NEPA EIS process which establishes a time limit for the EIS preparation not to exceed _____ months from the date of DOE's Advanced Notice of Intent.

d. Provide State reasonable opportunity, not to exceed _____ days, to review the EIS Implementation Plan prior to adoption by DOE.

e. Hold periodic progress review meetings in Hawaii at no less than 3 month intervals, to include attendance of the designated State Project Manager, all cooperating agencies and, as appropriate, prime contractors.

f. Provide State with reasonable opportunity, not to exceed _____ days, to review and comment on the draft EIS before it is made available for public review.

g. Provide State with reasonable opportunity, not to exceed _____ days, to review and comment on the draft responses prepared by DOE to comments received pursuant to public review of the draft EIS.

4. Each party will provide the other agency reasonable opportunity to expeditiously review and comment on any oral and/or written communication directed to the general public regarding the NEPA EIS.

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5. Each agency agrees to cooperate with the other agency and to use their best efforts to complete the EIS in a timely manner.

6. DOE agrees to have its Project Manager either located in Hawaii or to attend meetings in Hawaii that may be reasonably requested by State.

7. Each agency will be responsible for the respective costs and actions of that agency's contractor(s) and subcontractor(s). Each agency will provide the other agency a listing of its contractors and subcontractors, including name of contractor, address, name of contractor's Project Manager and phone number, contractor's area of expertise and the roles the contractor will perform in the EIS preparation. Neither agency will request services of the other agency's contractor(s) and subcontractor(s) without specific authorization of the contracting agency. Each agency will instruct its contractor(s) and subcontractor(s) not to request specific services of the other agency's staff without prior general agreement between the agencies Project Managers.

8. In the event of disputes between agencies, as to issues of substance or significant considerations to be included in the EIS, the EIS shall recognize and document all conflicting viewpoints. Disputes which relate to procedural issues shall be resolved by the DOE signator to the agreement.

9. Each agency shall be responsible and free to fulfill its statutory and regulatory responsibilities and authority.

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10. To the maximum extent practicable under their respective statutes and regulations, each agency agrees to share all relevant information.

11. It is specifically understood by the agencies that this agreement is neither a contractual agreement nor a delegation or modification of each agency's responsibilities under their respective statutes and regulations. Its specific purpose is to clarify and delineate the agency's role within agreed-upon cooperative approach.

12. Amendment and Termination. This MOA may be amended at any time in writing only upon mutual agreement by DOE and the State. This MOA shall expire upon and with the completion and publication of the Final EIS unless otherwise extended by mutual consent of both parties or terminated by either of the parties. Either party may elect to terminate this MOA prior to completion and publication of the Final EIS and other associated studies by providing written notice of its intent to terminate to the other party in accordance with the procedures set forth in paragraph 17. Upon termination of this MOA, each party shall be responsible for its share of any outstanding obligations, costs and noncancellable commitments incurred prior to the date of termination which have been incurred in accordance with this MOA. If, upon termination of this MOA, either party holds any unexpended funds which have been advanced to them by the other party, the party holding such unexpended funds shall be responsible for the repayment of those unexpended funds to the party advancing said funds.

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13. Each agency assumes liability for the negligent actions or omissions or wrongful conduct of its officers, employees or agents including contractors that are the cause of injuries or damages that occur in the performance of this Agreement.

14. Notices. All notices and demands which any party is required or desires to give to the other party shall be given in writing by personal delivery or by express courier service or by certified mail, return receipt requested or fax, to the address set forth below for the respective party, provided that if any party gives notice of a change of name or address, notices to that party shall thereafter be given as demanded in that notice. All notices and demands given by personal delivery or by express courier service shall be effective upon receipt by the party to whom notice or a demand is being given; all notices given by mail shall be effective on the third business day after mailing; all notices given by fax shall be effective on the date of receipt.

State:

Mr. Murray E. Towill
Director
Department of Business, Economic Development & Tourism
220 South King Street, 11th Floor
Honolulu, Hawaii 96813

with copies to:

Mr. Maurice H. Kaya
Energy Program Administrator
DBED - Energy Division
335 Merchant Street, Room 108
Honolulu, Hawaii 96813

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DOE:

Dr. Lloyd Lewis, CE-121
Office of Conservation and Renewable Energy
U.S. Department of Energy
Forrestal Building
1000 Independence Avenue, S.W.
Washington, D.C. 20585

THEREFORE, the parties hereto have caused this Memorandum of Agreement to be duly executed on the respective dates set forth opposite their signature.

STATE OF HAWAII

By: _____ _____
Director, Business Economic Development & Tourism — Date

APPROVED AS TO FORM:

_____ _____
Deputy Attorney General — Date

U.S. DEPARTMENT OF ENERGY

By: _____ _____
Assistant Secretary, Conservation & Renewable Energy — Date

APPROVED AS TO FORM:

_____ _____
Date

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APPENDIX B

Notes on the Comments on
MEMORANDUM OF AGREEMENT
BETWEEN THE STATE OF HAWAII AND THE
U.S. DEPARTMENT OF ENERGY REGARDING THE
PREPARATION OF A NEPA ENVIRONMENTAL IMPACT STATEMENT
FOR GEOTHERMAL DEVELOPMENT IN HAWAII

If word changes were requested, they are noted as: deletions are stricken out, insertions are in brackets. If Dr. Lewis, Ms. Borgstrom or Mr. Dennison had comments they are noted.

Page 1. No changes requested at first review, but will be reexamined.

Page 2.
¶ C. Delete.

Consensus was that this ¶ was not needed.

¶ 1.

1. Preparation of a NEPA EIS. DOE as lead agency ~~and State as a Cooperating Agency~~ shall prepare an EIS for the project that satisfies the requirements of NEPA. The ~~project will be~~ [proposed action is] as defined in DOE's Notice of Intent.

Page 3.

b. Delete.

DOE consensus is that the State's energy policy role is unquestioned. DOE was of the opinion that this ¶ should be deleted. DBED wanted it in as they want input to process. DBED may choose to rewrite ¶.

¶ c. Dr. Lewis requested that the entire ¶ be deleted as the information will be included in the Implementation Plan; further, does not believe that DOE can commit to the requirements of the ¶.

Ms. Borgstrom stated that the target schedule would be in the Implementation Plan, but it is a target only. DOE cannot commit to a firm schedule.

Mr. Dennison stated that DOE cannot commit to a firm schedule as the requirement is to prepare an acceptable EIS.

¶ d.

d. Provide State reasonable opportunity, ~~not to exceed ____ days,~~ to review the EIS Implementation Plan prior to adoption by DOE.

Ms. Borgstrom said she would prefer to keep the time period loose. Dr. Lewis was inclined to 1 month. Both requested that the State keep DOE apprised of how long they will need. Ms. Borgstrom agreed that if the State needs 1 month to be productive, the time should be 1 month.

Dr. Lewis suggested that they rewrite to give the State of Hawaii at least a 30-day review of each DOE-prepared EIS product that is submitted to SOH for review/comment.

4¶ e. Delete.

Ms. Borgstrom and Dr. Lewis indicated that there will be meetings, but the locations and times will be negotiated as required. DOE will establish a Cooperating Agencies review process/schedule.

¶ f. Delete or rewrite.

Dr. Lewis noted that he would prefer to drop the ¶ or suggested that they rewrite to give the State of Hawaii at least a 30-day review of each DOE prepared EIS product that is submitted to SOH for review/comment.

¶ g. Delete or rewrite.

Dr. Lewis noted that he would prefer to drop the ¶ or suggested that they rewrite to give the State of Hawaii at least a 30-day review of each DOE prepared EIS product that is submitted to SOH for review/comment.

¶ 4. Delete.

Ms. Borgstrom said that she could not agree with this ¶
Mr. Dennison said that it should be refined or deleted.
Dr. Lewis requested that the ¶ be dropped as cooperators are not asked to agree on Notices.

Page 4.

¶ 6. Delete.

Ms. Borgstrom stated that DOE will determine the Project Manager and will determine the timing of meetings.
Dr. Lewis requested that the ¶ be dropped, noting that DOE would probably hire a local for a role to act as an unbiased point of contact, respected by all who can converse about technical issues.

¶ 7.

Dr. Lewis requests that this ¶ be omitted as it is redundant and the information will appear in the Implementation Plan.

¶ 8. Delete.

Ms. Borgstrom said that the substance of the ¶ is covered in the CEQ guidelines.
Mr. Dennison said that the ¶ is not necessary, since it is covered in the CEQ guidelines.
Tak Yoshihara said that the State wants to assure that both viewpoints are presented and why.

Page 5.

¶ 12. Rewrite.

Dr. Lewis questioned the need for this ¶, noting that no exchange of funds would be involved. He suggested that a mechanism that would minimize burden would be more appropriate. He will probably ask GC and EH at DOE Headquarters to suggest termination language.

Page 6.

¶ 13. Delete

Mr. Dennison stated that he had serious trouble with this ¶ and so would government procurement lawyers. He suggested that the State procurement people speak to DOE procurement to assure that all rules and regulations are met.

Dr. Lewis requested that the ¶ be deleted as not appropriate to an MOU.

¶ 14. DOE noted that this ¶ represented a conservative posture and requested that it be reworded to indicate DOE's intent to give the State reasonable time to respond. Dr. Lewis suggested that it be rewritten to pass GC and EH requirements.

HAWAII GEOTHERMAL PROJECT - Cooperative Agency Meeting
Meeting with Hawaii Department of Business, Economic Development, and Tourism
July 14, 1992 (0830-1000)

Contact: Maurice Kaya (DBEDT)
Location: DBED, Honolulu, HI
Attendees: Andrea Campbell, DOE-OR
Chuck Boston, Oak Ridge National Laboratory
Maurice Kaya, DBEDT
Frank Kingery, Ogden Environmental
Gerald Lesperance, DBEDT
Lloyd Lewis, DOE-HQ
Dean Nakano, DBEDT
Tom Morrison, Ogden Environmental
Ron Ritschard, Lawrence Berkeley Laboratory
Bill Staub, Oak Ridge National Laboratory

Meeting opened with Dr. Lewis (DOE) thanking everyone for attending. He next introduced the EIS team in attendance. Each team member briefly described his/her major area of responsibility in the EIS process.

Alternatives. Maurice Kaya asked about LBL's expertise to address the alternatives (i.e., who will do the work on alternatives). Dr. Ritschard briefly described LBL's lead role on assessing the various alternatives including renewables and demand-side management using the best available data and working in the framework of integrated resources planning (IRP). The special expertise of the LBL team was also mentioned. It was noted that ORNL will be providing a review of this work.

Purpose of Meeting. Dr. Lewis briefly described the purpose of this week's meetings in Hawaii. They are (1) to get the State's comments on the working *draft* of the Implementation Plan (WDIP), (2) to make contacts with the various State agencies, and (3) to initiate the data acquisition task. He also mentioned the signed Memorandum of Understanding (MOU) for the State of Hawaii and thanked all those present for their effort. He also described seven other cooperators, including the Counties of Hawaii and Maui, National Marine Fisheries Service (NMFS), National Park Service (NPS) , State of Hawaii, U.S. Army Corps of Engineers (USCOE), U.S. Fish and Wildlife Service (USFWS), and U.S. Geological Survey (USGS). He noted that in some cases (e.g., USCOE, USFWS, and USGS) there would be studies conducted by some of the federal cooperators in support of the EIS.

Implementation Plan Schedule. Dr. Lewis next outlined the schedule for the IP, which is as follows:

- Receive oral comments on substantive issues (e.g., What is missing? What is wrong? etc.) during the meeting of cooperators in Hawaii this Thursday,

- July 24 deadline for written comments from cooperators on working *draft* of IP (which will be used to prepare the next *draft*); goal is to have the next *draft* by early August,

- DOE headquarters (CE/GC/EH) review of the next *draft*,

- Cooperators will also be given a chance for another "quick" review (7-10 days),

- Final IP will be distributed to public reading rooms and distributed to cooperators and key commenters, however there will not be a new Notice of Intent (NOI) issued. There may be a local press release and possibly a flyer issued by DOE to notify the members of the EIS mailing list.

Gerald Lesperance asked if the Final IP will go out to the public for their comment. Lloyd Lewis responded that there would be no formal public comment period on the next *draft* IP, but we should consider it as a "living document" that could possibly be modified, particularly for substantive issues if any, later if necessary. However at some time, DOE has to consider the IP as a final document.

EPA's Role. Maurice Kaya asked if EPA has elected to cooperate with the EIS process. Dr. Lewis stated that EPA had provided useful comments on the NOI, but had not yet agreed to sign as a cooperator. He also described meetings that would be held next Monday (July 20) in San Francisco with EPA's Region IX Office of Federal Programs and media managers to discuss EPA's role.

Federal Cooperators. Dr. Lewis next briefly described the proposed work planned by the federal cooperators although the specific statements of work (SOW) had not yet been made final. USCOE will perform a wetland delineation for the areas of the Hawaii Geothermal Project (HGP) and the various alternative transmission cable routes. ORNL will be responsible for assessing the impacts of the HGP on the wetlands. The USCOE will review this section on impacts to the wetlands. USFWS will conduct surveys of vegetation, birds, invertebrates, and threatened and endangered species. In addition, they will be involved in ground-truthing and examining the impacts of rainforest segmentation and invasion of exotic species due to current geothermal development. USFWS will provide data and review all EIS sections related to their institutional mandate. USGS (managed through the Menlo Park, CA office) will provide environmental characterization of the geothermal fluids, geology, marine geology, and water resources, will make review comments to the EIS. DOE

will be meeting with each of these agencies over the next few days to continue discussions on the individual SOW.

Interagency Funding. Andrea Campbell next briefly explained the interagency agreement process and the possible ways in which these studies would be funded. She will be responsible for establishing the appropriate interagency funding arrangements with each cooperating federal agency.

USGS's Role and Possible Conflicts. Gerald Lesperance asked whether there would be conflicts with USGS's role in characterizing geothermal fluids, etc. and the current court order. Dr. Lewis responded that USGS would not be involved in any Phase 3 resource assessment, but that DOE and others might need to meet with Judge Ezra to demonstrate the need for the USGS studies, et al. and show how this work would not conflict with the Judge's orders.

State of Hawaii Contracts. Gerald Lesperance then described two State-supported geothermal projects that were either underway or just getting started. The first study is being performed by GeothermalEX Inc. (Richmond, CA). Their work is an analysis of existing geothermal resource data in a two-phase study. Phase 1 ($155K) is completed and Phase 2 was recently awarded with plans to spend about $120K. Phase 20 will continue until 6/93. An interim report is expected to be issued this month (July 1992) and Gerald Lesperance promised to provide a copy to DOE. The second study, which is just getting underway, is a $1.5 million project (with six tasks) to be performed by the University of Hawaii (School of Ocean and Earth Sciences and Technologies, SOEST). This study is funded by the State Departments of Business, Economic Development, and Tourism (DBEDT), Health (DOH), and Land and Natural Resources (DLNR). In this project, existing wells will be sampled including geothermal wells, water wells, and deep wells drilled previously by the University of Hawaii (SOH) with State funds. Data could come from wells drilled by private developers, from leased wells, and contemporary wells. The purpose of the study is to understand the geothermal fluids and chemistry as these might impact sensitive media (water, air, and land) and to characterize fluids for regulatory purposes. Some of the U. Hawaii people involved include Dr. Don Thomas (geochemistry), Dr. Frank Peterson (geohydrology), and Dr. Harry Olson (geology).

Dr. Lewis requested a copy of the SOW for the U. Hawaii project and Gerald Lesperance promised to provide one to DOE. Dr. Lewis also asked if there would be any deliverables timely enough to aid ORNL's assessment. He also suggested as a cost and time saver that USGS be allowed to obtain duplicate samples at these wells in the same time frame as the university samples. Laboratory analyses of these samples might be undertaken by USGS. He proposed to discuss this topic further during his meetings with USGS on Monday in San Francisco. Dr. Lewis asked Mr. Lesperance if he thought such duplicate sampling and analyses would be okay. Mr. Lesperance responded that he thought it would and such a request would be considered, and that he would get back to Dr. Lewis.

Dr. Lewis then asked if there were other publicly-available data on the geothermal wells for use in the EIS process. Mr. Lesperance stated that the True-Mid Pacific data were now available to the public from the DLNR files. The latter is true since the one-year propriety hold on these data had expired. DOE/ORNL should discuss this data availability with DLNR directly.

Marine Environment. Dr. Lewis next noted that the marine environment was not covered fully in the rush to complete the WDIP. This topic will be greatly expanded in the next version of the IP.

Site Visits. It was mentioned that ORNL (and possibly LBL) was proposing site visits of some technical staff during early August. Maurice Kaya asked that the State be kept informed about these technical interactions so that DBEDT could serve as a facilitator and could attend meetings if desired. Dr. Lewis and Ms. Campbell stated that they are still going over the details of the trip (how many people will attend and when).

Working Draft IP Review Comments. Dr. Lewis asked if he can assume that an integrated State review of the WDIP will be provided by DBEDT to DOE. Dean Nakano initially responded in the negative. Dr. Lewis stated that DOE didn't want to obtain conflicting comments from the State agencies that might need resolution at DOE. Maurice Kaya agreed that DBEDT would coordinate the review comments on the WDIP from the individual State agencies and would also provide all independent agency comments as a backup.

Funding of State Agencies. Dean Nakano asked if DOE planned to fund studies by State agencies. Dr. Lewis responded that the data and information needs of the EIS from most cooperators, including the State, are expected to fall under the category of an agency's regulatory and jurisdictional mission. If DOE asked for something that went beyond this ongoing role, the question of providing support would be dealt with at that time. That situation is not expected to occur in the case of the State, counties of Hawaii and Maui, NPS, or NMFS.

There was a related question about the air quality analysis planned for the EIS and the need for new models. Dr. Lewis stated that Bob Miller (ORNL) would lead the air quality analysis and if DOH recommends a model and supporting data, ORNL will evaluate them for use where possible. He reiterated that it is not anticipated that any new air models would be developed for the EIS.

Language in Introduction of WDIP. Dean Nakano raised an issue about the language in the Introduction (Section 1.0) of the WDIP regarding the proposed plan as defined by the State of Hawaii. After some discussion, Dr. Lewis suggested that DBEDT provide a paragraph or two defining the State's "preferred alternative" to the proposed action for consideration in the next version

of the IP.

Geothermal Resource Assessment. Gerald Lesperance asked if DOE in the EIS process will do a geothermal resource assessment since the current resource database is very limited for many of the sites. Dr. Lewis responded that in consideration of the District Court decision there will be no resource assessment performed but that DOE will use best available information and data and will describe the feasibility of different resource development scenarios. Anything the State could provide in this regard would be appreciated.

Requests from DBEDT. Dean Nakano asked that DOE provide a list of data information needs that would be required from the various State agencies. This request was deferred until after the upcoming site visits by ORNL and LBL.

Gerald Lesperance also requested a list of possible consultants who DOE and the supporting laboratories will use for the EIS preparation. Dr. Lewis said that the identification and selection of consultants is an ongoing process and he will share this information with DBEDT and other cooperators once consultants are selected. Any suggestions from the State would be greatly appreciated.

Action items. Several action items were identified at the conclusion of the meeting. They include the following:

1. The SOW and *draft* interim report on the GeothermalEX study will be sent by Gerald Lesperance of DBEDT to Ms. Campbell who will send it to ORNL with a copy to Dr. Lewis. At this time, it was noted by Dr. Lewis that the submittal to DOE should follow this pattern (data to Ms. Campbell of DOE-OR with a copy of the inventory of the data to Dr. Lewis; Ms. Campbell will be responsible for transmitting copies to ORNL or LBL). If the response contains policy, financial, and management information, copies should be sent to both Dr. Lewis and Ms. Campbell.

2. Gerald Lesperance (DBEDT) agreed to send the SOW for U. Hawaii geothermal assessment to Ms. Campbell as described above. He also agreed to get back to DOE about the possibility of sharing samples with the University of Hawaii contract.

3. DBEDT will provide information on the State's current "preferred" alternative to DOE.

4. Maurice Kaya will provide integrated State comments on the WDIP to DOE.

5. Dean Nakano's request that DOE provide a list of data and information needs expected from the various State agencies was deferred until after the technical site visits. (information exchange will follow as ORNL/LBL -> Ms. Campbell -> cc: to Dr. Lewis -> Maurice Kaya).

6. Gerald Lesperance's request for a list of potential consultants to DOE/ORNL/LBL was also deferred.

The meeting ended about 1030 and the DOE EIS team proceeded to the second meeting of the morning with representatives of the various State agencies.

HAWAII GEOTHERMAL PROJECT - Cooperative Agency Meeting
Meeting with Hawaii State Agency Representatives
July 14, 1992 (1030-1200)

Contact: Dean Nakano (DBEDT)
Location: Hawaii State Building, Honolulu, HI
Attendees: Chuck Boston, Oak Ridge National Laboratory
Brian Burnett, Office of State Planning (OSP)
Julie-Ann Cachola, Office of State Planning
Andrea Campbell, DOE-OR
Ruby Edwards, Office of State Planning
Nolan Hirai, Department of Health (DOH)
James Ikeda, DOH, Environmental Health Services
Lynn Lee, Office of Hawaiian Affairs (OHA)
Gerald Lesperance, DBEDT
Lloyd Lewis, DOE-HQ
Dean Nakano, DBEDT
Gary Noda, Department of Labor and Industrial Relations (DLIR)
Hugues Ogier, Public Utilities Commission
Ron Ritschard, Lawrence Berkeley Laboratory
Wendell Sano, DOH, CAB
Bill Staub, Oak Ridge National Laboratory
Sam Wilson, Department of Health Service (DHS), Planning Office
T. Seng Yang, Department of Agriculture (DOA)
Hiriam Young, Department of Land and Natural Resources (DLNR)

Meeting was opened by Dean Nakano and Dr. Lloyd Lewis. Dr. Lewis thanked everyone for attending the meeting and introduced the DOE/EIS team in attendance. The State agency participants also each introduced themselves and their affiliation. Dr. Lewis noted that the EIS team was available for individual State office meetings that afternoon.

State Response to Working Draft Implementation Plan. Dean Nakano requested that the other State agencies provide their review comments on the working *draft* Implementation Plan (WDIP) to DBEDT so that they can be integrated and transmitted to DOE. Lynn Lee (OHA) noted that through prior arrangement OHA would provide its comments directly to DOE.

Implementation Plan Schedule. Dr. Lewis described briefly the schedule for completion of the IP. It

is as follows:

- Review comments on the working *draft* IP are due to DOE by 7/24/92
- The next WDIP will be finished by early August and submitted to the DOE Review Process (CE/GC/EH)
- Next working *draft* would also be made available to the cooperators for a quick review (7-10 days).
- A new *draft* IP would be sent to the public reading rooms and made available to the cooperators and other important commenters
- Final IP scheduled for completion by the end of CY 1992

Work on EIS. Dr. Lewis noted that the EIS is being worked on in parallel with the IP. Currently in data acquisition and data identification stages. ORNL is planning site visits of technical staff in early August.

Possible Funding to State Agencies. A question was asked about the possibility of EIS funds to support the activities of the State agencies. Dr. Lewis anticipated that there would be no need for the State agencies to go beyond their normal jurisdictional/regulatory mission. If it was perceived that they were being asked to do so, these requests would be subject to review and consideration.

State EIS Process. Hiriam Young (DLNR) asked why Brian Choy of the Office of Environmental Quality was not invited since Hiriam believes that the State EIS process would need to be considered. It was stated by Gerald Lesperance that Mr. Choy had been invited but he decided not to attend. There was discussion about whether the federal EIS must pass the criteria of a State EIS. Dr. Lewis stated that it was the desire of the Governor of Hawaii that the federal EIS not address the State EIS statutes since the HGP to be addressed in the federal EIS is no longer considered a State project.

Cultural Concerns. Lynn Lee (OHA) stated that the overall issues identified in the WDIP seem appropriate, but she want to know which issues would be dismissed as out of the scope of the EIS. She also asked how consultants would be selected and noted that the archeological and native Hawaiian issues should be covered by consultants from Hawaii.

Dr. Lewis responded by saying that issues and non-issues will be identified specifically in the IP. Ms. Campbell pointed out language on page 28 of the WDIP as an example of how we will deal with issues that are beyond the scope of the EIS. The IP will identify in the section of the text labeled "Scope"

which issues are salient; which are not covered and why they are not being covered.

Regarding the consultants for the cultural analysis (and other topics), Dr. Lewis stated that consultants will be selected as we proceed with the EIS process and at some time in the future we will provide the State a list of selected consultants.

Julie-Ann Cachola (OSP) noted that a professor at the University of Hawaii (part of Cultural Assessment Network for Developing Options, CAN DO) is doing a cultural assessment with funding from DOH. She also stated that OSP is working on native Hawaiian land use issues and sovereignty issues. She suggested that DOE work with individual groups rather than considering native Hawaiian concerns collectively.

Lynn Lee (OHA) next asked where the cable landfalls would occur. She noted that depending on the specific sites chosen there would be quite different effects on the native Hawaiians. Dr. Lewis responded that we need OHA and other State agencies to help us in refining the alternative cable routes and landfalls based on cultural, archeological, and other concerns.

Worker Safety Issues. Gary Noda (DLIR) expressed his department's interest in OSHA regulations regarding worker's issues during construction and operation of the geothermal and associated facilities. He is also the contact for the State Fire Council, which deals with codes and hazardous wastes. Two other functioning groups were mentioned that deal with emergency preparedness. They are the State Office of Civil Defense and the Hazardous Evaluation and Emergency Response (HEER) group of the Department of Health. He felt that DOE should consider working with these groups as well.

Alternatives. Julie-Ann Cachola (OSP) stated that the alternatives described in Section 2.1 of the WDIP didn't seem to distinguish between the objectives of Phase 3 and Phase 4. She also suggested that a fiscal impact assessment (i.e., cost-benefit analysis) was needed to select the most viable alternatives. Dr. Lewis responded that a comprehensive cost-benefit analysis was probably beyond the scope of the EIS. Ms. Cachola then asked if the least-cost alternatives would be considered. Dr. Ritschard responded that the alternative energy options would be examined following an integrated resource planning (IRP) methodology, which considers both technical feasibility and least-cost analysis.

Ruby Edwards (OSP) questioned whether DOE would consider the economic and technical viability of the alternatives. Ms. Campbell noted that on page 31 of the WDIP an approach was described that would be used in the analysis of alternatives.

Socioeconomic Concerns. Ms. Cachola next asked about the population and land use impacts and how they would be addressed. Dr. Lewis stated that the EIS would consider socioeconomic effects including

population changes and land use. Ms. Cachola then stated that from a reviewer's point of view she was uncertain which set of EIS preparation rules (State or federal) applied. Dr. Lewis stated that the EIS is a federal document not a State document (as noted above this reflections the Governor's preference). It should be considered from a NEPA perspective not a Section 343 point of view. Ms. Cachola finally noted that the EIS should include energy demand projections especially those related to the distribution of populations on the individual islands. Dr. Lewis responded that we would rely on the utilities to provide us with the energy demand forecasts.

Ruby Edwards (OSP) also stated that DOE needs to consider the effects of decentralized population on the Hawaii Geothermal Project (HGP). The concept of decentralized population is mentioned in the Hawaii State Plan and in Senate Resolution 23. This concept is the desire to disperse economic activity to the neighboring islands.

Integrated Resource Planning. Hugues Oigler (PUC) noted that the State's IRP process was underway but that the initial plan would not be ready until May 1993. Dr. Lewis responded that this would probably be too late for use in the EIS especially since we may not be able to use the State's IRP as a finished product since it will not have received the necessary reviews. To the extent practical and possible, DOE may be able to use data being collected for the State IRP effort. Dean Nakano (DBEDT) said that the State Energy Functional Plan should be considered in the EIS process.

Demographic Data. Sam Wilson (Department of Human Services) asked what demographic data would be needed for the EIS. Dr. Lewis responded that the best available data from DHS (or other State agencies) would be sufficient, and no new demographic studies were proposed for this EIS.

Geothermal Resources/Emissions. Hiriam Young (DLNR) asked what type of technical data on reservoir emissions would be needed since reservoir characteristics and emissions data are not currently known. Again, Dr. Lewis stated that the best available data would be used in the EIS process. It was also mentioned that USGS, a federal cooperator, would be contracted to review the available reservoir and emissions data (DBEDT is currently funding some work in this area that may apply).

Clean Air Branch of DOH. Nolan Hirai of the Clean Air Branch (DOH) had not received the WDIP so he had no comments at this time.

Agriculture. T. Seng Yang (DOA) noted that the cable transmission corridors would impact agriculture through effects on land use and land value regardless of the route chosen.

The meeting closed with another plea from Dean Nakano (DBEDT) for each agency to provide their comments on the WDIP to him so that DOE would receive an integrated set of comments. It was also

noted again that DBEDT would also provide copies of all of the agency's comments as a backup. OHA will transmit their comments directly to DOE. Dr. Lewis thanked everyone for participating and again encouraged the attendees to complete their review so that their input could be reflected in the next *draft* of the IP. He again offered to have members of the EIS team present to meet with any State office in the afternoon to discuss the IP process.

Meeting ended about noon. In the afternoon, the DOE EIS team will breakup into two groups: Drs. Lewis and Ritschard will be attending a meeting with the Office of State Planning and Ms. Campbell, Dr. Boston, and Dr. Staub will meet with various people within the Department of Land and Natural Resources.

HAWAII GEOTHERMAL PROJECT - Information Exchange Meeting
DOE/Office of State Planning
July 14, 1992 (1330-1600)

Contact:	Dick Poirier, Office of State Planning (OSP)
Location:	Honolulu, HI
Attendees:	Brian Burnett, OSP
	Julie-Ann Cachola, OSP
	Gerald Lesperance, DBEDT
	Lloyd Lewis, DOE-HQ
	Robyn Loudermilk, OSP
	Dick Poneier, OSP
	Ron Ritschard, Lawrence Berkeley Laboratory

Meeting opened by Dr. Lloyd Lewis who thanked everyone for coming and participating. The purpose of the meeting is to obtain general comments on the working *draft* Implementation Plan (WDIP) and identify important issues relevant to the OSP.

Summary of Written Scoping Comments. Gerald Lesperance (DBEDT) asked if the public will be able to review the written scoping comments. Dr. Lewis said that the written comments are incorporated into the WDIP and therefore there is no need to make them available. He noted that all verbal comments are on transcripts in the reading rooms. The written scoping comments were voluminous. Mr. Lesperance suggested that the written scoping comments be made available to the public.

Section 1.0 of WDIP. Julie-Ann Cachola stated that she was unclear about the objectives of the Proposed Action, e.g., what are the objectives of Phase 3 vs Phase 4. If the proposed action is whether to partially fund Phase 3, why is DOE covering alternative cable routes, transmission corridors, etc.? Dr. Lewis responded that because of the court order the HGP EIS would both assess the impacts of both Phases 3 and 4 as defined by the State in its 1990 proposal to Congress, which includes alternative cable routes in the EIS. Ms. Cachola concluded that we should clarify the description of the EIS objectives in the next version of the IP. Dr. Lewis noted that he agreed and that OSP include comments like this in their written response that will be coordinated by DBEDT.

Alternative Cable Types and Routes. Ms. Cachola next asked if the various cable technology alternatives (i.e., dielectric vs oil-filled cable and high voltage AC vs high voltage DC) were really needed to be covered in the EIS. Dr. Lewis responded that DOE was required to cover both the

alternative cable routes as well as the alternative cable technologies since they were being proposed and were technically feasible alternatives.

Impacts Assessed in EIS. Ms. Cachola asked whether the impacts of the various alternatives would be analyzed in the EIS in the same way as those resulting from the proposed action (i.e., 500 MW geothermal plus submarine cable). Dr. Lewis stated that a similar list of environmental impacts considered (if not to the same level of detail) for the proposed action would be considered for the alternative energy options (but specific to the technology), cable technologies, and cable routes. Ms. Cachola suggested that a socioeconomic assessment including available cultural surveys might be included as Appendices to the EIS. Dr. Lewis responded that a discussion of the socioeconomic impacts would be part of the text of the EIS. In addition, he described how mitigation strategies and mitigation action plans would be identified for those alternative cases believed to have impacts.

Ms. Cachola then asked if the air quality impacts would be assessed just within the proposed HGP or beyond (e.g., Kona area). Dr. Lewis stated that the environmental impacts analyses would focus on both the areas of the HGP as well as the cable transmission corridors, sea-land transition part of the submarine cable, and the affected marine environment. Ms. Cachola asked whether the EIS would consider the air quality impacts of geothermal vs the background emissions from volcanoes. Dr. Lewis responded yes and that impact analyses will use all available data. He went on to say that the EIS is meant to be a technically-sound "body of facts" that can be used to describe the potential impacts of the proposed action and alternatives. The Record of Decision (ROD) is based on the EIS and any other information.

Ms. Cachola next questioned whether the EIS will look at water catchments and water quality in the Puna area. Her concern was the issue of lead contamination in the drinking water. Dr. Lewis stated DOE would work closely with the USGS through a funded statement of work to assess all available data on the water quality characteristics of catchments, aquifers, and the nature of underground and surface geothermal emissions.

Land Use Issues. Ms. Cachola stated that the EIS should deal with land tenure issues in addition to land use. For example, who owns the geothermal resources? Also, the topics of ownership patterns, native Hawaiian homelands, and ceded land (entitlement) should be considered. The Governor's action plan spells out how to solve these land use issues. Dr. Lewis stated that land zoning and land use would be considered in light of the effects on HGP or the alternatives. He doubted, however, that the issues of land tenure were within the scope of the EIS. Ms. Cachola cautioned that property rights and native Hawaiian rights are currently significant issues that DOE should be aware of. She cited the State Constitution (Section 5F) that describes land tenure issues. She also stated that we should consider the State's Geothermal Subzone Act. Finally, she mentioned a useful book that

should be included in the EIS team's library. It was the *Native Hawaiian Rights Handbook* by Melody McKenzie. This book identifies the native Hawaiian issues quite clearly.

Population Distribution. Both Ms. Cachola and Robyn Loudermilk briefly discussed the issue of population distribution on the neighboring islands. There are currently five-year boundary estimates of population in addition to descriptions of what type of development might occur related to this population distribution.

Ms. Loudermilk defined new urban expansion areas and new conservation (or specialized ecosystems) areas. Priority 1 recommendation means there is a legal case for reclassification by OSP. Priority 2 recommendations involve conservation resources where not enough data are available for reclassification. She went on to describe the State's authority over County lands. The Land Use Commission is the decision-making body and the OSP represents the State's interests before them. Land use in Hawaii is basically classified into three groups: (1) conservation, (2) urban (where the county has the lead for any land parcel less than 15 acres), and (3) agriculture. It was suggested that DOE pay attention to the following land use regulations: Hawaii Revised Statutes (HRS), Chapters 183 and 205 (rules and regulations).

Native Hawaiian Input. Dr. Lewis discussed the difficulty of getting representative inputs from native Hawaiian groups. Ms. Cachola said we should contact Elizabeth Pa-Martin of the Native Hawaiian Council in order to create a mechanism for obtaining input from the various native Hawaiian organizations (over 40 of these groups at the present time). Dr. Lewis noted that if we don't get more responses from the individual groups we will have to rely on OHA for our information, who in turn referred DOE to the Native Hawaiian groups directly. Ms. Cachola mentioned another book that would be useful in preparing the EIS. The book is *Hawaii: The Broken Promise* prepared by the Hawaii Civil Rights Commission. This book also provides a synopsis of Hawaiian issues.

The meeting ended at about 1630. The OSP provided a series of land use documents including executive summaries and island-by-island land use plans. Dr. Lewis thanked the OSP staff for their assistance and comprehensive review on the NOI and current WDIP.

HAWAII GEOTHERMAL PROJECT - Information Exchange Meeting
Meeting with Pro-Geothermal Alliance
July 15, 1992 (1330-1600)

Contact: Rod Moss, Vice President, Mid-Pacific Geothermal
Location: Kapolei Marketing Center, Estate of James Campbell
Attendees: Russ Alger, Campbell Estate
William A. Bonnet, Hawaiian Electric Co.
Chuck Boston, Oak Ridge National Laboratory
Andrea Campbell, DOE-OR
Bill Cook, Executive Director, Hawaii Island Geothermal Alliance (HIGA)
Bill DeMent, Campbell Estate
William H. (Rev. Bill) Kaina, Pastor, Kawaiahao Church, Honolulu
Allan G. Kawada, True Geothermal Energy Co.
Charles Lamoureux, Director, Harold L. Lyon Arboretum, U. Hawaii
G.O. Lesperance, DBEDT
Lloyd Lewis, DOE-HQ
Steven E. Morris, Puna Geothermal Venture (PGV)
Rod Moss, Vice President, Mid-Pacific Geothermal
Dean A. Nakano, DBEDT
Harry J. Olson, University of Hawaii
Ralph A. Patterson, R.A. Patterson & Assoc, Kailua, HI
Ron Ritschard, Lawrence Berkeley Laboratory
Bill Staub, Oak Ridge National Laboratory
Oswald K. Stender, Bishop Estate
Donald Thomas, University of Hawaii

Introductions. Dr. Lewis opened the meeting by thanking everyone for attending. He next introduced the members of the DOE-EIS team. These introductions were followed by short self introductions by all of the other participants. The following information was presented: Reverend Kaina, a minister from Honolulu, who grew up in the Puna area briefly described his knowledge of Native Hawaiians. Charles Lamoureux, University of Hawaii botanist who had conducted botanical surveys (during 1984-85) for the Kilauea geothermal project EIS. These surveys, which were sponsored by DBEDT, covered biota including endangered species in the Kilauea East Rift Zone (KERZ). He also has been monitoring for alien species in the geothermal area. Alan Kawada of True Geothermal was formerly with Campbell Estate. During November 1989, field work was completed at the True/Mid-Pacific site and the first well drilled. Bill Bonnet is with environmental affairs of the Hawaiian Electric Company (HECO) and was

leader of the deep water cable research effort. Bill DeMent is the Administrator for geothermal of the Campbell Estate. Bill Cook represents HIGA, which is a grassroots organization representing labor and business with a membership of over 45,000. Gerald Lesperance of DBEDT worked on the State's geothermal efforts since 1983. Dean Nakano manages geothermal programs in the Energy Division of DBEDT. Don Thomas, who has been at the University of Hawaii since 1975, has conducted monitoring of water in the Puna District, has been involved in sampling HGP-A, managed the H_2S monitoring, and evaluated geothermal resources. Harry Olson, has been a University of Hawaii professor since 1986, who was the Principal Investigator for the Scientific Observation Hole (SOH) work. He has been involved with geothermal resources since 1973 including the shallow hole survey in Iceland. Ralph Patterson currently is involved with new private business development. At one time he was manager of the Puna Geothermal Venture, and President of Dillingham Geothermal. Today, he is an observer for Mission Energy Company, the winner of the HGP RFP sponsored by HECO. Steve Morris is Director of PGV geothermal project in Puna. He has over 13 years of geothermal financing and accounting experience. Rod Moss is Vice President of Mid-Pacific Geothermal, which signed a lease in 1980-81 and has a permit for up to 100 MW power (their EIS is completed; currently in exploration phase). Ross Stender has been associated with Campbell Estate since 1980. He is currently a trustee with Bishop Estate. Russ Alger is from Campbell Estate and he has been involved with geothermal since the 1980s.

Geothermal Resources. Rod Moss stated that since the geothermal resources are not commercially defined it will be difficult for DOE to prepare the EIS. How do you plan to do? Dr. Lewis stated that DOE will do the most credible job possible. He went on to highlight the government exposure on this effort. Dr. Lewis said that he expected oversight from DOE, from the Court, and from a number of active players. He stated that there were eight cooperators involved (five federal agencies, the State of Hawaii, and the counties of Hawaii and Maui) and that three federal agencies (U.S. Army Corps of Engineers, USFWS, and USGS) would be funded to do studies in support of the EIS. At that time, Rod Moss suggested that we spend the remainder of the meeting addressing three issues: Native Hawaiians, geothermal resources, and botanical aspects. Dr. Lewis agreed to this agenda. Rod Moss noted that neither True/Mid-Pacific or PGV are part of the 500 MW HECO HGP.

Native Hawaiian Issues. Rod Moss started the discussion by stating that what was mentioned during the scoping meetings on the topic of Native Hawaiians was not representative of the true picture. Mr. Moss introduced Reverend Kaina who described his childhood in the Puna area and how at that time no one worshipped the god Pele". He went on to say that it was his opinion that only the young people turned to Pele and to a renewed interest in Native Hawaiian interests; what he called a cultural renaissance. The Native Hawaiian issues actually began in the 1960s with the beginnings of self-identity. He said again "a 100% Hawaiian does not worship Pele. Dr. Lewis stated that DOE realized that the Native Hawaiian issues were complex. He said that DOE wants to identify the concerns of Native Hawaiians. He wants suggestions on who to meet with and how to get their inputs. Mr. Stender and Mr. Moss stated that it

appears that there are only a small group of Native Hawaiians who have been vocal against geothermal development such as the Pele Defense Fund (PDF). Dr. Lewis responded that everyone had a chance to provide comments at the various scoping meetings. He went on to say that since Pele Defense Fund is a plaintiff DOE has met with them and they have provided useful information. He also noted that the representatives of PDF admitted that they did not represent a consensus of Native Hawaiian interests. PDF is opposed to tieing the Hawaiian islands together electrically. Dr. Lewis reiterated DOE's interest in obtaining a representative view of the Native Hawaiian issues. DOE is offering cooperative status to the Native Hawaiians and wishes to carry out the intent of cooperation.

Mr. Stender continued the discussion of Native Hawaiians. He said Hawaiians are mostly Christians who only hang onto Hawaiian customs when they need them. Pele worship is a very modern development beginning at about the time of geothermal resource development in the 1960s. He went on to say that another new issue was sovereignty. However, Hawaiians cannot agree on issues; there is little consensus. Also he noted that Hawaiians won't come out to debate geothermal development (or anything else); they won't confront one another. He feels that we are only hearing from a small group who are not representative of Native Hawaiian interests. It was also stated that the Office of Hawaiian Affairs does not speak for Native Hawaiians either. Mr. Stender said the story is that Pele came from Tahiti and settled in Kauai, but was thrown out so she went to Oahu and was thrown out again, so she went to Puna. Mr. Stender fells that we will only hear from those Hawaiians who are militant. It was suggested that Elizabeth Pa-Martin, a lawyer, was trying to bring together all Hawaiian groups to address sovereignty. Dr. Lewis stated that DOE recognizes that PDF doesn't represent all the Native Hawaiians (nor do they purport to) and maybe no one does. DOE will attempt to work with an envelope organization such as that being organized by Ms. Pa-Martin.

Mr. Patterson noted that there were a number of papers or studies during the early days of geothermal development that addressed the effects of geothermal on Native Hawaiians. Gerald Lesperance stated that DBEDT had sponsored several cultural surveys. Someone noted that these studies were done before the recent sovereignty issues surfaced. Dr. Lewis stated that DOE wishes to get a "balanced" view. He also realizes that some of the Hawaiian issues will be beyond the scope of the EIS.

Charles Lamoureux stated that Native Hawaiian issues need to be done by consultants from Hawaii. He mentioned Dr. Isabella Abbott of the University of Hawaii, who had recently completed a study of the ethnobotanical issues. Dr. Lewis said that he would appreciate a list of Native Hawaiian contacts for possible consultation on the EIS. Several participants including Reverend Kaina and Mr. Stender promised to provide names of Native Hawaiians who might provide input.

Rod Moss next turned the discussion to gathering rights and the Native Hawaiians who wish to come on to the Campbell Estate by asking Alan Kawada to describe his experience. Mr. Kawada noted that there

had been protests at the drill sites. Native Hawaiians were allowed to come on the site (even though it is private property) with four exceptions: (1) people are prevented from coming through the gate, (2) prevented from obstructing the gate, (3) prevented from the well/drill sites, and (4) prevented from blocking the access road. To date, he stated no one had been arrested who had complied with these rules. He also stated that about 20 acres is cleared out of a total of 27,000 acres of property and this area is not fenced. According to Article 12, Section 17, Native Hawaiians are allowed to practice their religious rights.

Mr. Patterson mentioned that in the past a small group of people took over the Puna Community Council, such as in their deliberations over the PGV transmissions lines, and made decisions that did not represent the community. He asked how DOE qualifies groups? Dr. Lewis responded that DOE doesn't qualify groups or check their credentials. DOE wants to obtain a balanced viewpoint from a variety of groups and people. DOE has an open door to everyone and will make the best judgement about their input to the process.

Bill Cook of HIGA stated that there have been several surveys of Hawaiians on their perception of geothermal. Mr. Lesperance said that DBEDT has them and will make them available to DOE.

Geothermal Resources. Don Thomas provided DOE with a geothermal bibliography (with citations up to 1983/84) on diskette of some 1300 references that were not exclusive to Hawaii. He had promised that information during his scoping testimony. Gerald Lesperance of DBEDT stated that they also had a bibliography that he had shared with DOE. Dr. Thomas then began a discussion of the geothermal resources relevant to 500 MW. He showed a diagram to the audience of the three subzones of the KERZ: (1) Kilauea Middle East Rift Subzone, which is believed to have the greatest evidence for geothermal resources (90% or greater potential for fluids that are 125°C at less than 3 km. All of the geothermal drilling activity has been in this subzone. (2) Kamaili Subzone, and (3) Kapolio Subzone. There is a residential area between subzone (2) and (3). Dr. Thomas is a member of the geothermal technical advisory committee that re-evaluated the resources in 1983-84 as part of a statewide resource assessment. The KERZ also has a high water recharge rate to the rift zone; about 250 million gallons per day. He went on to described the Southwest subzones (Kiluaea and Manua Loa) where there are very little data available and where there is much less rainfall (and thus less possible recharge) and more probability for saline waters. In general, there is less than 10% recharge in the SW Rift zone. Dr. Thomas mentioned the activity on Maui, which is believed to be low temperature for possible direct heat applications (but possibly insufficient for electric power generation). It was Dr. Thomas's contention that DOE is advised to focus on the KERZ because of the evidence for geothermal resources and the recharge rate. In sum, there is an optimum rift zone on the east side of Hawaii with ample water availability. Also, the SW rift is still not officially designated as a geothermal resource subzone (GRS). Dr. Lewis asked Dr. Thomas to provide a definition of the potential commercial development of the various

geothermal subzones with suggestions for near-term geothermal development. Dr. Thomas agreed to do so.

Botanical Surveys. Charles Lamoureux, University of Hawaii was asked to present a summary of his botanical work within the KERZ. He started by saying that one of the issues raised at scoping was that the Wao Kele O Puna rainforest was the last lowland rainforest in Hawaii. He stated that there were actually nine rainforest areas on the Hawaiian Islands. Dr. Lamoureux further stated that 300 acres within the KERZ are planned to be cleared out of a total of 60,000 acres of contiguous forest in the Puna area including the National Park. For the current geothermal development it was estimated that 300 acres out of 9,000 acres in the KERZ would be cleared for up to a 100 MW generation capacity.

Dr. Lamoureux next showed a series of vegetation maps of the area in question. He began describing the classification categories shown on these maps. He used USFWS maps and their classification criteria. The maps represented conditions at the end of 1984. The Ohia-1 represents the pristine forest with its canopy intact and with native understory. His maps showed that there were patches of Ohia-1 in the KERZ. He also noted that the State prohibits use of the KERZ containing these priority 1 or Ohia-1 forests. It was noted that it is not possible to extrapolate the land use estimates from the 100 MW case to 500 MW of geothermal development. All geothermal resources, according to Dr. Lamoureux, may not come from this rift zone. Gerald Lesperance (DBEDT) mentioned that as a "rule of thumb" the land use requirements were about 3 acres per MW.

Dr. Lamoureux went on to describe Ohia-2 forest in which the canopy is reasonably intact, but the understory has been destroyed or disturbed by pigs and humans. He briefly discussed "Ohia dieback" or the natural loss of forest followed by a replacement with alien or introduced species (e.g., strawberry guava). He stated that most of the geothermal subzones of interest are located in these disturbed forests. Ohia-3 represent plants that are associated with Hawaiian uses (e.g., ginger, taro, Ti, etc.). There are few of these lands in the geothermal subzones. Ohia-4 forests are typical of lower rainfall areas. They are not real rainforest according to Dr. Lamoureux and mostly lie outside of the GRSs. Finally, the Ohia Uluhe are scattered trees and tangled weeds. These represent the earlier successional stages of a climax rainforest. Dr. Lamoureux believes that the influx of weedy species (alien species) are preventing normal succession of this rainforest. Lava flows (up to November 1984) in major parts of the KERZ have also destroyed parts of the rainforest. Little damage, however, to the Ohia-1 forests; it is mostly to the Ohia-2 and some to the Ohia Uluhe. Dr. Lamoureux stated that in his opinion fragmentation of the rainforest was not a problem regarding pollination.

Dr. Lamoureux then summarized his views of the various botanical issues. They are as follows: (1) he claims that the amount of forest lost through geothermal development will not be large; (2) he believes the effects of forest fragmentation (50 ft corridors for example) is minimal; little effect on pollinators or

on seed dispersion; and (3) weeds developed as a result of road development can be controlled. On the last item, he noted that he monitors these areas every three months and periodically sprays the weeds with selective herbicide, such as "Round up". After returning to these sites later, Dr. Lamoureux states that the weeds are replaced along the road by native species. He also went on to state that in his opinion the emissions from the geothermal plants would have no deleterious effects on the plants and animals because they are mostly native and have evolved with volcanic emissions. With regard to the effects of noise and birds, he believes that they will move during drilling and shouldn't be affected. He went on to note that the Hawaiian thrush had already been declining in the lowlands because of avian malaria. Finally, he believes that the reduction of the forest resulting from geothermal development may destroy some habitats for birds.

Geothermal Technology. Toward the end of the meeting a discussion ensued about the type of geothermal technology that might apply to the HGP and where it might be located. What mix of technology including topics such as cooling towers, reinjection, etc. would be covered in the EIS? Dr. Lewis stated that DOE will consider the reasonably foreseeable geothermal technology. Rod Moss noted that the Mid-Pacific EIS called for conventional cooling towers using the condensate as cooling water with reinjection of all fluids, and with individual units between 25-50 MW each. Dr. Lewis asked the group to provide their suggestions on the likely choice of geothermal technology for HGP application. He also mentioned that as part of the alternatives, the EIS would consider an option of up to 100 MW on the Big Island (with no submarine cable) and a mix of alternatives for the additional 400 MW that the other islands might develop locally. For example, there is the possibility of a 400 MW coal plant.

Action Items. Several action items identified during the meeting. They include:

- Mr. Stender promised to provide a list of Native Hawaiian contacts who could present a balanced view.

- Dr. Don Thomas will provide a defensible definition of the potential commercial development of various geothermal subzones with suggestions for near-term development.

- Rod Moss and others would develop reasonably foreseeable geothermal plant system choices for use in the GRSs.

- Bill Cook (HIGA) requested a copy of the working *draft* implementation plan. Dr. Lewis explained that the WDIP was distributed to the cooperators, the affected utility, and interested Native Hawaiian organizations only. A later *draft* of the IP will be given to a much broader distribution.

- Gerald Lesperance noted that DBEDT is supplying a vegetation survey for use in the EIS.

This concludes the last meeting of the day. Drs. Lewis, Ritschard, and Staub confirmed that they will fly to Hilo tomorrow morning to meet with the Hawaii Geothermal Alliance (HIGA) and will be hosted by Bill Cook.

HAWAII GEOTHERMAL PROJECT - Cooperating Agency Meeting
Meeting with Cooperators
July 16, 1992 (0900-1600)

Contact: Dr. Lloyd Lewis
Location: Federal Building, Honolulu, HI
Attendees: Patricia Billington, U.S. Corps of Engineers
Chuck Boston, Oak Ridge National Laboratory
Steve Burns, Energy Coordinator, County of Hawaii
Andrea Campbell, DOE-OR
Denton Ching, U.S. Army Corps of Engineers
Bryan Harry, National Park Service
Warren Kanai, U.S. Corps of Engineers
Jim Kauahikaua, U.S. Geological Survey
Kalvin Kobayashi, County of Maui
Gerald O. Lesperance, DBEDT
Lloyd Lewis, U.S. DOE-HQ
Dean Nakano, DBEDT
Rodney Nakano, Hawaii County Planning Department
James E. Moulds, Geothermal Compliance Coordinator, County of Hawaii
John Naughton, National Marine Fisheries Service
Ron Ritschard, Lawrence Berkeley Laboratory
Bill Staub, Oak Ridge National Laboratory
Dan Taylor, Hawaii Volcanoes National Park, NPS
Andy Yuen, U.S. Fish and Wildlife Service

Introductions. Dr. Lewis opened the meeting of the cooperators by thanking everyone for coming and participating. Dr. Lewis first described where DOE was in the EIS process. The ANOI and NOI had been issued, the scoping process was completed, and written scoping comments were due to DOE by April 15, 1992. He noted that there were 10 scoping meetings at five locations. These scoping meetings, including both oral and written comments, served as input to the working *draft* of the Implementation Plan (WDIP). Dr. Lewis went on to state that the IP is an important document because it reflects the scoping input and serves as a masterplan for the development of the EIS, that is it guides the EIS preparation process related to which topics are covered and which are beyond the scope of the EIS.

Dr. Lewis went on to emphasize that this should be considered a "working" *draft*. It has been yet been reviewed by DOE-HQ (CE/GC/EH). The cooperator's comments will be included in the next working draft, which will come back to the cooperators for a quick look, before going through the DOE approval

process. The public version WDIP will follow which will be sent the various reading rooms with a notice to those on the mailing list. The public version will also be sent to interested governmental groups including the cooperators and several others. There will be no notice of the public version of the WDIP in the Federal Register, but DOE will consider comments from the public and others and prepare the final IP. The final IP is expected by the end of the CY 1992. DOE is working in parallel on the EIS. Dr. Lewis stated that today DOE is looking for substantive issues, specific issues on Section 3 of the WDIP, and a discussion of the proposed EIS schedule. Dr. Lewis noted that the comments received today are understood to be preliminary agency views. Written comments to DOE that provide the agency's views are due by July 24, 1992. The turn around for the next WDIP is expected during the early part of August. This version will be sent to the upper levels of DOE for their review.

Dr. Lewis next introduced the DOE-EIS team in attendance. This was followed by brief self-introductions of each participating cooperator. He mentioned that three federal cooperators will participate in funded projects. USCOE will prepare a wetlands delineation. USFWS will conduct field surveys of biota, including endangered and threatened species. USGS will complete a comprehensive review of geothermal resources data including information about hydrology and emissions. Dr. Lewis stated at this point that EPA probably will not chose to become a cooperator because of manpower limitations. The meeting next moved into a discussion of the WDIP. First, Dr. Lewis suggested that we consider general comments, followed in the afternoon by more specific comments.

General Comments. Dr. Lewis began this discussion by asking if the WDIP had properly reflected the scoping comments. If not, what is missing? John Naughton (NMFS) asked if the issues mentioned in Section 3 of the WDIP were taken specifically from the scoping meetings. Dr. Lewis responded that these issues reflected responses to the ANOI, NOI, the cooperators, and the scoping materials. Mr. Naughton replied that there seemed to be very little in the WDIP on the near-shore marine environment. Dr. Lewis responded that the marine impacts need to be considered in the IP and the EIS and the WDIP would be revised if needed. He went on to say that marine impacts will be covered in separate sections for the affected environment, impacts to the environment, etc. in the next version of the IP because of the significance of the marine cable.

Mr. Naughton next as how many issues identified in the scoping meetings are reflected in the WDIP.. He felt that the scoping comments need to be reflected more completely in the next version of the IP. Dr. Lewis responded that the written scoping comments are not yet fully analyzed. DOE will do a much better job of summarizing and utilizing both the oral and written comments in the next version of the IP.

Rodney Nakano (County of Hawaii) stated that DOE needs to make clear where we are in the process when the IP goes public. He suggested that the purpose of the proposed action (that is, the purpose of the EIS) be more carefully spelled out. Mr. Nakano said that the HGP might proceed as a combination

of federal, State, and private funds. He went on to say that it needs to be made clear that without DOE funds, the project may still proceed with state and private funding subject to further environmental review pursuant to permitting and jurisdictional requirements.

Kalvin Kobayashi (County of Maui) added that Maui County can require an environmental review or can use the federal EIS. Dr. Lewis responded that the EIS can be considered as a baseline with additional environmental reviews as more site-specific.

Gerald Lesperance (DBEDT) stated that the EIS will affect a specific decision (i.e., DOE funding Phase 3 of the HGP), but it may not affect other decisions regarding geothermal development in Hawaii.

Jim Moulds (County of Hawaii) requested the addition of a section to the WDIP as an Appendix that would define terms. This would go beyond the definition of acronyms as currently contained in the WDIP. Mr. Moulds next asked "what's in it for the County?" If the grid on the Island of Hawaii is to cable power to Oahu, who gets cut off first if there is a problem? Dr. Lewis responded that this issue was outside the purview of the EIS. Again, Mr. Moulds asked how will the County of Hawaii benefit? Dr. Lewis stated that there will be a full analysis of alternatives for the EIS and this analysis will define issues and benefits of these alternatives. He further noted that the EIS will point out both the positive and negative impacts to the Island of Hawaii of the proposed action including employment, population changes, tax revenues, royalties, etc. under the category of socioeconomic effects.

Bryan Harry (NPS) asked if it was fair to make an intelligent guess on how long it would take to replace something in the environment that would be lost because of an accident associated with the geothermal technology. Dr. Lewis responded that the EIS will address hazards to reliability and sustainability as well as topics like the geological impacts on the cable.

Steve Burns (County of Hawaii) asked to what extent human values would be considered in the EIS. Things such as people currently being used to clean air and a certain lifestyle that might change under some geothermal development scenario. Dr. Lewis said DOE will do a better job in the next version of the IP to reflect how the EIS will be prepared and what topics will be covered. He went on to say that topics such as cultural resources and socioeconomics will be covered in the EIS. Dr. Lewis asked for help from the participants to identify what is currently being funded at the University of Hawaii on the impacts on Hawaiian lifestyles, the rural culture, and associated topics. He also noted at this time that if the any of the cooperators wish to send data or other information to DOE they should send it to Ms. Andrea Campbell (DOE-OR) with a transmittal letter and inventory of the data to Dr. Lewis (DOE-HQ). If they don't take the time to inventory the data, DOE will respond to them with an acknowledgement.

Jim Kauahikaua (USGS) noted that the WDIP did not mention the role of the developer, for example to assist USGS in getting information from them. Dr. Lewis stated that DOE cannot legally give developers status as cooperators, but that they have been very cooperative. At this time, he mentioned the meeting with the Pro-Geothermal Alliance on the previous day. Dr. Lewis went on to say that DOE signs MOUs with governmental agencies not private parties.

Dan Taylor (NPS) asked what geothermal technologies were being considered (e.g., what size units, how much land required?). Dr. Lewis stated that the Pro-Geothermal Alliance has offered to provide DOE with their estimates of a development plan including plant concepts for geothermal on the Island of Hawaii. Dr. Lewis also noted that the State will also provide some input on geothermal technologies. DOE will use its best judgment with all the available information.

Patricia Billington (USCOE) stated that she assumes that the USCOE will need to prepare a supplemental environmental document when the developer comes in at some later time with a specific project and plans.

Dean Nakano (DBEDT) mentioned that the ongoing geothermal projects (PGV and True/Mid-Pacific) are not part of EIS proposed actions since EISs have been completed to deliver power to the Island of Hawaii and have been permitted. Dr. Lewis agreed that these plants were not part of the geothermal development, which is the action of this federal EIS. However, he noted that DOE will look at these plants as part of a cumulative impacts analysis required in the EIS.

Rodney Nakano (County of Hawaii) stated that the WDIP and EIS should contain a section that clarifies the role of the developer. Who are the developers? Dr. Lewis agreed to give this suggestion further consideration.

Gerald Lesperance (DBEDT) noted that the HGP was based on HECO's selection of a developer which is currently on hold. Dr. Lewis responded that it was DOE's understanding that Mission Power had been selected by HECO but that the process is now on hold per HECO's decision to wait the outcome of the federal EIS, as stated in the scoping document.

Dr. Lewis asked the participants whether it was their sense that the cooperators should hold periodic meetings or should we meet when there is a specific need. By consensus, the group decided that the cooperators should meet when it was needed. John Naughton (NMFS) suggested that DOE prepare a periodic summary (announcement or newsletter format) of the progress on the EIS. For example, who is DOE to meet with? These summaries would be for the purpose of participation by the cooperating agencies. Dr. Lewis noted that DOE would provide minutes of the cooperator's meetings to participating agencies, including the minutes from today's meeting.

Specific Issues. The remainder of the meeting was focused on obtaining specific comments on Section 3 of the WDIP. The session was organized so that each subtopic of Section 3 could be discussed briefly.

Section 3.3.1 Air Quality Issues. Rodney Nakano (Hawaii County) asked if other man-made emissions such as sulfur compounds would be included in the EIS in addition to those from geothermal plants and volcanoes. Mr. Nakano wanted these other sulfur emissions to be considered in the affected areas (e.g., KERZ). Dr. Lewis noted that all contributions to the ambient air quality will be described.

Andy Yuen (USFWS) wanted to be sure that the effects of contaminants from air-borne emissions on birds and terrestrial species would be included in the EIS. For example, he mentioned the impact of heavy metals such as mercury on biota. Dr. Lewis stated that these would be included in the EIS and the specific emissions would be cross-referenced to sections on aquatic and terrestrial species.

Jim Moulds (County of Hawaii) stated that the air monitoring system, which is fixed, might not characterize properly the geothermal emissions because of the trade winds, etc. He proposed that the EIS consider the most appropriate monitoring schemes, protocols, and equipment. Dr. Lewis responded that the EIS will have a section of mitigation action plans that can include topics such as air monitoring schemes.

Jim Kauahikaua (USGS) asked what ambient air quality conditions (baseline) would be assumed for the EIS analysis. He extended this question to not only air, but also water and noise. He went on to ask if there was enough baseline information (including that for the volcano). He also noted that there are several chemical species (e.g., arsenic, lead, etc.) that have not been characterized. Dr. Kauahikaua stated that data on the major species was pretty good but there was not much beyond that. Furthermore, he believes that data on some of the air quality emissions are available but not much can be said about specific data within the KERZ. Dr. Lewis noted that one of the USGS tasks will be to provide background data on the contribution of volcanic conditions to the background emissions.

Gerald Lesperance (DBEDT) stated that in 1982-83 air quality data were collected in the KERZ. He wondered if it could serve as the baseline. Dan Taylor (NPS) responded that he thought these data were too generic but at least it is a starting point. Dr. Taylor went on to say what is needed is a 24-hour monitoring system.

It was asked whether data from PGV and True/Mid-Pacific would be made available to the EIS process. Dr. Lewis responded yes; these geothermal ventures had agreed to release on-site data on geothermal well characteristics to the EIS process. DOE expects a full and complete data exchange for use in the EIS.

Kalvin Kobayashi (County of Maui) asked if the new rules that EPA is currently promulgating for the 1990 Clean Air Act will be considered in the EIS process. Dr. Lewis responded that DOE will consider the best available regulations including the State air quality rules on H_2S, OSHA, NIOSH, and the evolving set of rules in this area that are part of the 1990 Clean Air Act.

Jim Moulds (County of Hawaii) suggested that the EIS should consider various possibilities regarding the operation of geothermal wells, such as normal mode of operation, "kicks" or blowouts, and emission compliance. Dr. Lewis explained that this would be done and is currently addressed in the WDIP.

Section 3.3.2 Surface and Ground Water. Andy Yuen (USFWS) asked if the EIS was going to address the fate of reinjection fluids. In other words, when fluids are reinjected into the ground, where do they go? Will they affect anchialine ponds? Jim Kauahikaua (USGS) stated that we really don't know enough about the injection of these fluids and their fate underground. Dr. Lewis responded that the EIS would consider this issue using the best information available to DOE. Dean Nakano (DBEDT) responded that current State geothermal regulations require reinjection. He also said that the State Department of Health requires a monitoring system be present to protect aquifers.

Andy Yuen (USFWS) next stated that the EIS should described who should control the geothermal wells, i.e., identify control technologies. He questioned the use of water for the "quenching" of geothermal wells. Where will the water come from? Will streams be diverted and will it affect terrestrial and aquatic ecosystems? Others in the audience responded that surface streams probably will not be diverted and the "quenching" water will most likely come from underground wells.

Jim Moulds (County of Hawaii) stated that there is a lack of geothermal fluids data especially with regard to its corrosive effects. Dr. Lewis responded that there are mechanisms in place for sampling these wells including data already collected. DOE will work with all State-supported projects and others to obtain the best available information about the characteristics of the geothermal fluids.

Section 3.3.3 Geological Issues. Jim Kauahikaua (USGS) asked will the EIS consider what will happen if a 500 MW plant is developed but only 100 MW of steam are found? Dr. Lewis responded that DOE will have to make some assumptions about resource availability from existing information. DOE believes that USGS will assist in this assessment. Jim Kauahikaua next stated that there is nothing about alternative geothermal sites (e.g., Maui) in the WDIP. Dr. Lewis responded that it appears that the EIS will focus on known subzones in the KERZ and probably not on those on Maui, which are believed to be for low-heat needs. Also, the EIS will probably not consider the SW Rift Zone because of the recharge rate, water availability, location, quality of the resource, and the fact that it is not currently designated as a geothermal resource subzone, but this is subject to further consideration.

Section 3.3.4 Terrestrial/Ecological Issues. Warren Kanai (USCOE) stated that the EIS should clarify the legal requirements involved with wetlands (especially regarding Section 404). Also, the EIS should identify other sensitive areas such as cave resources and archeological sites. Dr. Lewis responded that at a meeting earlier this week with representatives of the USCOE, DOE asked for written comments on the legal requirements associated with wetlands and wetland delineation that would be incorporated into the next version of the IP.

John Naughton (NMFS) next suggested that this WDIP section be split into Terrestrial and Aquatic. Furthermore, the aquatic section should be organized into wetlands, anchialine ponds, near-shore marine, deepwater marine, surface water, and groundwater. Dr. Lewis agreed that the reorganization of this section of the WDIP seemed appropriate.

Andy Yuen (USFWS) stated that the issues in this section were too general. He said that the USFWS would be providing their written comments DOE.

Gerald Lesperance (DBEDT) noted that need for a baseline study of invertebrates. Dr. Lewis stated that such a survey is being considered as part of the USFWS's statement of work.

Steve Burns (County of Hawaii) asked to what extent will the methodologies to be used in the EIS be defined in the IP. Dr. Lewis responded that DOE will add more to the IP about the specific methods as we more clearly define the studies.

Section 3.3.5 Noise Issues. Jim Moulds (County of Hawaii) asked whether the effects of a geothermal industry being sited within a residential community will be included in the EIS. His concern was the issue of annoyance. Dr. Lewis confirmed that the impacts on residents will be addressed.

Section 3.3.6 Land Use Issues. Gerald Lesperance (DBEDT) noted that the State's Geothermal Subzone Act should be described in the land use section of the WDIP.

Dan Taylor (NPS) stated the concern that fragmentation of land use (i.e., incompatible land uses next to one another) should be considered from a regional perspective. Dr. Lewis responded that the EIS will describe land uses, but it won't be assessing values of land uses.

Jim Moulds (County of Hawaii) asked about the issue of deed to property. Dr. Lewis stated that this topic will probably not be included in the EIS. Mr. Moulds then inquired whether the amount of land required for Phase 3 or Phase 4 will be considered. Dr. Lewis responded that DOE will attempt to cover this issue using the best available estimates.

Patricia Billington (USCOE) stated that the Corps would like to see assessments of the alternative infrastructure (i.e., roads, pipeplines, etc.) associated with the proposed geothermal development. Dr. Lewis stated that these topics would be covered under the description of the geothermal technologies in the EIS.

Andy Yuen (USFWS) noted that 500 MW in the SW Rift Zone or other subzones outside the KERZ would probably have less impact on the environment. Will DOE cover these options? Dr. Lewis stated that it is unlikely that DOE will consider the SW Rift Zones since they are not yet official subzones.

Bryan Harry (NPS) asked if DOE will consider how the 500 MW are used and the effects of this usage. Dr. Lewis responded that DOE will attempt to cover the topic of commercial and industrial uses for 500 MW of geothermal on the Island of Hawaii.

Gerald Lesperance (DBEDT) stated that DOE should obtain and consider using several energy planning documents prepared by the State of Hawaii or HECO. They include the HECO RFP for 500 MW of geothermal, Hawaii State Plan, and State Energy Functional Plan. Mr. Lesperance said that DBEDT will provide copies of the latter two reports to all cooperators.

Section 3.3.7 Health & Safety Issues. Rodney Nakano (County of Hawaii) asked if the EIS will establish baseline health and safety conditions. He stated that there is a state of malaise in the Puna area and it will be exacerbated by an additional 500 MW of geothermal. Dr. Lewis stated that the EIS will consider the cumulative health and safety impacts using best available information including previous studies.

Steve Burns (County of Hawaii) asked that instead of looking at individual effects (i.e., air quality effects), will DOE also look at the combined effects (synergistic and cumulative impacts). Dr. Lewis said that the EIS will try to address these under the topic of cumulative impacts.

Sections 3.3.8 Socioeconomic and 3.3.9 Cultural Issues. Warren Kanai (USCOE) stated that it is important that the HGP be in full and complete compliance with State archeological and cultural requirements. Dr. Lewis responded that DOE will be consulting with the Historical Preservation Office (SHPO) and others on the archeological and cultural aspects of the EIS.

Section 3.3.10 Aesthetics. Dan Taylor (NPS) stated that the NPS wanted to be included in discussions with consultants about the effects of the HGP on the Volcano National Park. Dr. Lewis responded that seemed appropriate.

Sections 3.3.11 Alternatives. Dr. Lewis began this discussion asking for input from the cooperators on reasonable alternatives. Kalvin Kobayashi (County of Maui) responded that the County (who are

advisers) does not plan energy facilities. He suggested that DOE should discuss this topic with the utilities (e.g., HECO). Dr. Lewis said that DOE is consulting with HECO and other utility planners about the choice of alternatives. He went on to say that the State's Integrated Resources Plan will not be completed until May 1993. Since this plan will not be reviewed by the PUC, State, or counties in time for use in the EIS, DOE will attempt to use common methodologies, process, and data so that the work is comparable. Mr. Kobayashi then stated that DOE should not narrow its scope of alternatives. Dr. Lewis responded that DOE will consider all reasonably viable alternatives.

Steve Burns (County of Hawaii) asked if DOE was bound to the current IRP methods being considered for the Hawaii IRP. Dr. Lewis stated that DOE will conduct an independent review of the utilities plans, the IRP methods being considered, and the data as the first step in the assessment of alternatives.

Jim Moulds (County of Hawaii) questioned the inconsistency in the WDIP regarding the alternative of geothermal on the Island of Hawaii. In one place, the WDIP states that an alternative will be the development of up to 100 MW geothermal on the Island of Hawaii with no submarine cable. In Section 3.3.11, it is stated that both an alternative of up to 100 MW and 500 MW geothermal for the Island of Hawaii (no cable) are mentioned. Dr. Lewis responded it was suggested in the scoping comments that the 500 MW (Big Island only) alternative needs to be evaluated since there are two EIS documents either already completed (space port) or in preparation (manganese nodule refining) that require geothermal power for the Big Island. The WDIP will be corrected to eliminate this inconsistency.

Dean Nakano (DBEDT) asked if the proposed action is 500 MW to the island of Oahu. Dr. Lewis said yes, but DOE will also take into consideration 500 MW and its utilization.

Sections 3.3.11 and 3.3.12 Regulation and Compliance. Dr. Lewis stated that Table 4-1 in the WDIP needed to be reviewed and would be revised in the next version of the IP. He specifically requested written comments on the list of regulations and responsible agencies.

Steve Burns (County of Hawaii) asked if the cooperators should reiterate the comments that were given today as part of the written comments on the WDIP. Dr. Lewis responded yes and that DOE needed the final agency comments in writing by July 24, 1992.

Draft EIS Schedule. Dr. Lewis described as the last topic to be discussed was the proposed DEIS schedule listed in the WDIP. Several participants responded to this request. Andy Yuen (USFWS) thought that the schedule was very optimistic and tight. Because of the timing of the various biotic surveys, which had specific time windows, he suggested that an addition of one to one and one-half quarters would be required. Patricia Billington (USCOE) also raised the issue of a tight schedule. Jim Moulds (County of Hawaii) felt that there was a problem with timing between the WDIP and the DEIS.

There was just not enough time to respond to all important comments raised during the reviews. Gerald Lesperance (DBEDT) stated that DBEDT could live with a schedule that added an additional quarter. Jim Kauahikaua (USGS) said that his agency also needs at least an additional quarter to complete their studies. Dr. Lewis noted by consensus of all cooperators, the EIS schedule for preparing the *draft* EIS and all subsequent milestones will be extended by one quarter.

The meeting ended with Dr. Lewis thanking all of the cooperators for their participation in the meeting and assistance. He also encouraged them to complete their review of the WDIP and submit their written comments to DOE by July 24, 1992. He also noted DOE could receive these written comments as late as August 1, as requested by several cooperators.

Department of Energy
Washington, DC 20585

January 5, 1993

Mr. Jack Keppler
Deputy Director
Department of Land and Natural Resources
State of Hawaii
1151 Punchbowl Street
Honolulu, HI 96813

Dear Jack:

As has been long promised, I am finally able to send you minutes from meetings we held with your organization to discuss the Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS). In addition to these meetings, as you know, DOE held some ten public scoping meetings in Hawaii on the HGP EIS in March 1992. Transcripts from those meetings are available at the reading rooms in Hawaii and on the mainland as listed in both the HGP EIS Mailing List and the Notice of Intent previously sent to you.

Much of the knowledge gained from these meetings was used in the preparation of our draft Implementation Plan (IP). This IP will be published and broadly distributed in Hawaii and elsewhere soon. The minutes were also of great assistance in preparing cooperating agency memoranda of understanding and draft work statements.

Please excuse the occasional misspelling of names and/or places, or incorrect identification of individual titles, etc. Some of these minutes were prepared as we were still making initial contacts and learning about the players. You are requested to assist the HGP EIS team by making further distribution of the enclosed minutes to listed meeting attendees. If you have any questions about these minutes, please contact me at:

Dr. Lloyd Lewis CE-121
HGP EIS Program Director
U.S. Department of Energy
1000 Independence Avenue S.W.
Washington,D.C. 20585
Tel: (202) 586-6263
Fax: (202) 586-5124

Again, thank you for your interest in the HGP EIS and your willingness to assist DOE in acquiring information for its preparation.

Yours truly,

Lloyd F. Lewis, Ph.D.
HGP EIS Program Director

LFL/dn

Enclosure

cc: Ms. Andrea Campbell, DOE-OR (w/o enclosure)
Dr. Charles Boston, ORNL (w/o enclosure)
D/Mr. Maurice Kaya, SOH/DBED

INVENTORY LISTING - MINUTES OF DOE MEETINGS

HAWAII GEOTHERMAL PROJECT ENVIRONMENTAL IMPACT STATEMENT

SENT TO: Mr. Jack Keppler, Deputy Director, Department of Land and Natural Resources State of Hawaii (SOH)

ORGANIZATION(S)	DATE
SOH: DLNR	10/8/91

Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS)
Cooperating Agency Meeting
State of Hawaii (SOH) Dept. Land and Natural Resources (DLNR)
October 8, 1991

Location: SOH DLNR, 1151 Punchbowl Street, Honolulu
Contact: Mr. Manabu Tagomori, Acting Dep. Director, DLNR (808) 587-2150
Attendees: Mr. Manabu Tagomori, DLNR
Ms. Janet Swift, DLNR
Dr. Lloyd Lewis, DOE-HQ
Ms. Patricia Phillips, DOE-OR

SOH Role: DLNR recommended that the SOH be a cooperator on the federal EIS, but noted that DLNR was short on both staff and funds to support that cooperation.

Geothermal Leasing: Mr. Tagomori explained that in HI, all geothermal resources are SOH owned and managed by DLNR's Board of Directors. DLNR, in turn, leases geothermal development rights. Two such leases have been granted on the Big Island: One to Campbell Estates (where True-Mid Pacific is carrying on an exploration effort); one to Kapoho Land Company (which eventually was transferred to Puna Geothermal Ventures-PGV). Lessees are required to file Geothermal Management Plans with DLNR prior to drilling.

Geothermal Advisory Board (GAB): DOE was encouraged by DLNR to talk to members of the DLNR GAB:

- Dr. Jim Alexander, U.HI, Hilo
- Dr. Harry Olson, U. HI, Manoa
- Dr. Peterson, U. HI, Manoa
- Mr. Jim Kauahikaua, US Geological Survey

The GAB members have current information on current geothermal resources in Puna.

Land Swap: Mr. Tagomori explained a recent 25,000 acre land exchange between the SOH and Campbell Estates. This resulted in higher elevation, pristine rainforest being placed in conservation status and forming a no-developmental buffer adjacent to Hawaii Volcanoes National Park. The lower elevation, less pristine acreage became (almost entirely) a part of the designated geothermal resource subzone (GRS).

GRSs: There are four GRSs in HI. They are on the Big Island (three GRSs) and Maui. The southwest rift of Kilauea was proposed for GRS designation, but never received such designation. Exploration for geothermal resources can occur in any of the four categories of land in HI (i.e., urban, agricultural, rural and conservation), but production is only allowed in a designated GRS. It takes about two years to complete a GRS designation (note: details of GRS designation process are given in a reference provided DOE by DLNR). DLNR is currently re-evaluating the geothermal resource in the Kilauea East Rift Zone (KERZ) and may redraw the 90 percent resource occurance probability lines after acquiring data from the current developers. These data can be made available to DOE (note: only PGV data currently releasable) after the one year confidentiality period expires.

Current Developments: DLNR described the current geothermal developments in Puna, probable distribution of expected royalties, a possible assets fund for relocation of residents, the SOH-County of Hawaii (COH) task force investigating the KS-8 well venting incident of June 1991, etc. It was noted that the SOH Dept. of Health (DOH) licenses reinjection wells while DLNR licenses production wells.

HGP Licensing: Ms. Swift described the SOH "one stop licensing" process established by legislation in HI for HGP and associated transmission cable permits. So far, there have been no applications for this service. Developing this licensing service involved the federal, SOH and COH task force referred to in the federal court decision.

Future Meetings: DLNR recommended that DOE meet with HELCO to discuss the current electrical power shortages on the Big Island. Dr. Lewis noted that DOE is scheduled to meet with the utilities in November 1991.

ACTION ITEMS:

1. DOE/ORNL to obtain GMPs for current developments in Puna from DLNR.

2. DOE/ORNL to follow up contacts with DLNR GAB for geothermal resources information.

3. DOE/ORNL to request geothermal well data from current developers through DLNR.

4. DOE to meet with HELCO during utilities meetings in November 1991.

JOHN WAIHEE
Governor
MUFI HANNEMANN
Director
BARBARA KIM STANTON
Deputy Director
RICK EGGED
Deputy Director
TAKESHI YOSHIHARA
Deputy Director

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

ENERGY DIVISION, 335 MERCHANT ST., RM. 110, HONOLULU, HAWAII 96813 PHONE: (808) 587-3800 FAX: (808) 587-3820

October 23, 1992

MEMORANDUM

TO: Distribution

FROM: Maurice H. Kaya

SUBJECT: U. S. Department of Energy's Draft Implementation Plan for the Hawaii Geothermal Project Environmental Impact Statement.

Thank you for commenting on the June 30, 1992, working draft of subject plan.

Attached is a copy of the October 20, 1992, draft of the plan. Please review and provide comments, if any, directly to Dr. Lloyd Lewis whose fax number is (202) 586-5124 by November 2, 1992. Please provide DBED's Dean A. Nakano with a copy of your comments to Dr. Lewis. Mr. Nakano's fax number is 586-2353.

Maurice H Kaya

MHK/GOL:hk
Attachment

Distribution:

Ronald L. Walker, DOFAW, DLNR
Henry M. Sakuda, DAR, DLNR
Don Hibbard, HPO, DLNR
Manabu Tagomori, DOWALD, DLNR
William Wong, Safe Drinking Water Branch, DOH
Paul Aki, Clean Air Branch, DOH
T. Seng Yang, Planning Staff, DOA
Julie-Ann Cachola, Planner, OSP

Department of Energy
Washington, DC 20585

October 20, 1992

Mr. Dean A. Nakano
Geothermal Program Manager
Department of Business, Economic
Development and Tourism
130 Merchant Street, Suite 1060
Honolulu, HI 96813

Dear Mr. Nakano:

Thank you for your comments on our working draft Implementation Plan (IP) for the Hawaii Geothermal Project (HGP) Environmental Impact Statement (EIS). Your comments and suggestions were particularly useful to us and we have attempted to consider and incorporate a response to them in the draft IP. The latter is being sent to you today via Federal Express for your review.

It is our current plan to give the draft IP final DOE review and broadly distribute it for public review in early November 1992. To accomplish this goal, we are asking you to complete your review and get your comments back to DOE not later than November 2, 1992.

Although we request your review of the entire draft IP, we especially encourage you to pay particular attention to our summary of your scoping responses as it appears in Appendices A and B, as well as pertinent subsections of the "Results of Scoping", Section 3.3. We are also requesting your assistance in assuring that the "Agency Consultation" information in Section 4 is accurate and up to date.

Please return your draft IP comments and suggestions to:

Dr. Lloyd Lewis, CE-121
HGP EIS Program Director
Office of Conservation and Renewable Energy
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

It would be very helpful if you could fax your comments to (202) 586-5124 and confirm at (202) 586-6263.

Thank you again for your assistance in the preparation of the HGP EIS.

Respectfully requested,

Lloyd F. Lewis, Ph.D.
HGP EIS Program Director

LFL/mat

cc: Mr. Maurice Kaya, Energy Program Director, DBEDT
Ms. A. Campbell, DOE-OR
Dr. C. Boston, ORNL

State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
Commission on Water Resource Management
Honolulu, Hawaii

RECEIVED
92 JUL 21 P2:54
DIV. OF WATER &
LAND DEVELOPMENT

JUL 21 1992

MEMORANDUM

TO: Manabu Tagomori

FROM: Rae M. Loui

SUBJECT: Draft Environmental Statement (EIS) for Hawaii Geothermal Project

We have no comments.

Scope of EIS covers our concerns.

Enclosure

State of Hawaii
Department of Land and Natural Resources
DIVISION OF AQUATIC RESOURCES

July 22, 1992

MEMORANDUM

TO: Manabu Tagomori, Manager and Chief Engineer
Division of Water and Land

FROM: Henry M. Sakuda, Administrator
Division of Aquatic Resources

SUBJECT: Draft Environmental Impact Statement (EIS)
Hawaii Geothermal Project

The construction and operation of the geothermal electric generating plant on fast land in the Puna District of Hawaii will have no effect on aquatic resources since there is no known stream or water body in the immediate development area.

However, the Draft Executive Summary of the Working Draft has identified potential for significant impacts to aquatic resource values that may occur during installation, operation and maintenance of the proposed deep-water transmission cable. We understand those concerns will be addressed in the forthcoming EIS.

We would appreciate the opportunity to review the EIS when it is completed.

HAWAII GEOTHERMAL
PROJECT TEAM
Project Account 3345-3350

Rev: July 21, 1992

Name	Phone	Bldg.	MS	Room	Area of responsibility
C. R. Boston (Chuck)	4-5758	4500N	6200	D-30	Project Leader
C. E. Easterly (Clay)	4-6254	4500S	6101	F-256	Health and safety, EMF effects
P. C. Gailey (Paul)	4-5693 4-0419	3508	6318	A-4	Health and safety, EMF effects
F. M. Glenn (Fredia)	4-8138	4500N	6200	D-34	Information, Admin. Support
C. W. Hagan (Charlie)	4-8625	4500N	6200	148A	Technical writing
M. S. Hunt (Mary), LBL FAX	510-486-5645 510-486-4260				Marine impacts; Alternatives
R. O. Johnson (Bob)	4-4230	4500N	6185	144F	Water resources
D. P. Lombardi (Doug)	6-9231	4500N	6200	D-232	Meteorology/air quality
R. L. Miller (Bob)	6-0751	4500N	6200	D-18	Meteorology/air quality
R. W. Murphy (Rick) FAX	6-7772 4-9338	3147	6070	228	Engineering
T. G. Patton (Thelma)	4-6096	4500N	6200	148A	Project assistance
J. W. Saulsbury (Bo)	4-4694	4500N	6206	H-14	Socioeconomics/ Asst. Project Leader
S. M. Schexnayder (Susan)	4-5810	4500N	6206	G-9	Socioeconomics
W. P. Staub (Bill)	4-5761	4500N	6185	144D	Geology/soils/seismicity
V. R. Tolbert (Virginia)	4-7288	1505	6036	0268	Aquatic ecology (non-marine)
C. C. Trettin (Carl) FAX	4-5607 6-8543	1505	6038	320	Terrestrial ecology
L. Trettin (Lillian), U.T.	4-5348	4500N	6206	H19-D	Cultural resources
J. W. Van Dyke (Jim)	4-6720	4500N	6205	G-34	Alternatives
B. Vogt (Barbara)	4-5856	4500N	6190	E-6	Emergency preparedness
		Document Peer Review			
R. M. Reed (Bob)	4-5756	4500N	6200	D-33D	
M. Schweitzer (Marty)	6-2726	4500N	6206	F-26	
L. L. Sigal (Lorene)	4-7266	1505	6038	0382	

JOHN WAIHEE
Governor
MURRAY E. TOWILL
Director
BARBARA KIM STANTON
Deputy Director
RICK EGGED
Deputy Director
TAKESHI YOSHIHARA
Deputy Director

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

ENERGY DIVISION, 335 MERCHANT ST., RM. 110, HONOLULU, HAWAII 96813 PHONE: (808) 587-3800 FAX: (808) 587-3820

July 17, 1992

MEMORANDUM

TO: Distribution

FROM: Maurice H. Kaya
Energy Program Administrator

SUBJECT: REQUEST FOR REVIEW AND COMMENT ON THE U.S. DEPARTMENT OF ENERGY'S (DOE) DRAFT EIS IMPLEMENTATION PLAN FOR THE HAWAII GEOTHERMAL PROJECT (HGP)

DBED's memorandum of July 7, 1992 requested that your agency review the draft EIS Implementation Plan (IP) for the Hawaii Geothermal Project and submit your comments directly to Dr. Lloyd Lewis at the U.S. DOE Headquarters.

However, at the July 14, 1992 meeting with Dr. Lewis, at which your agency was represented, it was agreed that all State agencies, except the Office of Hawaiian Affairs, should provide their comments directly to DBED. DBED as the lead agency for the State in this cooperative EIS preparation will be responsible for consolidating these comments and transmitting them to DOE.

Recognizing DOE's deadline of July 24, 1992 for submittal of comments, we respectfully request that you transmit your agency's comments prior to July 22, 1992 to:

Dean A. Nakano
DBED Geothermal Project Office
130 Merchant Street, Suite 1060
Honolulu, Hawaii 96813

Thank you for your continued cooperation and expeditious review of the draft IP document. Please ensure that the appropriate programs within your agency have an opportunity to review the issues that will be considered within the scope of the EIS. Should you have any questions, please contact Dean A. Nakano at 586-2353.

MHK/DAN:js:390

Distribution:

Mr. Hugues Ogier, PUC
Mr. Paul Aki, DOH (CAB)
Mr. James Ikeda, DOH (N&RB)
Mr. Hiram Young, DLNR
Mr. Sam Wilson, DHS
Ms. Julie-Ann Cachola, OSP
Mr. Gary Noda, DLIR
Mr. T. Seng Yang, DOA

cc: Takeshi Yoshihara, DBED

3714

JOHN WAIHEE
Governor

Director
BARBARA KIM STANTON
Deputy Director
RICK EGGED
Deputy Director
TAKESHI YOSHIHARA
Deputy Director

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

Central Pacific Plaza, 220 South King Street, 11th Floor, Honolulu, Hawaii
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804 Telephone: (808) 586-2406 Fax: (808) 586-2377

July 7, 1992

MEMORANDUM

TO: Distribution

FROM: Barbara Kim Stanton
Acting Director

SUBJECT: REQUEST FOR REVIEW AND COMMENT ON THE U.S. DEPARTMENT OF ENERGY'S (DOE) DRAFT EIS IMPLEMENTATION PLAN FOR THE HAWAII GEOTHERMAL PROJECT (HGP)

Transmitted for your review and comment is a copy of DOE's Draft Implementation Plan (IP) for the Federal (NEPA) EIS for a large-scale geothermal and inter-island power transmission project as defined by the U.S. District Court of Hawaii.

Comments received by DOE during the recent Federal EIS scoping meetings held in Hawaii have been summarized and responded to in the Draft IP. The IP when finalized will identify issues and alternatives related to the HGP that will be assessed in the Federal EIS and will discuss the approach that DOE will take in its preparation.

Since the IP will serve as a detailed outline for the Draft HGP EIS, your agency's early review of the draft document is requested. Preliminary comments as they relate to your area of expertise should be provided at the meeting between DOE and affected State agencies scheduled for July 14, 1992. The DOE/State meeting will begin at 10:30 a.m. at the DBED Conference Room on the 19th Floor of the Grosvenor Center located at 737 Bishop Street, Suite 1900 (Mauka Tower).

DOE staff will be available in the afternoon to meet with individual State agencies to discuss specific contents of the Draft IP. Should your agency wish to continue these discussions with DOE, please contact our Geothermal Project Office at 586-2353 to make the necessary arrangements.

Recognizing the short time frame in which to review the attached Draft IP, formal written comments may be submitted to DOE following our meeting on 7/14/92. The deadline for submission of written comments is July 24, 1992. Comments should be submitted directly to the HGP/EIS Program Director:

Dr. Lloyd Lewis, CE-121
Office of Conservation and Renewable Energy
U.S. Department of Energy
Forrestal Building
1000 Independence Avenue, S.W.
Washington, DC 20585

It is requested that copies of all correspondence to DOE related to the NEPA EIS be provided to DBED's Energy Division. Should you have any questions, please contact Maurice H. Kaya, Energy Program Administrator at 587-3807.

BKS/DAN:js:383

Attachment

Distribution:

Hon. William W. Paty
Hon. John C. Lewin, M.D.
Hon. Clayton Hee
Hon. Yukio Kitagawa
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Working Draft

Implementation Plan

for the

Hawaii Geothermal Project

Environmental Impact Statement

Prepared by
The United States Department of Energy
Conservation and Renewable Energy

June 30, 1992

U.S. Department of Energy
Washington, D.C.

Working Draft

Implementation Plan
for the
Hawaii Geothermal Project Environmental Impact Statement

Prepared by
The United States Department of Energy
Conservation and Renewable Energy
Washington, D.C.

In Cooperation with
County of Hawaii
County of Maui
National Marine Fisheries Service
National Park Service
State of Hawaii
United States Army Corps of Engineers
United States Fish and Wildlife Service
United States Geological Survey

June 30, 1992

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WORKING DRAFT (6/30/92)

Implementation Plan
for the
Hawaii Geothermal Project Environmental Impact Statement

1. INTRODUCTION

The U.S. Department of Energy (DOE) is preparing an Environmental Impact Statement (EIS) that identifies and evaluates the environmental impacts associated with the proposed Hawaii Geothermal Project (HGP), as defined by the State of Hawaii in its 1990 proposal to Congress (ref). The EIS is being prepared pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA), as implemented by the President's Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508) and the DOE NEPA Implementing Regulations (10 CFR 1021), effective May 26, 1992, which now require Mitigation Action Plans. Mitigation Action Plans, completed in conjunction with the EIS and its Record of Decision (ROD), explain how measures designed to mitigate adverse impacts will be planned and implemented. This draft Implementation Plan (IP) identifies the issues raised in the scoping process and describes the approach to be used in preparing the EIS.

The State's proposal for the four-phase HGP consists of (1) exploration and testing of the geothermal resource beneath the slopes of the active Kilauea volcano on the Island of Hawaii (Big Island), (2) demonstration of deep-water power cable technology in the Alenuihaha Channel between the Big Island and Maui, (3) verification and characterization of the geothermal resource on the Big Island, and (4) construction and operation of commercial geothermal power production facilities on the Big Island, with overland and submarine transmission of electricity from the Big Island to Oahu and other islands. DOE prepared appropriate NEPA documentation for separate federal actions related to Phase 1 and 2 research projects, which have been completed. This EIS will consider Phases 3 and 4, as well as reasonable alternatives to the HGP. In this regard, in addition to considering non-geothermal alternative energy resources for power production

(including, but not necessarily limited to, coal, solar, biomass, and wind), the HGP EIS will consider the reasonable alternatives among submarine cable technologies; geothermal extraction, production, and power generating technologies; pollution control technologies; overland and submarine power transmission routes; sites reasonably suited to support project facilities in a safe and environmentally acceptable manner; and nonpower generating alternatives such as demand side management.

1.1 BACKGROUND

The HGP is the culmination of research and development efforts begun in the mid-1970s to explore the feasibility of using Hawaii's indigenous geothermal resource for the production of electricity. Geothermal exploration began in Hawaii in 1972 with funding from the National Science Foundation (NSF). A high-potential geothermal resource site was identified on the east rift of the Kilauea volcano on the Big Island. Subsequent exploratory drilling (also funded by NSF) between December 1975 and April 1976, resulted in a productive geothermal well at a depth of approximately 6000 feet. In 1976, the Energy Research and Development Administration (ERDA), a predecessor to DOE, funded the testing of the geothermal well, which was designated as the HGP-A well. In 1979, DOE, which succeeded ERDA, funded the development of a 3-MW demonstration power plant at the HGP-A site. In 1986, the HGP-A facilities were transferred by DOE to the State of Hawaii to be used for further research. The State has referred to this early exploration and testing of the Big Island geothermal resource as Phase 1 of the HGP.

DOE also provided funds for the Hawaii Deep Water Cable Program, referred to by the State of Hawaii as Phase 2 of the HGP, which was initiated in 1981. The goal of the program was to determine the technical and economic feasibility of constructing and operating a deep water submarine power transmission cable that would serve the island of Oahu and would operate for a 30-year period. This project, completed in 1991, demonstrated the feasibility of the deep water power transmission cable. Over an 11-year

period, DOE has provided approximately $33 million for geothermal and deep water cable research in Hawaii, which is about 80% of the HGP cost-shared effort.

The State of Hawaii considers the unknown extent of the geothermal resource as the primary obstacle to private investment and commercial development. State and private industry experts estimate that at least 25 commercial-scale exploratory wells will need to be drilled to verify the generating potential of the resource. To that end, Phase 3 activities would include well drilling, logging of cores from holes, measuring temperatures, collecting and analyzing geothermal fluid samples, and making downhole geophysical and geochemical measurements.

After resource characterization, the State of Hawaii's 1990 proposal forecasts that from 10 to 20 separate geothermal power plants of from 25-30 MW each could be developed. The actual number of plants would depend on the extent of the resource defined in Phase 3. Because the exact location of plants will not be known until Phase 3 is completed, the EIS will rely on best available data and information to predict development sites. Based on the physical characteristics of the resource and contemporary geothermal energy development practice, the State estimated that about 125 production wells and 30 injection wells may be needed to produce 500 MW. At the source, some power level greater than 500 MW will be required, considering power transmission losses. The plants most likely would be connected by a network of roads, piping, and overland power transmission lines. Overland and underwater transmission lines (300 kV AC or DC) would be constructed to distribute power to Oahu and other islands.

In 1990, the State projected that permitting and financing for Phase 3 and 4 would occur in 1991 and that 500 MW of power could be on-line by 2005. Compliance with State and federal legal and environmental requirements is likely to extend this schedule.

In 1990, the State of Hawaii requested additional federal funding for what is defined by the State as Phase 3 of the HGP: Resource Verification and Characterization. In 1990, Congress appropriated $5 million (ref) for the State's use in Phase 3. Because Congress considered Phase 3 work essentially is "research" and not development or project construction, Congress indicated that this funding would not be considered a major federal action under NEPA that would typically require an EIS. However, because the project is

highly visible, somewhat controversial, and involves a particularly sensitive environment in Hawaii, Congress directed in 1991 that "... the Secretary of Energy shall use such sums as are necessary from amounts previously provided to the State of Hawaii for geothermal resource verification and characterization to conduct the necessary environmental assessments and/or environmental impact statement (EIS) for the geothermal initiative to proceed" (ref). In addition to this Congressional directive, the U.S. District Court of Hawaii (ref), in litigation filed by several environmental groups, ruled that the federal government must prepare an EIS for Phases 3 and 4 of the HGP before any further disbursement of federal funds to the State for the HGP.

1.2 PURPOSE AND NEED

The purpose of the HGP is to develop Hawaii's indigenous geothermal resource for the production of electricity. The State of Hawaii has declared that the HGP is needed to help the State reduce its heavy dependence on imported oil. Currently, the State uses petroleum for approximately 90 percent of its power production, which is the highest percentage usage of petroleum among the 50 states.

1.3 SCOPE

The full range of potential impacts of the proposed project and alternatives will be addressed in the HGP EIS. The environmental resource areas that have the potential for significant impact, and therefore those that will be analyzed in detail include land use, air quality, water resources, ecological resources, geologic issues, noise, health and safety, socioeconomic issues, cultural resources, and aesthetic visual effects. Further information on these topics and on other topics expected to be addressed in the EIS can be found in Section 3.3 of this working draft IP. A proposed outline for the HGP EIS that identifies the types of impacts to be addressed is presented in Appendix A.

2. PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The proposed action is for DOE to partially fund Phase 3 of the HGP, as defined by the State in its 1990 proposal (ref) to Congress, using the funds, remaining from the $5 million Congressional appropriation for Phase 3 of the HGP after EIS expenditures. However, the EIS will address both Phases 3 and 4 as required by Congressional directive (ref) and U.S. District Court of Hawaii ruling (ref) (Sect. 1.1). Activities to be carried out in Phases 3 and 4 are described in Sect. 1.1.

2.2 ALTERNATIVES

The basic decision being considered by DOE is whether or not to partially fund Phase 3, as defined by the State, with the funds remaining from the $5 million Congressional appropriation after EIS expenditures. Under the no-action alternative, the federal government would not contribute funds to planned geothermal development in Hawaii; but this alternative would not preclude the continuation of the HGP using other sources of funding by the State or others

Other alternatives that will be considered are: (1) development of up to 100 MW of geothermal power for exclusive use on the Big Island, with no inter-island transmission cable (It would include other sources on other islands to make up the equivalent power and generation of the proposed projects); (2) alternative sites for geothermal development and construction of power plants within established geothermal resource subzones (GRSs); (3) alternative routes for transmission lines on land and in the sea; (4) alternative geothermal power generating technologies; (5) alternative submarine cable technologies; (6) alternative power production technologies, such as coal-fired; (7) renewable and

demand-side management (DSM) alternatives that would consider a mix of supply and demand options available to Hawaiian utilities and the State within the framework of integrated resource planning (IRP); (8) continued reliance on the existing mix of power generating technologies with emphasis on oil-fired power plants.

Although many alternatives were mentioned during the scoping process, only those alternatives deemed to be viable and reasonably foreseeable within the time frame of the proposed project will be considered. In general, the alternatives that will not be considered in this EIS were either anticipated to be not technically feasible within the project time frame (e.g. ocean thermal energy conversion) or technically feasible but extremely unlikely because of legislative or other impediments. As an example, the development of nuclear power in Hawaii is unlikely because of the statutory requirement for a 75% legislative affirmation of such an action (ref).

3. THE SCOPING PROCESS AND RESULTS

3.1 NOTICE OF INTENT

An Advance Notice of Intent (ANOI) regarding preparation of the HGP EIS was issued in the *Federal Register* (ref) by DOE on September 3, 1991. It announced the initiation of planning and scoping of the HGP EIS and solicited public input regarding scope and content of the EIS. DOE received 55 comment letters on EIS-related topics, which were considered in this working draft IP. These comments helped frame the content of the ANOI and were the stimulus for a series of information exchange meetings. DOE solicited further input at these meetings held during September, October, and November 1991, and March 1992. These meetings were conducted with federal, State, and local agencies, as well as with environmental, civic, Native Hawaiian, and public interest groups, in addition to utilities and geothermal developers (see Table 3-1).

On February 14, 1992, a Notice of Intent (NOI) was issued in the *Federal Register* by DOE to announce DOE's intent to prepare an EIS for Phases 3 and 4 of the HGP as defined by the State in its 1989 proposal to Congress. The NOI also announced that ten scoping meetings would be held in Hawaii from March 7 through March 16, 1992, to afford the public an opportunity to identify environmental issues and concerns related to the proposed project. The NOI also asked that written scoping comments, which were to be given equal weight with oral comments, would be received until April 15, 1992, for consideration in the IP.

TABLE 3-1
INFORMATION EXCHANGE MEETINGS

November 12, 1991 - Wailuku, Maui, HI (18)
- Blue Ocean Preservation Society
- Campbell Estate
- Coral Reef Foundation
- Kaupo Ranch
- Maui Tomorrow
- Pele Defense Fund
- Sierra Club

November 13, 1991 - Hilo, HI (35)
- Mayor's Advisory Group on Energy

November 13, 1991 - Pahoa, HI (23)
- Big Island Papaya Growers
- Big Island Rainforest Action Group With Malu Aina
- Citizens for Responsible Energy Development With Aloha Aina
- Greenpeace Hawaii
- Hawaii Island Geothermal Alliance
- Kapoho Community Association
- Lani Puna Gardens Association
- Pele Defense Fund
- Puna Community Council
- West Hawaii Sierra Club

November 14, 1991 - Honolulu, HI (9)
- Native Hawaiian Legal Corporation
- Pele Defense Fund

November 15, 1991 - Honolulu, HI (13)
- National Audubon Society
- Natural Resources Defense Fund
- Oahu Rainforest Action Network
- Rainforest Action Network
- Sierra Club Legal Defense Fund

March 6, 1992 - Pahoa, HI (7)
- Puna Geothermal Ventures (incl. site visit)

March 7, 1992 - Pahoa, HI (27)
- Native Hawaiian Organizations
- Pele Defense Fund

March 8, 1992 - Pahoa, HI (7)
- True-Mid-Pacific (incl. site visit)

3.2 SCOPING MEETINGS

Beginning on March 7, 1992, DOE held two scoping meetings at each of five locations in Hawaii, as indicated in Table 3-2. The public scoping meetings were held in compliance with CEQ regulations (40 CFR 1501.7) and DOE NEPA Guidelines (52 FR47664, December, 1987) and in concert with DOE's policy to facilitate opportunities for public involvement in the NEPA process. The purpose of these meetings was to assure adequate opportunity for public and government agency participation in developing the EIS scope by identifying the issues to be addressed, commenting on the proposed action, and suggesting alternatives to be analyzed. The public scoping meetings ended March 16, 1992. Copies of the meeting transcripts are available at DOE Reading Rooms and other locations identified in the *Federal Register* Notices. DOE has also prepared an extensive mailing list identifying parties which are participating in the EIS preparation. DOE has notified all interested parties by mail of the availability of the meeting transcripts. As shown in Table 3-2, about 170 people provided approximately 600 comments during scoping meetings. In addition, approximately 70 people submitted materials and letters to DOE during the scoping period (before the April 15, 1992, deadline). The majority of comments came from individuals. However, about 50 organizations, including environmental, public interest, and community groups, also participated by offering comments through representatives.

3.3 RESULTS OF SCOPING MEETINGS

The following discussion summarizes the comments raised during the scoping process, organized according to the issues raised. Table 3-3 indicates how many comments were received relating to each concern or issue. Examples of comments from which each issue was derived are provided, followed by how the EIS will address that issue. The discussion also identifies which issues DOE considers to be within the EIS scope.

Table 3-2 Scoping Meeting Locations, Dates and Number of Commenters/Comments

Location in Hawaii	Date	Commenters	Comments
Pahoa (Big Island)	March 7, 1992		
	Meeting 1	35	134
	Meeting 2	19	65
Wailuku (Maui)	March 9, 1992		
	Meeting 1	14	45
	Meeting 2	18	78
Kaunakakai (Molokai)	March 12, 1992		
	Meeting 1	14	27
	Meeting 2	16	40
Honolulu (Oahu)	March 14, 1992		
	Meeting 1	10	51
	Meeting 2	23	87
Kamuela/Waimea (Big Island)	March 16, 1992		
	Meeting 1	15	47
	Meeting 2	6	27
Total		170	601

3.3.1 Air Quality/HGP Emissions

Many commenters expressed concerns about atmospheric emissions from the geothermal wells and facilities-emissions that may occur during construction and operation of the proposed facilities, and during an accident. Bases on recent experience with geothermal development and accidents in Puna, commenters suggested a variety of adverse environmental effects that may arise from these operations. Of particular concern was the emission of hydrogen sulfide (H_2S) and other airborne pollutants and their effects on the health of nearby residents; several examples of ongoing effects were noted. The commenters believed that such effects are poorly understood and frequently underestimated.

Table 3-3. EIS issues and number of comments

Chapter 3 section number	Issue	Number of Comments	
		ANOI	NOI
3.3.1	Air Quality		48
3.3.2	Surface and Groundwater Resources		30
3.3.3	Geologic Concerns		88
3.3.4	Terrestrial and Aquatic Ecological Resources		79
3.3.5	Noise		18
3.3.6	Land Use		42
3.3.7	Health and Safety		67
3.3.8	Socioeconomics		73
3.3.9	Cultural Resources		82
3.3.10	Aesthetic Resources		40
3.3.11	Alternatives		70
3.3.12	Federal, State, and Local Government and Developers		74
3.3.13	Compliance with Environmental Regulations		12
Total			723

Examples of issues that were identified in the scoping process include:

- Effects on human health of acute exposure to H_2S
- Nuisance effects of H_2S
- Effects of emissions other than H_2S (e.g., radon, heavy metals, and silicate)
- Degradation of ambient air quality with regard to the concentrations of those pollutants for which ambient air quality standards exist (sulfur dioxide, nitrogen oxides, carbon monoxide, ozone, lead, and suspended inhalable particulate matter)
- Validity of data regarding H_2S exposure and the validity of using standards for healthy workers as opposed to standards for the general population
- Sufficiency of air quality monitoring
- Effects on human health of cumulative and chronic exposure to H_2S and other pollutants (e.g., radon, heavy metals, and silicate)
- Global issues (acid rain and global warming)
- Effects of adverse meteorological conditions (air stagnation) on concentrations of pollutants that might affect human health.

The air quality section of the EIS will identify pollutant sources during drilling, construction, and operation of the geothermal power plant as well as potential sources of pollutants that may occur during a facility accident. Background levels of air pollutant concentrations must be added to estimates of pollutant concentrations resulting from the proposed action, and the results must be compared with the National Ambient Air Quality Standards (NAAQS) and state of Hawaii standards, including the recently passed State of Hawaii standard for H_2S (ref). Pollutant concentrations will be estimated using EPA-approved modeling codes. Prevention of significant deterioration of air quality will also be addressed in this EIS. It is possible to conform to the NAAQS and still be in violation of the standards for prevention of significant deterioration. The description of ambient air quality presented in the affected environment section of the EIS will consider cumulative emissions from existing geothermal sources and from regional sources such as the volcano. The USGS will characterize volcanic contributions to ambient air quality. Ongoing air quality monitoring (of existing conditions) will be discussed in the EIS. Any additional

monitoring of air pollutants resulting from the proposed action will be discussed. Where applicable, the EIS will discuss mitigation measures that can be used in the event of an exceedance of air quality standards. The Hawaii Department of Health (DOH), Clean Air Branch, will be the primary cooperating agency to determine background levels of air pollutant concentrations and existing emissions sources other than the volcano; there are no air quality agencies at the local level in Hawaii. DOE, through its cooperating agency relationships with the State of Hawaii, will obtain the necessary background data.

The EIS will address the impact of H_2S emissions during routine operations and during facility accidents; H_2S is one of 189 hazardous air pollutants specifically listed in the 1990 amendments (ref) to the Clean Air Act, and is also one of the 16 extremely hazardous pollutants listed in Title III, Section 301 (r)(3), of the Clean Air Act Amendments of 1990. The Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) H_2S exposure limits (in addition to the new State H_2S ambient air quality rule) will be presented and discussed in the EIS. Because H_2S is a major issue relevant to the proposed action, measures for abatement and mitigation will be considered in the preparation of the EIS.

Additionally, the EIS will discuss emissions during routine operations that may affect global air quality concerns. These include atmospheric emissions of CO_2 and other greenhouse gases.

Where not explicitly addressed above, scoping comments specifically brought forth by Region IX of the U.S. Environmental Protection Agency will be addressed in the EIS. Specific issues to be addressed include: background ambient air quality, nonattainment (if applicable), hazardous air pollutants, adverse meteorological conditions affecting air quality (e.g., stagnation), fugitive emissions from construction and operation, air quality monitoring, and noise (in a separate section).

The Hawaii Volcanoes National Park is designated a Class I area for the prevention of significant deterioration of air quality. Class I areas are designated to severely restrict the degradation of air quality, and specific standards for certain pollutants (nitrogen oxides, sulfur dioxide, and airborne particulate matter) apply. The effects on the Class I area will be addressed in the EIS.

Air quality related values such as visibility degradation and odors will be addresses in the EIS. These values are of particular importance in national parks and other Class I areas.

The air quality section of the EIS will not address the impact of airborne releases on soil, water, vegetation, and other ecological resources. Additionally, human health impacts from air pollutants will not be discussed in the air quality section. All of these topics will be specifically addressed in other sections of the EIS.

3.3.2 Surface and Groundwater Resources

Commenters thought that well drilling, resource utilization, and well reinjection activities may adversely affect water resources. A common concern was the impact of airborne emissions deposited on the catchment water systems used by nearby residents for drinking water supplies. Airborne emissions consist of geothermal fluids containing sulfides, arsenic, boron, mercury, lead, and benzene as well as other hazardous and toxic substances whose presence could render catchment water systems unfit for human consumption.

Commenters also noted the complex hydrogeology of the region and the importance of area aquifers. Hawaii's groundwater supplies consist of (1) a freshwater lense (referred to locally as basal water) floating on the underlying saltwater in a highly permeable, porous aquifer, and (2) groundwater reservoirs impounded by underground, volcanic dikes.

Examples of issues and information requests that were identified in the scoping process include:

- Leakage from production and injection wells into aquifers caused by well casing failures
- Impacts of other accidents, such as well blowouts on water resources
- Other effects of reinjection, such as thermal and chemical contamination
- Impacts on drinking water quality of nearby, affected catchment systems and deep wells

- Transport of contaminants from HGP-related wastes and effects of brine impoundments, both into underground sources of drinking water
- Erosion control during construction and operation of the plant
- Management of point and nonpoint contamination sources
- Groundwater monitoring system
- Mitigation plan to halt emanating groundwater contamination detected by groundwater monitoring system
- Complete geothermal fluid characterization
- Map of nearby drinking water wells that could be affected by construction and operation of the plant
- Spill prevention, containment, and mitigation methodology
- Source of water for well drilling during construction and well quenching during plant operation
- Well casing and hydrologic monitoring plan for both production and reinjection wells

Analyses will be performed to evaluate the environmental impacts associated with the above issues. Studies will be carried out to obtain information requested above that is not available in the open literature.

The State of Hawaii is considering the status of its water quality designation in the geothermal subzone beneath the District of Puna. All analyses of environmental impacts will be based on the water quality designation in effect at the time of writing of the EIS.

Cooperating agency involvement will include the State of Hawaii, the U.S. Geological Survey, the U.S. Army Corps of Engineers, and the County of Hawaii. The results from a surface water and groundwater survey that will be performed by the U.S. Geological Survey will be included in the EIS.

The status of existing surface and groundwater resources and the effects of the HGP on these resources will be assessed in the EIS. Existing hydrogeological data for the HGP site and its surrounding environs as well as other available background information will be used to assess the potential for contaminant transport and contamination. Impacts of routine operations and potential accidents also will be evaluated. Use of this information will provide the basis for the health and ecological assessments discussed in Sects. 3.3.4

and 3.3.7, respectively. Underground injection regulations promulgated by both the State of Hawaii and EPA will be used in the assessment of groundwater impacts.

Effects on water resources will be evaluated by comparing impacts that occur during normal plant operation against (1) impacts from accidents that would be mitigated by safety systems such as shutoff valves installed in the plants, and (2) impacts from severe accidents that would overwhelm safety features designed into the plants. These analyses will focus on temporary uncontrolled well venting during loss of cable, accidental well blowouts, and underground reinjection of geothermal fluids. This approach will place upper and lower bounds on potential impacts to water resources and will demonstrate that impacts attributable to reasonable design accidents are reduced to as low as reasonably achievable (ALARA) levels by installed safety features.

3.3.3 Geologic Issues

The location of geothermal facilities on the site of an active volcano concerned many commenters. They indicated that the potential for seismic disturbances and lava flows at the geothermal facilities increased the risk of accidents and created conditions that cannot be addressed by the current state of technology. A geologically active and complex region, they said, is not suitable for industrial facilities. The rugged and unstable terrain of the marine environment in which the undersea cable would be placed also was noted as a geologic issue.

The principal issues identified in the scoping process were:

- Hazards of development in a seismically and volcanically active area
- Potential for induced seismicity from withdrawal and reinjection of geothermal fluids
- Potential for geothermal-associated subsidence from withdrawal and reinjection of geothermal fluids
- Resource depletion; reliability of geothermal power production
- Geothermal fluid withdrawal and reinjection effects
- Effects on soils
- Comparison of HGP site with other geothermal development sites (e.g., Iceland)

- Reliability of the cable in harsh and unstable marine environment
- Potential for lava flow hazards
- Potential for tephra hazards (airborne lava)
- Potential for uplift and subsidence hazards from volcanic activity
- Potential tsunami hazards
- Potential undersea slide hazards and turbidity current hazards

For both the HGP and the transmission/cable system, geologic issues will be treated in detail in the EIS. The volcanically and seismically active nature of the proposed development area raises a number of geologic issues that require an objective evaluation. Site studies and available literature will provide data; these data should provide a basis for assessing several geologic issues such as subsidence and withdrawal/reinjection effects. The geologic suitability of the site for HGP facilities also will be assessed.

Geological literature of the Hawaiian Islands is extensive. The U.S. Geological Survey and DOE are in consultation about appropriate levels of analysis for natural hazards (earthquakes and volcanism) and for identifying the most appropriate information to be used in analyses of geologic issues. The potential for damage to geothermal facilities by fresh lava flows will be assessed as well as effects of earthquake-induced phenomena such as excessive ground motion, surface rupture, liquefaction, and landslides. Environmental impacts of accidental release of geothermal fluids will be assessed (see Section 3.3.2). The effects of prolonged withdrawal and reinjection of geothermal fluids during plant operations also will be analyzed (see Section 3.3.2). If possible, reservoir engineering characteristics will be used to predict the nature of induced seismicity, subsidence, and geothermal reservoir depletion. These analyses would depend on the availability and appropriateness of existing models. Analysis of routine operational impacts would be based on the assumption that automatic shut-off valves and blowout preventers function as intended and that other reasonable safety features (such as flexible joints between steam gathering lines on the surface and well heads) are included. Analysis of accident driven impacts will assume that pipeline-well head connections fail and that automatic shut-off valves also fail or that a blowout preventer on a drilling well fails, leading to uncontrolled venting of geothermal fluid. The impact of damaging an undersea transmission cable also

will be assessed. Scenarios in which an undersea cable may be severed include strong ocean currents, submarine erosion by strong ocean currents, and submarine landslides (turbidity currents) generated by earthquakes and submarine erosion.

Soils in the Puna District and on transmission line rights-of-way will be described from existing U.S. Soil Conservation Service (USSCS), or equivalent, surveys. Construction, operational, and accident-related impacts to these soils will be assessed. The USSCS will be consulted.

Well completion designs and erosion and sedimentation control plans will be assessed for compliance with existing State regulations. In addition to the USGS, this assessment will require consultation with the Hawaii Department of Land and Natural Resources, the Division of Water Resources Management, and Department of Health. County governments will be consulted with respect to erosion and sedimentation control plans.

3.3.4 Terrestrial and Aquatic Ecological Resources

A recurring concern expressed by commenters was the effect of geothermal development and cable construction on terrestrial and aquatic resources. The uniqueness and value of the Wao Kele O Puna rain forest was cited as an overriding concern. Commenters suggested that comprehensive surveys of rain forest species need to be compiled and evaluated. Moreover, they thought that the EIS should fully investigate the potential short- and long-term impacts of the HGP to pristine environments, such as the rain forest, the southeast coast and Hana districts of Maui, much of Molokai, the marine environment and other locations. These data gathering activities will be a significant part of the early activities in preparing the EIS.

The principal issues identified in the scoping process include:

- Deforestation and loss of biodiversity
- Impacts of geothermal development and transmission right-of-way on habitat
- Effects of atmospheric emissions, liquid effluents, waste disposal and impoundments, and noise on ecological resources in the Puna district
- Perceived impacts of EMF on fauna along transmission corridors

- Impacts of cable on marine species, including humpback whales, rays, skates, and sharks
- Impacts on populations of threatened and endangered species and critical habitat
- Effects of operation of geothermal facilities on agricultural crops
- Loss or disturbance of wetlands

Terrestrial and aquatic ecological resources will be described in the EIS, and the impacts of HGP development, construction, and operation on the resources, including wetlands, floodplains, and species and areas of special concern, will be assessed. Assessment will draw upon existing literature and studies conducted by FWS and COE including a comprehensive biota survey (e.g., forest bird and vegetation studies), a hoary bat survey, a native rain forest ecostem analysis, and wetland delineations. The need for additional data collection is currently being evaluated in consultation with DOE, FWS, COE, and others. Any deficiencies in the information base required to prepare the EIS will be noted and supplemented if judged appropriate. Depending on the results of the assessment and the relationship to proposed Alternatives, appropriate mitigation action plans will be developed in the preparation of the EIS.

The impacts of the proposed development on the terrestrial and aquatic ecosystems in general and on the rain forest, wetlands, cave ecosystems, vegetation, bird species, threatened and endangered species (both in the rain forest and along the transmission corridors), invertebrates, and ethnobotanical species in particular will be addressed in the EIS. Results of studies approved and conducted in support of the EIS will be incorporated into the EIS. Potential impacts of invasion of alien species into the rain forest as the result of geothermal development and power transmission will be addressed. A Geographic Information System (GIS) analysis, built on existing data bases, will be used to address pertinent issues identified during preparation of the EIS. These issues include (1) whether geothermal development will accelerate invasion of alien species into natural and disturbed areas, (2) whether geothermal development will contribute to the loss of native flora and fauna, (3) if roads and well pads can be located within the rain forest to minimize invasion of alien species and to minimize impacts on native vegetation and habitats, and (4) if there are changes in vegetation communities as a result of natural

disturbances. Existing and updated vegetation and bird survey data can be overlaid to determine the distribution of required habitat for different bird species and can be used to recommend areas for preservation and those more suited for potential development.

The extent and type of wetlands within all land areas potentially involved in the geothermal resource area and along transmission corridors will be delineated and significance ascribed by COE in consultation with DOE, SCS, USGS, FWS. The COE will use the 1987 COE Wetland Delineation Manual to delineate wetlands. Wetlands maps and supporting data will be provided to DOE for the purpose of performing wetlands assessments based on the practicable alternatives analysis in accordance with Clean Water Act [Sect. 404(b)(1)] guidelines for dredging and filling. When wetlands are identified, a detailed assessment of the potential impacts on the wetland ecosystem will be made and approaches for minimizing or avoiding wetland involvement will be discussed. The assessment will include potential impacts on wetland functions, including water quality, hydrology, vegetation composition and structure, habitat for threatened and endangered species, and biological diversity and will become an appendix to the EIS.

The potential for impacts to threatened and endangered species and wetlands are required analyses in the EIS. During the EIS process the FWS, the NMFS, as well as the State Department of Natural Resources will be contacted for information and consultation under Section 7 of the Endangered Species Act and the Marine Mammals Protection Act (see Table 4-1).

The EIS will include an evaluation of the potential biological effects on marine life of electric and magnetic fields produced by the submarine cable. At least four possible cases will be evaluated. The first case considers fields produced during normal operation of the cable system including typical static magnetic fields and electric fields as well as induced fields which may occur during transients and line loading changes. Case two occurs temporarily after damage to one or more of the cables, and is characterized by higher than normal current densities in the area around the cable damage. The third case involves deliberate transmission of the system return current through the ocean in emergency situations when only one cable is functional. This technique has been used routinely in other submarine DC power transmission systems. Case four involves staged development in which there could be AC transmission between the islands of Hawaii and Maui.

Certain marine animals (e.g. sharks) have specific sensory organs that aid in navigation and foraging and that detect extremely weak electric or magnetic fields. Behavior patterns may be affected by transmission line fields. Calculations of the fields will be provided in the EIS followed by a review of available knowledge regarding the effects of the these fields on sensitive marine life and if possible an evaluation of expected impacts. In addition the potential effects of EMF from the transmission lines on terrestrial fauna will be evaluated.

3.3.5 Noise

Some commenters pointed out that well drilling and venting from geothermal development and operations will create noise. Well drilling and venting from current local geothermal developments were often cited as activities that produce intense noise. Extraordinarily quiet conditions currently prevail in the area where noise impacts resulting from the proposed activity are expected.

Examples of noise issues that were identified in the scoping process include:

- Occupational and public health impacts (including psychological impacts) of noise from drilling, construction, and venting operations, and possible associated exceedances of OSHA/NIOSH standards
- Effects on terrestrial flora and fauna.

This section of the EIS will use existing data provided by qualified professionals specializing in noise characterization to describe and assess noise. Noise measurements will include ambient levels as well as noise resulting from existing geothermal activities (drilling and operating). Consultants will be used, as necessary, to develop noise contours. The noise measurements will include peak levels and energy-averaged levels. Noise from both normal operation (including transients) and upset conditions will be described.

The EIS will assess and evaluate potential impacts of noise to the nearest residential population, and to terrestrial species. A section will be prepared which describes noise-induced hearing loss. The levels associated with this effect will be compared with expected contours. Compliance with applicable public and occupational standards for

nuisance related noise, including psychological effects, will be addressed in the EIS. Noise-related annoyance and possible cardiovascular effects to residents living near well-drilling or other geothermal activities will be addressed. Noise abatement and mitigation measures (e.g., rock mufflers) will also be addressed and assessed.

3.3.6 Land Use

Commenters raised land use concerns, especially those pertaining to conflicts between residential use and geothermal development. Land-use issues related to Native Hawaiian concerns are discussed in Sect. 3.3.9.

Examples of issues that were identified in the scoping process include:

- Incompatibility of HGP with existing nearby residential, agricultural, and military land uses and lands in conservation areas and the Hawaii Volcanoes National Park and other preserve land areas
- Loss of unique land resources, such as the Wao Kele O Puna rain forest, to HGP and its associated features (transmission lines, roads, support facilities)
- Incompatibility of transmission line corridors with existing and planned land uses

Land-use issues will be addressed in multiple sections of the EIS. Agriculturally and ecologically related land-use issues will be discussed under the "land use" heading. Land use issues that affect Native Hawaiian interests and culture will be discussed separately (see Sect. 3.3.9) and land use issues related to economics will be discussed in the socioeconomics sections of the EIS (see Sect. 3.3.8). To assess potential land use impacts, the EIS will identify existing and planned land uses in the proposed vicinity of HGP facilities, and transmission corridors, and determine if and to what extent the construction and operation of the HGP would be incompatible with or destructive to those land uses. Cooperating agencies that will provide information about existing and planned land uses include the Counties of Hawaii and Maui (Planning Departments) and the State of Hawaii (e.g., the Department of Land and Natural Resources and Office of State Planning). In

particular, County Community Development Plans for affected counties will be consulted and considered.

3.3.7 Health and Safety

Participants in scoping expressed concern about health risks to workers and the public from routine operations and accidents.

Examples of issues that were identified in the scoping process include:

- Health and safety impacts of routine emissions (via air and water pathways)
- HGP accidents—effects on human health
- Cable accidents
- Effects of well venting and possible blowouts
- Occupational safety
- EMF effects
- Psychological effects of HGP development, construction, and operation
- Hazardous wastes and other materials

The HGP EIS will address health and safety issues as they relate to both operations and accident conditions. The basic methods for addressing these situations are similar. For public exposures first step is to identify the materials that will be emitted to air or water. These would include radon and daughters, H_2S, heavy metals, silicate and the entire inventory of gaseous and particulate emissions to the air or water. The next steps are to consider the various transport pathways, such as inhalation, food, and drinking water, and then calculate intake either on a continuous basis or under accident (episodic) conditions. These intakes then are converted to health effects via dose-response relationships, or compared with allowable intakes or other indices (e.g., State ambient air quality standards for the H_2O). In addition, potential occupational exposures will be evaluated, to the extent possible, with respect to OSHA and NIOSH regulations.

Of special concern are the many hazardous materials, including waste which are present at geothermal sites. To the extent possible, these will be listed along with applicable regulations. Drilling muds and waste ponds represent a special source of possibly toxic materials and they may pose a special waste disposal situation. To the extent possible, the contents of such muds and ponds, will be characterized so that any potential health effects issues can be quantified and future waste disposal requirements can be identified.

Public concern over the possible health effects of EMFs associated with power generation and transmission has increased sharply in recent years. The EIS will include an evaluation of EMFs near the power generation facilities, along the transmission line right-of-ways, at the rectification stations, and at ocean entry and exit points. Safety issues associated with ocean return currents during single cable operation will also be evaluated. In addition, a section will be prepared which summarizes the most recent scientific understanding of the possible long-term effects on humans.

To the extent possible for accidents, materials-selection and/or design-related will be bounded. Accidents could result from material phenomena or from a variety of human factors including operator error, material and design choices. Where information is deficient, a deterministic approach will be used. Because the site is geologically active, major potential accident initiators are natural in origin and include earthquakes, and volcano eruptions. The quantities of the primary materials released such as radon, H_2S, toxic heavy metals and their effects will be contrasted with the quantities and effects that the natural events initiate such as well head failure.

The HGP EIS will include a qualitative discussion of potential psychological effects and their manifestations (e.g., people moving out of their residences due to geothermal activities) resulting from factors related to the construction and operation of geothermal facilities (e.g., noise, odor, night lights). Influences on sleep deprivation by fear, and anxiety will be evaluated and the effects of frequent evacuation will be assessed.

The HGP EIS will describe existing emergency preparedness plans in the Puna District. It also will address emergency preparedness needs that may arise from the proposed project. Emergency preparedness will be addressed in light of the State of Hawaii's H_2S rule, the Federal Emergency Management Agency's (FEMA) guidance, and

the requirements of the Superfund Amendments and Reauthorization Act (SARA) Title III, as implemented by EPA. Issues related to visual impairment during emergency situations will be discussed.

3.3.8 Socioeconomics

Socioeconomic concerns were expressed by many commenters. Scoping participants noted that the potential social and economic costs and benefits of geothermal development are complex and need to be evaluated in detail. Socioeconomic concerns ranged from the local effects of HGP (e.g., property values) to more general concerns (e.g., economics of Hawaiian tourism and industry).

Examples of the issues that were identified in the scoping process include:

- The total cost of the HGP from inception to decommissioning and rehabilitation
- Attracting industrial development to Hawaii
- Effects on nearby property values
- Increasing electric rates (because of HGP's high cost and questionable reliability) and tax changes
- Increasing tourist developments and economic dependence on tourism
- Impacts of the HGP on life styles of the general population, specifically on Native Hawaiians
- The cost of cable or facility failure once geothermal energy provides a significant proportion of Hawaii's energy needs
- The need for an accurate cost estimate of geothermal construction and operation
- Financial reimbursement to nearby residents due to HGP
- Economic impacts on agriculture, commercial fisheries, aquaculture, and tourism

The EIS will assess several of these and other potential socioeconomic issues, including: 1) HGP-related population changes and subsequent impacts to employment, housing, public services, land use, and recreation and tourism; 2) the possibility of the

HGP providing power for increased urbanization, industrialization, and tourism; and 3) the political and social conflict generated by the HGP.

The EIS will assess socioeconomic impacts by examining the impacts of constructing and operating existing geothermal projects and other large energy-related facilities and projecting the HGP's impacts based on past experiences. The socioeconomic impact assessment will rely heavily on data from local planning agencies and the State of Hawaii.

Some concerns raised by commenters are beyond the scope of the EIS. Issues that will not be addressed in the socioeconomic impact assessment include the economic impacts of HGP construction and operation on marijuana growers and the financial impacts of the State's promotion and litigation of the HGP.

3.3.9 Cultural Resources/Native Hawaiian Concerns

Many speakers at the public meetings requested that the EIS consider the Native Hawaiians and their rights, religion, and culture. Many people expressed the belief that geothermal development would desecrate the volcano goddess Pele, and recommended that the EIS examine potential impacts of the HGP on Native Hawaiian lifestyles and cultural and religious practices.

Examples of the issues that were identified in the scoping process include:

- Potential desecration of Pele, the volcano-nature deity, and impaired ability to observe Native Hawaiian religious practices associated with Pele; interrupted generational continuity in the training of young persons in traditional religious and cultural practices
- Loss or desecration of religiously, spiritually, culturally, and socially unique habitats, land forms, resources (e.g., archaeological sites and artifacts; atmospheric signs such as rainbows), and species
- Loss of racial identity

- Reduced access to traditional coastal trails and to areas important for subsistence gathering and medicinal use of plants; loss of gathering, fishing, and water rights, and loss of healing places
- Reduced contact with fish, birds, and other wildlife identified as 'aumakua (deified ancestors); loss of traditions rooted in aloha 'aina (respect and love for the land)
- Impaired religious and other cultural uses of surface and subsurface waters located at or near the geothermal resource
- Loss of access to and use of Native Hawaiian Homelands and ceded lands on several of the islands
- Alteration of the traditional rural physical setting and landscape
- Compliance with the American Indian Religious Freedom Act , the National Historic Preservation Act of 1966, and other pertinent state and federal legislation (see Table 4-1)
- Effects of geothermal development on archaeological resource identification, evaluation, and protection; increased unauthorized access to archaeological sites and areas important to traditional culture, which could lead to their alteration or destruction
- Confidentiality of Native Hawaiian practices and religiously significant sites, including heiaus (places of worship) and burial sites in caves, cliffs, lava tubes
- Effects on subsistence lifestyles
- Impact on State constitutional Native Hawaiian legal rights and Common Law rights of 1892
- Impact on Native Hawaiian family and community life
- Impact on intergenerational linkages to ancestral lands and cultural/historic sites
- Impact on quality of life, changes in mental/cultural health, and impact on Native Hawaiian identity and pride

To assess specific cultural resource and Native Hawaiian concerns, the EIS will employ an archaeological survey of the main project area in the Puna District and additional reconnaissance and inventory surveys on all affected islands, of geothermal resource subzones, transmission line corridors and access roads, and land-sea transition points along

submarine cable routes. In addition, the EIS will utilize a Native Hawaiian cultural resource survey which may involve archival research and indepth ethnographic and ethnohistorical description and analysis of those aspects of Native Hawaiian culture covered by this project. The survey work needed for this assessment will be conducted by consultants; however, the Hawaii State Historic Preservation Officer, the Office of Hawaiian Affairs, the Office of Hawaiian Homelands, the National Park Service, the President's Council on Historic Preservation, and the Hawaii State Department of Health, Environmental Project Section will be consulted as important sources of information and guidance in undertaking the required studies. These archaeological and cultural resource surveys will provide the basis for compliance with pertinent federal legislation, including the National Historic Preservation Act of 1966 (as amended), Sections 106 and 110; the American Indian Religious Freedom Act of 1978 (amendments proposed); and the Native American Grave Protection and Repatriation Act of 1990. Pertinent state legislation includes Hawai'i Revised Statutes, Chapter 6E; and State Act 306 concerning historic preservation and protection of burial sites, respectively.

Some aspects of Native Hawaiian issues are beyond the scope of the EIS; these include, for example, the potential loss of racial identity. Other issues will be addressed only to the extent that they relate clearly to impacts generated by HGP. For example, a compilation of litigation involving Native Hawaiian claims aside from those directly related to HGP is beyond the scope of the EIS. However, DOE intends to consult and cooperate with Native Hawaiians through mutually recognized expert consultants and through recognized organizations (including the Office of Hawaiian Affairs and Hui Malama I Na Kupuna O'Hawai'i Nei) to ensure that the EIS accurately reflects to the extent practicable the concerns and issues tht Native Hawaiians regard as significant. In addition, DOE will promote wherever possible community access to the results of cultural studies. To the extent possible, consultations on these surveys will extend directly to affected Native Hawaiian communities.

3.3.10 Aesthetic Resources

Impacts to aesthetic resources were a concern for several commenters. They thought the EIS should address the aesthetic impacts of HGP on all islands, including impacts to natural and agricultural landscapes, beaches, and recreation areas.

Examples of the issues that were identified in the scoping process include:

- Visual impacts of clearing of the Wao Kele O Puna rain forest
- Visual impacts of transmission lines, particularly in established scenic areas and near park lands and preserves
- Visual impacts of an industrial facility in a residential and/or rural environment
- Aesthetic degradation of the Puna District because of HGP-related noise, odor, and night lighting
- Proximity of HGP facilities to Hawaii Volcanoes National Park in consideration of Air Quality Related Values under the Clear Air Act

The EIS will identify and describe important aesthetic resources in the vicinity of HGP facilities, and will assess the impacts of the proposed project on those resources. The assessment will involve an aesthetic resources survey and analysis conducted by professional consultants specializing in landscape architecture and aesthetic impact analysis. These consultants will contact local planning agencies and tourism boards for information and assistance in preparing the aesthetic resources survey and analysis.

3.3.11 Alternatives

Commenters suggested that there were several alternatives to the proposed HGP that should be addressed in the EIS. Examples of issues raised include:

- Development of up to 100 MW geothermal power (without inter-island submarine cable) for use on the Big Island.
- No-action alternative (i.e., DOE does not partially fund Phase 3)

- Economics of geothermal power compared with other reasonably foreseeable alternatives
- "Environmentally and economically preferable" alternative sources such as solar, wind, biomass, and others
- A mix of supply options, conservation, and demand-side management analyzed in an integrated resources planning context
- Use of petroleum byproducts (from petroleum processing for transportation fuels) for power production given the need to reduce Hawaiian dependence on imported oil
- Various HGP designs and configurations, including alternative facility locations away from residential areas
- Use of coal-fired generation
- Alternative cable (overland and submarine) routes
- The need for new power production facilities defined through integrated resource planning assessments

Alternatives to the proposed DOE action (partially funding Phase 3) and reasonably foreseeable actions by others (such as Phase 4, the State's proposed construction and operation of HGP) will be addressed in the EIS. These alternatives will include the no-action alternative of not partially funding Phase 3. In addition, reasonable alternatives within the proposed HGP, both supply and non-supply, as well as design and location alternatives will be considered.

The HGP will be evaluated to determine which alternatives have the potential to achieve similar objectives. The main emphasis will be in determining the proposed HGP's contribution to meeting power generation needs and Hawaii's energy policy goal of reducing reliance on imported oil. This determination will be based in part on projections of electric generation requirements and plans to meet these requirements.

Alternatives will be considered: alternatives associated with the submarine and overland transmission cable routes and alternatives related to electric power generation. Alternatives to the proposed transmission system will include: various overland and submarine cable routes, solid dielectric or oil-filled submarine cables, operation at either high voltage AC or DC, and alternative methods of land-sea transition. Each of these

alternatives will be evaluated based on their economic and technical viability, and the potential environmental impacts of each will be discussed.

Alternatives to the proposed 500 MW geothermal development will include various power generation strategies including alternative geothermal sites and power generating technologies. The no-action alternative will be defined as continued reliance on the existing generating mix (which is predominately oil-fired capacity with some renewables) to meet the equivalent amount of power associated with geothermal development. The alternative of coal-fired capacity will be considered. A mix of renewable alternatives, including biomass, solar thermal, photovoltaic, small-scale hydro, and conservation/demand-side management (DSM), including solar hot water heating systems, will be examined on an island-by-island basis in the context of integrated resources planning.

Alternatives that provide for geothermal generation to be used only on the Big Island with no submarine cable are: 500 MW for replacement of existing oil generation and to supply new commercial or industrial development on the Big Island; or approximately 100 MW of geothermal capacity for oil replacement only. The definition of these alternatives will consider the State of Hawaii and utility plans, and/or projected needs for generating power on the Big Island.

The alternatives will be evaluated by first screening them for technical feasibility, i.e., does the resource exist and is it technically feasible to develop it in the same time-frame as the HGP? If the alternative is technically feasible, its potential environmental impacts and economic costs will be evaluated and compared to those of the HGP.

The basis of the economic evaluation will be a comparison of the discounted valued of the life-cycle costs of geothermal to a configuration of alternatives that would provide equivalent power and generation (or an equivalent increase in energy efficiency and DSM) over the expected life of the geothermal resource. Cost estimates of alternatives will be based on the best available information with special consideration of cost factors affecting Hawaii. Alternative resources, power generating plants, DSM resources, and renewable energy options will be compared in an integrated resource planning context. This assessment will be conducted using available data and studies from the State of Hawaii, local utilities, DBED, and others, and will be coordinated with Hawaii's integrated resource planning process that is currently underway.

Uncertainty about capital costs, energy costs, economic risks, and other factors will be incorporated through sensitivity analyses. Alternatives to the HGP will be evaluated through the simulation of alternative resource plans using production cost modeling. The effect of alternatives on Hawaii's dependence on imported oil will also be explicitly examined. This examination will look at the use of imported petroleum, its association with petroleum processing residuals used for power production, and how reduced use of oil for electricity production would affect Hawaii's dependence on petroleum imports. The need for power production facilities will also be evaluated. The effect on environmental resources that are being considered for the proposed action will be considered for all viable alternatives.

3.3.12 Federal, State, and Local Government and Geothermal Developers

During the public scoping process, participants questioned the credibility of some organizations involved in the development of the HGP. They suggested involvement of non-geothermal affiliated firms during preparation of the EIS to improve credibility.

Examples of the issues that were identified in the scoping process include:

- Lack of governmental concern for citizens' rights, health, and welfare
- Lack of due process in HGP-related litigation
- Dismissal of public concerns by government officials
- Collaboration between government and geothermal developers
- Powerlessness of citizens to influence government decisions on HGP
- Competence of government employees and geothermal developers

These issues will not be addressed explicitly in the EIS, but will be a part of the overall EIS process. DOE recognizes the importance of independent oversight and public involvement in activities to build confidence and trust, and will continue to make information available to the public and respond to public comments.

For the HGP EIS, DOE held ten public scoping meetings (two a day at five locations) and provided a public comment period. Transcripts from these meetings were placed in

the HGP EIS reading rooms for public review. In addition, information exchange meetings and native Hawaiian meetings were held (see Table 3-1). This draft IP is being made available for public review and comment. Also, an interactive workshop will be held to receive comments and suggestions on the draft IP from all cooperating agencies. To encourage public involvement, *Federal Register* notices, press releases, and local advertisements have been used to publicize activities. DOE will continue to publicize public participation opportunities.

3.3.13 Environmental Compliance Regulatory Issues

Commenters thought that the EIS should review all applicable federal, State, and County rules, regulations, and statutes, including NEPA, OSHA requirements, the National Historic Preservation Act, the American Indian Religious Freedom Act, the Endangered Species Act (including Section 7 consultation), and the Public Utilities Regulatory Policy Act, and other (see Table 4-1). Commenters also thought that the EIS should include a review of regulatory issues in light of the major changes that have occurred during the course of the HGP.

Examples of the issues that were identified in the scoping process include:

- Federal, State, and local permit compliance
- Affect of past and current litigation on geothermal development
- Apparent violations of environmental laws by geothermal developers
- Inadequate monitoring for compliance with emissions standards
- Role of State and local enforcement agencies

The HGP will be required to comply with all relevant federal, State, and local regulations and legislation. The EIS will list and describe the federal, State, and local laws and acts that pertain to HGP, and will assess HGP impacts against the standards associated with those laws. For example, National Ambient Air Quality Standards and State of Hawaii air quality standards for H_2S will be used in the EIS assessment of HGP air quality impacts.

4. AGENCY CONSULTATIONS

A partial list of agencies that will be consulted during the EIS process are listed by subject area and agency in Table 4-1. This list will be revised and expanded if necessary in consultations with cooperating agencies.

4.1 COOPERATING AGENCIES

As part of the scoping process, DOE invited other federal agencies to participate in the EIS preparation as cooperating agencies. Cooperating agency roles and responsibilities in the EIS process, defined in the NEPA regulations, include participation in the scoping process, developing information, preparing environmental analyses, providing technical reviews, and lending staff support. The Corps of Engineers, U.S. Fish and Wildlife Service, U.S. Geological Survey, National Park Service, National Marine Fisheries Service, State of Hawaii, County of Maui, and County of Hawaii have agreed to be cooperating agencies on the HGP EIS. Memoranda of Understanding are being negotiated by DOE and each cooperator. Details of cooperating agency studies and/or assessments are currently under review. Discussions are underway to determine the type and degree of cooperating agency involvement.

4.2 OTHER FEDERAL AND LOCAL AGENCIES AND ORGANIZATIONS

While preparing the HGP EIS, DOE will request consultations and conduct reviews with other federal agencies and Native Hawaiian organizations that do not have "cooperating" status as defined by CEQ. Other federal agencies have regulatory and environmental responsibilities. In particular, EPA, United States Navy, United States Coast Guard, Soil Conservation Service, Department of Interior, and Department of Transportation have been identified for such consultation. These regulations and responsibilities will be addressed in the EIS.

Table 4-1
Agency Consultations and Government Agency Permit Consultation List

Subject Area	Legislation	Agency
Endangered species	Endangered Species Act of 1973, as amended; state laws	U.S. Fish and Wildlife Service, State agencies
Migratory birds	Migratory Bird Treaty Act	U.S. Fish and Wildlife Service
Archaeological, historical, and cultural resource preservation	National Historic Preservation Act of 1966; Archaeological Resources Protection Act; Antiquities Act; American Indian Religious Freedom Act; and Native American Grave Protection and Repatriation Act	State Historic Preservation Office, President's Advisory Council on Historic Preservation, Native Hawaiian Groups, Office of Hawaiian Affairs
Discharge of pollutants to water	Clean Water Act; Safe Drinking Water Act	U.S. Environmental Protection Agency, State agencies
Work in navigable waters of the United States	Section 404 of Clean Water Act; Rivers and Harbors Act	Corps of Engineers
Prime and unique farmlands	Farmland Protection Policy Act of 1981	Soil Conservation Service
Floodplains	Executive Order 11988; Fish and Wildlife Coordination Act	Corps of Engineers, U.S. Fish and Wildlife Service, State agencies
Wetlands	Executive Order 11990; Fish and Wildlife Coordination Act; Section 404 of Clean Water Act	Corps of Engineers, U.S. Fish and Wildlife Service, State agencies
Water body alteration	Fish and Wildlife Coordination Act	U.S. Fish and Wildlife Service, State agencies
River status	Wild and Scenic Rivers Act; Anadromous Fish Conservation Act; Hanford Reach Study Act	U.S. Department of the Interior
Air pollution	Clean Air Act	U.S. Environmental Protection Agency, State and local agencies
Water use and availability	Water Resources Planning Act of 1965; Safe Drinking Water Act; others	U.S. Environmental Protection Agency, Office of Water Policy, State agencies
Noise	Noise Pollution and Abatement Act of 1970; Noise Control Act of 1972	U.S. Environmental Protection Agency, State agencies
Siting and planning	State siting acts; County zoning regulations	State and County agencies
Waste management and transportation	Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act and the Hazardous and Solid Waste Amendments of 1984; Comprehensive Environmental Response, Compensation and Liability Act; Emergency Planning and Community Right to Know Act	U.S. Environmental Protection Agency, U.S. Department of Transportation, State agencies

Table 4-1 (continued)
Government Agency Permit Consultation List

Permit	Agency and Permits	Cross References of Related Permits/ Permits Delegated to Other Agencies
Department of Land and Natural Resources		
DLNR 1	Ocean Waters Construction Permit	NOAA 1, CG 1, CG 2
DLNR 2	District Boundary Amendment	
DLNR 3	Changes in Zoning	
DLNR 4	Forest Reserve Special Use Permit	
DLNR 5	Forest Reserve Access Permit	
DLNR 6	Entrance to Wildlife Sanctuary	
DLNR 7	Transporting Permit	
DLNR 8	Permit to Enter Closed Watershed	
DLNR 9	Natural Area Reserve Special Use Permit	
DLNR 10	Historic Preservation Review	COE 1, COE 5
DLNR 11	Use of State Land Including Submerged State Lands	NOAA 1, CG 1, CG 2
DLNR 12	Conservation District Use Application	
DLNR 13	Water Use Permit Within Water Management Areas	
DLNR 14	Stream Channel Alteration Permit	
DLNR 15	Stream Diversion Works Construction or Alteration Permit	
DLNR 16	Well Construction or Pump Installation Permit	
DLNR 17	Geothermal Resource Mining Lease	
DLNR 18	Dams and Reservoirs Construction Approval	COE 2
DLNR 19	Geothermal Exploration Permit	
DLNR 20	Geothermal Resource Subzone Designation	
DLNR 21	Geothermal Plan of Operations	
DLNR 22	Geothermal Well Drilling or Modification Permit	
Department of Health		
DOH 1	Notification of Hazardous Waste Activity	EPA 1
DOH 2	Hazardous Waste Treatment, Storage and Disposal (TSD) Permit	EPA 1

Table 4-1 (continued) Government Agency Permit Consultation List		
Permit	**Agency and Permits**	**Cross References of Related Permits/ Permits Delegated to Other Agencies**
DOH 3	Underground Storage Tank (UST)	
DOH 4	Underground Injection Control (UIC) Permit	EPA 3
DOH 5	Water Quality Certification (WQC) Army Corps of Engineers Section 401 Permit	
DOH 6	Authority to Construct (ATC) a Potential Air Pollution Source	
DOH 7	Permit to Operate (PTO) a Potential Air Pollution Source	
DOH 8	Prevention of Significant Deterioration (PSD)	
DOH 9	Community Noise Permit for Construction Activities	
Office of State Planning		
OSP 1	Federal Consistency With the Hawaii Coastal Zone Management Program	COE 5
Department of Transportation		
DOT 1	Permit to Perform Work on State Highways	FHA 1
Hawaii County		
HC 1	Geothermal Resource Permit (GRC)	
HC 2	Special Management Area (SMA)	
HC 3	Shoreline Setback Variance (SSV)	
HC 4	Special Permits	
HC 5	Use Permits	
HC 6	Subdivision of Land	
HC 7	Plan Approval	
HC 8	Grubbing, Grading, Excavation and Stockpiling Permits	
HC 9	Excavation of Public Highways	
HC 10	Installation of Utilities Within Federal and Secondary County Highways	
HC 11	National Flood Insurance	
HC 12	Building Permits	
HC 13	Outdoor Lighting Permit	
HC 14	Electrical and Plumbing Permits	

Table 4-1 (continued)
Government Agency Permit Consultation List

Permit	Agency and Permits	Cross References of Related Permits/ Permits Delegated to Other Agencies
HC 15	Sign Permit	
HC 16	Building Plan Approval	
	Maui County	
MC 1	Department of Public Works Drainage and Erosion Control Plans	
MC 2	Board of Height Variance	
MC 3	Department of Water Supply Source and Storage Assessment	
MC 4	Geothermal Resource Permit	
MC 5	Shoreline Setback Variance	
MC 6	Special Management Area Use Permits	
	City and County of Honolulu	
CCH 1	Conditional Use Permit-Type 1	
CCH 2	Special Management Area Use Permit (SMP)	
CCH 3	Shoreline Setback Variance	
	Department of the Navy	
NAV 1	Notification Regarding Surface and Subsurface Plans	
	Department of the Army Corps of Engineers	
COE 1	Permits Under Sections 9 and 10 of the Rivers and Harbors Act of 1899 for Structures or Works in or Affecting Navigable Waters of the United States	NMFS 2
COE 2	Permits Under Section 103 of the Marine Protection Research and Sanctuaries Act of 1972 for Ocean Dumping of Dredged Material	USF&W 1, NMFS 6, NMFS 7
COE 3	Permits Under Sections 404 of the Federal Water Pollution Control Act of 1972 and Amendments for Discharges or Dredged or Fill Material into Waters of the United States	EPA 1, USF&W 2, NMFS 1
COE 4	Water Quality Certification from the State of Hawaii Department of Health	DOH 5
COE 5	Coastal Zone Management Consistency Certification from the State of Hawaii	OSP 1
COE 6	National Environmental Policy Act (NEPA) Environmental Impact Statement	EPA 4

Table 4-1 (continued)
Government Agency Permit Consultation List

Permit	Agency and Permits	Cross References of Related Permits/ Permits Delegated to Other Agencies
National Oceanic & Atmospheric Administration		
NOAA 1	Notification to Charting and Geodetic Services	CG 1
Department of Transportation U.S. Coast Guard		
CG 1	Notification of Submerged Cable	NOAA 1
CG 2	Notification of Cable Laying Operations or Related Projects	
U.S. Fish and Wildlife		
USF&W 1	Endangered Species Act Activities Review	COE 2, NMFS 6
USF&W 2	Clean Water Act Review	EPA 1, DOH 5, COE 3, NMFS 1
USF&W 3	Rivers and Harbors Act Review	COE 1, NMFS 2
USF&W 4	Fish and Wildlife Coordination Act Review	
National Marine Fisheries Service		
NMFS 1	Clean Water Act Section 404 Permit Application Review	USF&W 2, COE 3
NMFS 2	Rivers and Harbors Act of 1899 Section 10 Permit Application Review	COE 1
NMFS 3	Clean Water Act Section 401, Water Quality Certification Application Review	COE 4, USF&W 2, EPA 1
NMFS 4	Federal Coastal Zone Management Consistency Determination Review	OSP 1, COE 5
NMFS 5	Marine Mammal Protection Act (MMPA) Exemption	
NMFS 6	The Endangered Species Act (ESA) Section 7, Consultation Process	USF&W 1, COE 2
NMFS 7	Marine Protection Research and Sanctuaries Act of 1972, Section 103 Permit Review	COE 2
Environmental Protection Agency		
EPA 1	Permits and Licenses Under Section 402 of the Federal Water Pollution Control Act of 1972 and Amendments	DOH 1, DOH 2, USF&W 2, COE 3
EPA 2	Permits and Licenses Under the Clean Air Act	DOH 6, DOH 7
EPA 3	Underground Injection Control (UIC) Permit	DOH 6

Table 4-1 (continued) Government Agency Permit Consultation List		
Permit	**Agency and Permits**	**Cross References of Related Permits/ Permits Delegated to Other Agencies**
EPA 4	National Environmental Policy Act (NEPA) Environmental Impact Statement	COE 6
Federal Highway Administration		
FHA 1	Approval for Work to be Performed on Interstate Highway	DOT 1

5. SIGNIFICANT EIS MILESTONES

Activity	Date
ANOI	September 3, 1991
NOI	February 14, 1992
Scoping Meetings	March 7, 1992 to March 16, 1992
Draft IP	August, 1992
Comments on Draft IP	September, 1992
Final IP	Fourth Quarter CY 92
Draft EIS	Third Quarter CY 93
Public Hearing and Comment Period on Draft EIS	Fourth Quarter CY 93
Final EIS	Second Quarter CY 94
Record of Decision (ROD)	Third Quarter CY 94

6. PREPARERS OF THE EIS

The Oak Ridge National Laboratory (ORNL) has been selected by DOE to assist in the preparation of the EIS on the proposed Hawaii Geothermal Project and to support all EIS procedural requirements. ORNL is assisted by the Lawrence Berkeley Laboratory in the area of alternatives and marine cable impacts. Supporting documentation and data will be provided by other federal, State and County agencies (especially those identified as cooperating agencies) and others. ORNL has the responsibility to ensure that the information meets quality assurance requirements for use in the EIS process. DOE is responsible for the scope and content of the EIS and supporting documents. NEPA disclosure statements are on file at DOE's Office of Conservation and Renewable Energy, Washington, D.C. Copies of these statements are included in Appendix B.

7. RELATED ENVIRONMENTAL DOCUMENTATION

(To be provided)

APPENDIX A

PROPOSED OUTLINE FOR THE ENVIRONMENTAL IMPACT STATEMENT

WORKING DRAFT (6/30/92)

PROPOSED OUTLINE FOR THE HAWAII GEOTHERMAL PROJECT (HGP) ENVIRONMENTAL IMPACT STATEMENT (EIS)

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CONTRACTOR DISCLOSURE STATEMENTS

NEPA DISCLOSURE STATEMENT
PREPARATION OF ENVIRONMENTAL IMPACT STATEMENT
FOR THE HAWAII GEOTHERMAL PROJECT

CEQ Regulations at 40 CFR 1506.5 (c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981, guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations", 46 FR 18026-18038 at Question 17a and b.

"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)". 46 FR 18026-18038 at 18031.

In accordance with these requirements, Martin Marietta Energy Systems, Inc. (COMPANY NAME) hereby certifies as follows: check either (a) or (b),

(a) [X] Martin Marietta Corp. (COMPANY NAME) has no financial or other interest in the outcome of the Hawaii Geothermal Project.

(b) [ ] _____ (COMPANY NAME) has the following financial or other interest in the outcome of the Hawaii Geothermal Project and hereby agrees to divest itself of such interest prior to initiating any technical analyses in support of this Project.

Financial or Other Interests

1.

2.

3.

Certified by:

Gary J. Draper
SIGNATURE

Gary J. Draper
NAME

Manager, Contracts
TITLE

May 27, 1992
DATE

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF ENVIRONMENTAL IMPACT STATEMENT FOR THE HAWAII GEOTHERMAL PROJECT

CEQ Regulations at 40 CFR 1506.5 (c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981, guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations", 46 FR 18026-18038 at Question 17a and b.

"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)". 46 FR 18026-18038 at 18031.

In accordance with these requirements, University of California, Lawrence Berkeley Lab. (COMPANY NAME) hereby certifies as follows: check either (a) or (b),

(a) [X] University of California Lawrence Berkeley Lab. (COMPANY NAME) has no financial or other interest in the outcome of the Hawaii Geothermal Project.

(b) [ ] _____ (COMPANY NAME) has the following financial or other interest in the outcome of the Hawaii Geothermal Project and hereby agrees to divest itself of such interest prior to initiating any technical analyses in support of this Project.

Financial or Other Interests

1.

2.

3.

Certified by:

SIGNATURE

Rick Inada
NAME

Acting Head, Office of Sponsored Research
TITLE

May 27, 1992
DATE

NEPA DISCLOSURE STATEMENT FOR
PREPARATION OF ENVIRONMENTAL IMPACT STATEMENT
FOR THE HAWAII GEOTHERMAL PROJECT

CEQ Regulations at 40 CFR 1506.5 (c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981, guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations", 46 FR 18026-18038 at Question 17a and b.

"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)". 46 FR 18026-18038 at 18031.

In accordance with these requirements, Energy, Environment + Resource Center, Univ of Tennessee hereby certifies as follows: check either (a) or (b).
COMPANY NAME

(a) [X] Energy, Environment + Resource Center has no financial or other interest in the outcome of the Hawaii Geothermal Project.
COMPANY NAME

(b) [ ] _____ has the following financial or other interest in the outcome of the Hawaii Geothermal Project and hereby agrees to divest itself of such interest prior to initiating any technical analyses in support of this Project.
COMPANY NAME

Financial or Other Interests

1.

2.

3.

Certified by:

Jack Barkenbus
SIGNATURE

JACK BARKENBUS
NAME

Acting Director
Energy, Environment + Resource Center
TITLE

May 28, 1992
DATE

APPENDIX C

A SUMMARY OF SCOPING COMMENTS

DRAFT EXECUTIVE SUMMARY
HAWAI'I GEOTHERMAL PROJECT - EIS SCOPING MEETINGS
MARCH 1992

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

1. PURPOSE AND NEED

Nearly 20% of those presenting 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 fuels, and to develop indigenous, cost-effective, renewable energy supply options for the State's future energy needs.

Several presenters suggested that if additional energy or energy self-sufficiency were very important, then serious attempts at conservation would have been made and laws requiring solar hot-water heating on State buildings or new homes would be passed.

In questioning the objectives of the HGP, commenters noted that planning for the development of 500 MW of geothermal power places substantial reliance on a single source of power with a high potential for failure either in power supply or cable.

Many noted that the ~~majority~~ bulk of the crude oil used in Hawai'i is used for transportation, and that electricity is generated using the residuals. Therefore, unless the need for petroleum products for transportation were reduced, geothermal power would not in any meaningful way reduce the State's dependence on imported oil. If tourism is increased due to increased power availability, tourism's reliance on oil for transportation may increase Hawai'i's dependency on oil.

2. PROPOSED ACTION

2.1 Definition of Project. About 15% of the commenters want a better definition of both phases of the HGP. The EIS should clearly delineate the federal and State's participation in the HGP. It was noted that in order for 500 MW to reach Oahu, more power must be generated at the source. The proposed action should be defined from inception through decommissioning and rehabilitation, including locations of power plants, well-heads, transmission corridors, campsites, access roads, other infrastructure and aircraft used for surveillance. The number of wells for exploration, source, and reinjection should be estimated and the acreage required to support them for the lifetime of the plant. 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.

As 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.

2.2 Resource Concerns. Some commenters were concerned that the magnitude of the resource in the Kilauea East Rift Zone has not been verified. The EIS should discuss the reliability and renewability of the resource (~15% of the commenters). 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 discuss the reliability of the geothermal power generation facility (>25% of those presenting), and associated infrastructure, some noting mistakes that had been made in the past. Those concerned about the reliability of the geothermal facilities mentioned the potential hazards of locating such plants (and transmission lines) in an active seismic/volcanic zone, of isolation from the base load (both at the facility and to the users), of irreparable wells, and of uncontrolled and unabated blowouts. They were concerned about the integrity of well-casings and the possibility that brine ponds might overflow during heavy rains or leak due to the corrosive nature, high temperature, and high pressure of the geothermal fluids. Others were concerned about availability of water for quenching.

Thus, the EIS should identify and assess potential impacts of failure modes. It should examine the unique geological system with which the HGP will interact, examining ~~examine~~ the potential for seismic/volcanic events interconnecting aquifers resulting in contamination.

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*. Proposed and alternative abatement and mitigation measures should be described and their potential impacts identified and assessed, including: best available control technologies, measures to prevent invasion of exotic species, reforestation techniques (*i.e.* reforest, restock with biota *etc*.), and disposal of hazardous waste. Backup measures should be included. The EIS should state how monitoring, mitigation, and enforcement measures advocated by the document will be guaranteed.

2.4 Cumulative Impacts. The commenters were concerned about whether the impacts of prior and on-going geothermal development would be considered in the EIS. They do not generally hold either the past or present geothermal development or developers in high regard (suggesting that the many failures are due to improper operation). Others noted that geothermal energy has been successful elsewhere. Twenty percent of those

presenting mentioned the effects that have already occurred in the Puna district: health effects, both physical and psychological (due to geothermal emissions and noise), and impacts to agriculture, livestock, and other plants, animals and birds both in and out of the Wao Kele o Puna rainforest. Some residents were forced to leave their homes during recent venting incidents. The presenters also ~~noted~~ claimed increased depreciation of material and lowered property values and that community and individual rights were violated.

Puna Geothermal Ventures

The EIS should assure that incidents, such as those that occurred at PGV in 1991, do not occur with the HGP noting that PGV is a small scale operation relative to HGP. This includes reviewing previous incidents and implementing the recommendations of the expert review team. The commenters expressed concern that, to date, geothermal developers have not provided citizens with accurate information concerning their operations and releases.

The presenters also noted that environmental examination of geothermal development to date has been segmented, inadequate, and performed using a very limited data base and perspective. Some prior environmental compliance documents did not address the reasonably foreseeable consequences of a successful projects, were inadequate, and conditions for operation and mitigation were not followed.

2.5 Cable/Transmission Lines. The EIS should describe the submarine cable, the transmission lines, pumping stations and other infrastructure, their reliability, and efficiency (~20% of those presenting). It should identify the primary and alternative route. Those presenting suggested that the EIS should address impacts associated with cable/transmission line installation, operation, maintenance, and failure. They asked if the submarine cable was technically/economically feasible and reliable (in terms of placement, operation and maintenance), considering the depths, bottom roughness, frequency of debris flows, and extreme oceanic conditions in the Alenuihaha Channel. Similarly, they asked about: the reliability of the system if it were subjected to a seismic or volcanic event; the implications of possible sabotage of the cable; whether shark bites or ship anchors will damage the cable; and if the grid on Hawai'i can safely distribute the power associated with HGP. They expressed concern that parallel transmission lines along the Kea'au road makes the system vulnerable [to seismic events, volcanic events, extreme events (storms), sabotage]. They noted that if lines are broken, any escape route from Puna could also be cut off.

The EIS should outline repair strategies and state how long repairs will take.

2.6 Future Uses. About 15% of the presenters suggested that the EIS identify and assess the potential impacts of the future uses of geothermal energy on all islands affected: increased greater urbanization, growth, industrialization, and development that could include: seabed mining and refining, construction of a space port,

and increased tourism with associated golf courses and energy-intensive hotels. It should examine negative impacts on the infrastructure, overpopulation, crime, or social upheaval.

The commenters suggested that increased power availability could cause increased population and power consumption. They noted that increased tourism could result in increased use of fuels for transportation, thereby increasing Hawai'i's dependence on oil.

It was noted that once the submarine cable was in place, that other power generation facilities could use the cable as a conduit, in fact, laying of the cable could make construction of other energy-production facilities economically feasible.

3. ALTERNATIVES TO THE PROPOSED ACTION

Nearly fifty percent of the commenters stated that the EIS should identify and assess the relative merits and impacts of alternative energy supply options that are cost-effective, viable and safe, and could ~~to~~ meet the goals of the State's stated purpose for the HGP. The EIS should examine their technical and economic feasibility/reliability, and their environmental impacts. These include "no action," fossil fuel options (coal gasification), conservation and renewables, and various geothermal options. 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. They noted that the State is initiating such a process (but may not be completed within the proposed time ~~scale~~ frame of the EIS).

3.1 Conservation and Renewables. Nearly 40% percent of the commenters stated that the EIS should examine conservation and renewable energy-supply options, such as photovoltaics, solar thermal (particularly solar hot water heating), wind, OTEC, biomass, demand-side options (conservation/energy efficiency, passive solar), off-grid options, and others. Many believe that alternative energy options can meet the needs of the State, if the alternative energy supply options could be helped by tax-incentives and low-cost loans. They noted that wind, solar and biomass are successful elsewhere and that the most islands have excellent wind and solar resources.

ocean thermal energy conversion

3.2 Geothermal Alternatives. With respect to geothermal alternatives, commenters want the EIS to assess a staged development of HGP so that experience is gained with the least capital costs, the possibility of closed-cycle geothermal using immediate reinjection, *in-situ* heat exchange, and geothermal development at locations other than the Kilauea East Rift Zone.

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. 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. Alternatives to transmission lines should be considered including "no action," solid rather than oil-filled cables, high voltage AC transmission *vs* high voltage DC transmission, and various cable/transmission line routes (above ground *vs* buried, percentage of lines on land *vs* submarine). A number of alternative routes were suggested including an alternative to the route along the southeastern coast of Maui: North Kohala to Lana'i with spur lines to Lahaina and Moloka'i and direct line from Lanai to Oahu; or routing the cable directly to Oahu, not landing on Maui. The EIS should consider the costs (including indirect costs, such as impacts to property values and aesthetic impacts) of above and undergrounding the transmission lines. This could be necessary on a district by district basis, given the variable geology of the State. Prior to development of the HGP plus cable a smaller demonstration should be conducted to determine whether power transmission to other islands is reasonable.

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 reduce Hawai'i's dependence on imported oil. The EIS should examine the potential contributions of alternative transportation fuels, providing on-site or near-site employee housing, alternative methods for interisland travel. However, the EIS should examine the costs associated with supplying an unneeded mass transit system on Oahu to save energy.

3.5 Fossil Fuel. The EIS should identify and assess the impacts of fossil-fuel-fired operations, particularly the obtaining of foreign coal, and the environmental effects of these operations. The EIS should address the issue that fossil-fuel power generation adversely impacts air quality and potentially contributes to global climate change. The proposed coal-burning facilities may use coal derived from strip mining a rainforest 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

A number of studies of the affected environment were suggested, including: characterization of the affected environment (including socioeconomics), ground water, the hydrology and geology of the Kilauea East Rift Zone,

local meteorology, natural (ambient) emissions, and geothermal emissions, fluids, and solid wastes. Surveys of the biota in the Kilauea East Rift Zone region, and all the proposed overland and undersea transmission corridors should be carried out and the archeological sites on the southeastern coast of Maui should be analyzed.

5. POTENTIAL ENVIRONMENTAL ISSUES

The EIS should fully evaluate the short- and long-term environmental, social, and economic costs and benefits of the HGP (including wells, support structures, transmission lines/submarine cable, pumping stations, campsites, access roads, and aircraft used for maintenance reconnaissance), particularly to pristine environments, such as the Wao Kele o Puna rainforest, the southeast coast and Hana districts of Maui, much of Moloka'i, and the marine environment. The EIS should not only consider local impacts, but should take a planetary or global perspective. The preparers of the EIS should consider the fact that the Hawaiian islands are finite, and consider, therefore, if the HGP is consistent with this limitation on growth.

Commenters expressed a general requirement to protect the land and its biota as a responsibility of those living on it. Commenters noted that when assessing the impacts of the HGP, there should be no artificial separation of humans from the environment.

DOE should perform the environmental studies necessary to provide the scientific data required to weigh the costs and benefits of the HGP and should make the information available to the public. However, the commenter noted that studies that would be intrusive should not be performed. The EIS should clearly state information gaps and their significance. When measurements (for monitoring or other purposes) are taken. they should be performed by analysts with appropriate expertise and at appropriate locations.

A number of issues were raised that apply to many of the categories below. The EIS should identify and assess (1) the chronic effects of HGP-related high- and low-level emissions, effluents, noise, and night light on plants, animals, birds, and insects, in the wild, in the rainforest, on agricultural lands and on humans (see Health and Safety); (2) the impacts on plants and animals of medicinal and ritual use for Native Hawaiians (The EIS should also address the impacts of the loss of benefits of these plants.); and (3) the impacts of the HGP on plants, animals, birds, and fish used for subsistence living. 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. Herbicides so used can impact terrestrial and aquatic biota within or outside the rainforest, including threatened and endangered species. They can enter the human food chain in drinking water, air of food.

Many of those presenting questioned the impacts of acid rain or fog that may occur as a result of geothermal development, which can impact air, water and soil quality, terrestrial and land-based aquatic ecosytems, and have significant socioeconomic effects. Concern that emissions would cause acid rain resulting in excessive corrosion of piping or building materials or that emissions would discolor or erode paint *etc.*

The EIS should establish whether the clearing of land for HGP would exacerbate erosion affecting air and soil quality and terrestrial and aquatic land-based ecosystems. Increased erosion could cause increased siltation and turbidity potentially impacting the near-shore environment including fishponds and fisheries, reefs, and tourism (economic, cultural and archeological concerns).

5.1 Competing Uses. Nearly 30% of those commenting recommended that the EIS consider the propriety of: (1) geothermal development in the residential neighborhoods of Puna, noting that blowouts occur at most geothermal installations world-wide; (2) using Native Hawaiian homelands, ceded lands and conservation districts for the HGP, even though some of those lands are not currently being developed because they have no supporting infrastructure; and (3) the land exchange in Puna [Campbell Estate for Wao Kele o Puna], and subsequent redesignation as a geothermal subzone, to determine whether it has benefitted 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.

In addition the EIS should address the impacts of the HGP on water availability and water uses. The EIS should determine if there is sufficient water with in the Kilauea system to support the HGP and provide for other uses. In addition, fire hazards associated with the transmission line system exacerbated by drought conditions were mentioned. The EIS should address the impacts of the absence of registration of geothermal wells as water wells, as some Native Hawaiians have claimed water use rights for the subsurface waters in the Puna district.

The EIS should consider impacts of the HGP on aviation, communication, agriculture, and on recreational uses, for example in the rainforest and on beaches.

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

5.2 Air Quality Concerns. More than 20% of the presenters recommended that the EIS characterize the emissions associated with the 500 MW development and identify the impacts of those emissions, including toxic releases, acid rain or fog, and thermal pollution, and particles from solid wastes. Certain atmospheric conditions

were reported to exacerbate the effects of HGP-related emissions in Puna, and even degrade the air quality on Maui and Moloka'i. Geothermal emissions can affect the water quality in catchment systems, commonly used in Puna for drinking and bathing.

5.3 Water Quality Issues. Nearly 25% recommended that the EIS characterize the effluents and the brine ponds associated with the 500 MW development. The EIS should report the impacts of leakage of source and injection wells into aquifers due to well failure (due to seismic/volcanic events or corrosion), or leakage/overflow from the brine ponds. The EIS should address impacts of the HGP on drinking water quality (particularly in water catchments), on surface or ground waters, considering the effects of possible contact with HGP-related solid wastes, abatement technologies or their possible failures, and changing the water quality designation of aquifers in the geothermal subzone.

5.4 Ecological Resources. Nearly 50% of the presenters asked that the EIS examine the project's impact on the unique ecosystems that make up Hawaii including plants, vertebrates, and invertebrates. Many of the concerns raised could be applied to more than one ecosystem: terrestrial, land-based aquatic, or marine ecosystems and the threatened, endangered and endemic species therein and on humans. Many have been discussed in the introduction to section 5.

5.4.1 *Impacts to Terrestrial and Land-based Aquatic Ecosystems*. In addition to the concerns mentioned in the introduction to Section 5, 25% of the commenters recommended that the EIS should address the potential impacts of the HGP on unique species, for example insects, that live in lava tubes.

5.4.2 *Rain Forest Issues.* Nearly 30% of those commenting expressed concern for the rainforest.
The EIS should identify and assess the impacts of the HGP (particularly in terms of species diversity and its ability to regenerate), including the effects of introduction of exotic species, extensive segmentation caused by roads built and areas cleared, and incursions of humans. The EIS should also study the impacts of destroying the unique and fragile habitat of the Wao Kele o Puna rainforest. It should note the interrelationship between the lava, the biota of the region, and the regeneration that occurs following an eruption.

One commenter was concerned that the construction of the HGP would start a series of complex changes in the lowland rainforest ecosystem. He stated that the "long-term longitudinal study" necessary to understand this effect would be difficult to conduct for the EIS, making it equally difficult, if not impossible, to predict the consequences of those changes. Thus, the EIS should assess the risks of making a complex environmental decision without information regarding the impacts.

5.4.3 *Threatened, endangered, or endemic species concerns*. Nearly 20% of the presenters were concerned about the potential impacts of the HGP on threatened, endangered, and endemic species, particularly in the rainforest of Puna, the dry forest on Maui, and in the ocean. Species mentioned include humpback whales (particularly nursing mothers and their offspring), sea turtles, ohia, happy-face spider, Hawaiian hawk, and hapu'u (tree fern). The EIS should consider that, because of the unusual geology in Hawai'i (criss-crossing lava flows, all islands), very small areas of unique habitat exist that support the few remaining individuals of an endangered species that are evolving at different rates.

One speaker stated that he believed that if there were "take," even inadvertent, in a federally-funded project then the project would be stopped. Another commenter asked what happens if species become extinct as a result of HGP.

5.4.4 *Marine Concerns*. Nearly 20% of the commenters requested that the EIS should investigate the impacts of the submarine cable installation and maintenance (increased turbidity, possible ciguatera, and increased noise levels), normal operation (emf, stray voltage, electrotaxis), and in failure modes (such as oil leakage) on the ocean and its resources including: marine mammals, sea turtles, big game fish, dolphins, food stocks, sharks, rays, and skates; and on beaches, surfing locations, and reefs; and on ecology in the coastal zone.
The EIS should investigate the impacts of the cable on humpback whale migration patterns, birth rate, and ability to navigate and locate and the potential impacts of nets (used to protect swimmers if the submarine cable attracts sharks) on humpback whales' birthing habits in shallow, protected waters.

The EIS should investigate the impacts the HGP would have on fisheries. The EIS should consider the impacts of the cable (installation, operation, maintenance *etc.*) on the reefs and fish ponds.

5.5 Geological Issues. The commenters expressed concern that undertaking geothermal development in a seismically and volcanically active zone may, in fact, exacerbate those activities and upset the hydrological balance as the development will be situated on a geological structure that contains numerous vertical dikes, faults, and horizontal shelves. The EIS should examine the problem of geothermal associated subsidence.

5.6 Aesthetic Issues. The EIS should address the aesthetic impacts of HGP-related noise, visual disturbances and odors. Although noise is primarily a Health and Safety Issue, it is also an aesthetics issue as it is a nuisance, disrupting peace and quiet. Commenters want the EIS to address the impacts of chronic exposure to nuisance levels of noise associated with geothermal development, including drilling, operation and venting, and transmission lines.

Commenters expressed concern about the aesthetic costs of the HGP, (particularly the impacts of the overland transmission lines and clearing the Wao Kele o Puna rainforest) on all islands, including impacts to natural and agricultural landscapes, beaches and surfing spots. One commenter mentioned the problems of night-time lighting.

5.7 Health and Safety Issues. The EIS should assess the health and safety impacts of the HGP and its components, failures, mitigation measures, and future uses (more than 40% of those presenting).

5.7.1 *Geothermal Emissions and Effluents*. About 25% of the commenters expressed concerns about the health effects of geothermal emissions (particularly H_2S and acid rain) and effluents, due to HGP-related changes in air, drinking water, and food quality. These effects can include eye, throat irritation, and noise irritation, trouble breathing, coughing, wheezing, and lowered resistance to infection. Those presenting were concerned about the cumulative and synergistic effects of emissions, effluents, and brine ponds, on children and babies, those with respiratory ailments, the elderly, Native Hawaiians, and workers. The EIS should analyze the short- and long-term chronic and acute effects of geothermal emissions on public health and safety.

5.7.2 *Transmission Line Effects*. The EIS should examine the health and safety impacts of the transmission line/underwater cable system (including transformers), particularly the effects of electromagnetic fields and stray voltage along the transmission line corridor, or ciguatera associated with cable construction in the near-shore environment.

5.7.3 *Noise*. The EIS should address the impacts of noise associated with geothermal development, including drilling, operations at and near the geothermal facility under normal operating conditions and with unscheduled venting, and also along transmission lines, at work camps or substations, and due to aircraft (doing maintenance reconnaissance). They note that noise can cause ear damage; and it can cause fear, loss of sleep, and psychological stress.

5.7.4 *Psychological Impacts*. The commenters recommend that the EIS address psychological impacts of the HGP and its associated development, including impacts of stress due to fear, unannounced venting, and sleep deprivation (due to noise, fear, frustration, and lack of trust) and the problem of the fears of geothermal development that exist in the surrounding communities due to the prior activities in the region. They asked what the psychological impacts are on a community experiencing controversy, lack of empowerment, and loss of due process. The EIS should consider psychological impacts on persons whose lifestyle had been disrupted (for example, children and Native Hawaiians) and cross-cultural psychological issues.

5.7.5 *Safety, Civil Defense Issues*. With respect to geothermal developments in residential areas, the commenters strongly urged that the EIS should develop a worst-case scenario for the full development and, noting that there is no adequate emergency response plan for the Puna District, develop one. Residents are concerned about impacts of isolation of the facility from the base load, which could result in unabated and/or uncontrolled venting. The transmission lines parallel the Kea'au road, which is also the evacuation route from Pahoa. If a seismic or volcanic event should occur along that road, the facility could be isolated from its base load and the community would be prevented from evacuating. They also mentioned inadequate communication systems.

The EIS should address the impacts of the violence that might occur should the HGP proceed.

With respect to the submarine cable, the EIS should: state what steps will be taken to protect the public and the cable if it attracts sharks; consider the implications of possible sabotage of the cable; and address the risks of accident during maritime operations in the Alenuihaha Channel. The EIS should consider the civil defense issue of a major segment of power generation capacity being linked by such a transmission connection to its load.

The EIS should identify and assess the hazards of overland transmission lines, including the potential of increased fire danger and electrical hazards associated with high tension lines. The EIS should remember that the HGP may cause increased population, which would (along with drought conditions which do occur on the Big Island) further exacerbate the problems mentioned above.

5.8 Political Issues. Fifty percent of the commenters expressed political concerns of one kind or another, noting their frustration. These comments were in regard to a lack of concern by government, loss of due process because of government regulations and actions, loss of faith in government, lack of necessary expertise within government, and skepticism regarding motives and resolve of government. The commenters mentioned infringement on privacy due to the actions of geothermal developers' security personnel, insufficient public review, and inadequate distribution of information.

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 commenters believe that State/federal governments should enforce the laws currently in existence (including permitting and monitoring requirements). They noted that the State has never set air quality standards for H_2S. They asked if regulations have been violated in the past, are they currently being violated and will they be in the future?

The EIS should consider the international implications of the messages conveyed by the U.S. to the international community, noting that U.S. actions, far more than words, help establish global policy. Thus, the EIS should address concerns about the example it sets for the global community when the U.S. permits cutting of the rainforest for the purpose of power generation (when it asks that other nations not cut theirs) and does not show respect for the cultural and ethnic resources of its citizens, *i.e*. Native Hawaiians.

5.9 Socioeconomic Issues. Almost 75% of those commenting expressed concern about the long- and short-term socioeconomic impacts of the HGP detailed below.

5.9.1 *Economic Issues*. Nearly 40% of the commenters expressed economic concerns. They asked that the EIS lineate the costs (past, present, and future) of the entire HGP project to consumers, users and non-users, taxpayers, and utilities, from inception through decommissioning and rehabilitation, including all State and federal developmental and court costs, and costs for publicity *etc*, drilling and wells, building new ships, harbours, and the cable *etc*., mitigation, and rehabilitation, and monitoring and enforcement. It should examine the economic feasibility and cost-effectiveness of the project. It should consider the cost of cable or facility failure once geothermal energy provides a significant proportion of Hawai'i's energy needs, including the costs associated with a declining resource, of repair, and of development of backup capacity. The EIS should identify who would be responsible for the consequences of lower property values or property condemnation associated with the HGP.

The EIS should (1) address the economic impacts should the submarine cable affect fisheries (including fishponds), big game fish and food stocks, or tourism; (2) evaluate the impacts of the HGP (and the effects of its presence making large regions of the State less desirable for living) in terms of lower property values (including condemnation), increased cost of living, *etc*., loss of crops or livestock, increased depreciation (*e.g.*, of fences, houses, and catchment systems) due to geothermal-related corrosion; (3) examine the economic impacts of geological risks and hazards, the impact of the indebtedness incurred; (4) consider impacts to businesses (including agriculture), such as job loss, business relocation, or loss of business; and (5) assess impacts to local economies.

The EIS should identify who is liable - the federal government, the State, and/or privately-owned corporations - for all costs incurred and should mandate that conditions of permits should include future liability clauses. The EIS should identify means to provide insurance for those whose property values (*etc.*) decline or are forced to move due to the HGP.

The EIS should consider the impacts of diverting funds that could be spent on conservation technologies to the

geothermal effort. One commenter noted that investment in conservation has resulted in changing patterns of investment toward technologies that reduce the need for energy consumption. Investment in conservation technologies save the costs of constructing/updating additional generation/transmission facilities.

5.9.2 *Life Style*. The EIS should address impacts of the HGP on the life styles of the general population, specifically on Native Hawaiians. They ask if the cable/transmission lines will affect, for instance, subsistence life styles, the ability to access beaches, and the lifestyles of those who prefer privacy, peace and quiet, or lower levels of population, technology, or development (*e.g.* off-grid living).

5.9.3 *Social Issues*. The EIS should address the social effects the HGP, or its failure, particularly on communities near the geothermal operations and along proposed cable routes, including the social consequences of increased cost of living due to HGP. It should identify and assess the socioeconomic costs due to a decline in resource after HGP has stimulated growth and evaluate the social costs of HGP-related civil disobedience. One commenter noted that Hawai'i, which has largely service-related jobs has a low unemployment rate, whereas industrialized regions of the country are where the high unemployment occurs.

5.9.4 *Native Hawaiian Issues*. Nearly 50% the commenters were concerned that the EIS respect Native Hawaiian race, rights, religion, history, language, and culture. Many expressed the belief that geothermal development would result in a desecration of Pele.

The commenters asked that the EIS examine potential impacts of the HGP on: Native Hawaiian culture and religious beliefs; the ability of Native Hawaiian practitioners to obtain herbs, animals, and birds necessary for medicinal and ritual practices; Hawaiian homelands or ceded lands (noting that Native Hawaiians have a right and spiritual need to be able to return to their homelands and live their chosen life style); Native Hawaiian subsistence hunting, fishing, and gathering; and the land, ocean, and natural phenomena considered sacred. They expressed concern that HGP construction will result in desecration of ancient or modern Hawaiian burials in lava tubes, heiaus and places sacred to Native Hawaiians. 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 anthropological impacts of the HGP. A commenter 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 cultural practices.

5.9.5 *Impacts to Cultural Resources (Archeological/Historical Sites and Regions*. Other speakers indicated that the EIS should assess potential impacts to the many important, and often undocumented, archeological and historical sites and regions, including the southeast coast of Maui, the south coast of Moloka'i, and North Kohala.

6. COST BENEFIT ANALYSIS

Nearly 30 % of the commenters declared that the EIS should state what the economic benefits of the HGP are, identify who receives them, and weigh the potential benefits of the HGP against the environmental costs. The commenters wanted to assure that consumers and tax payers receive some of the benefits. The presenters would like the EIS to address the concern that those who will bear the greatest cost in terms of health and safety, economics, cultural resources, and environmental losses, will not be the ones to benefit.

7. LEGAL ISSUES

The EIS should review of all applicable rules, regulations and statutes, including NEPA, the National Historical Preservation Act, the Native American Religious Freedom Act, the Endangered Species Act, Section 7 consultation and the Public Utilities Regulatory Policy Act of 1978.

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 examine the complex regulatory situation with respect to land use and geothermal subzone designation.

APPENDIX D

ACRONYMS AND ABBREVIATIONS

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AC	alternating current
ALARA	as low as reasonably achievable
ANOI	Advance Notice of Intent
BACT	best available control technology
CEQ	President's Council on Environmental Quality
COE	Department of the Army Corps of Engineers
CO_2	carbon dioxide
CFR	*Code of Federal Regulations*
DBED	State of Hawaii Department of Business and Economic Development and Tourism
DC	direct current
DLNR	State of Hawaii Department of Land and Natural Resources
DOE	U.S. Department of Energy
DOH	Department of Health
DSM	demand-side management
EIS	Environmental Impact Statement
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency
ERDA	Energy Research and Development Administration
FEMA	Federal Emergency Management Agency
FR	Federal Register
FWS	U.S. Fish and Wildlife Service
GIS	Geographic Information System
GRSs	geothermal resource subzones
H_2S	hydrogen sulfide
HGP	Hawaii Geothermal Project
IP	Implementation Plan
IRP	integrated resource planning
kV	kilovolt
LBL	Lawrence Berkeley Laboratory
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NIOSH	National Institute for Occupational Safety and Health
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NSF	National Science Foundation
OR	U.S. Department of Energy - Oak Ridge Operations Office
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
OTEC	ocean thermal energy conversion
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SCS	U.S. Soil Conservation Service
SHPO	State Historic Preservation Office