HECO T-1
DOCKET NO. 03-0XXX

TESTIMONY OF
THOMAS L. JOAQUIN

SENIOR VICE PRESIDENT
OPERATIONS
HAWAIIAN ELECTRIC COMPANY, INC.

Subject: Project Need,
Selection Process (Policy)

INTRODUCTION

Q. Please state your name and business address.

A. My name is Thomas L. Joaquin and my business address is 820 Ward Avenue, Honolulu, Hawaii.

Q. What is your present position with the Hawaiian Electric Company, Inc. ("HECO")?

A. I am the Senior Vice President of Operations. My educational background and experience are provided in HECO-100.

Q. What is the scope of your testimony?

A. My testimony will address the need for the East Oahu Transmission Project from a policy perspective and the selection process for the preferred alternative being presented in this application.

APPLICATION

Q. What is HECO requesting by its Application filed in this docket?

A. HECO requests Commission approval to commit funds in excess of $500,000 (currently estimated at $55,424,000) for Item Y48500, East Oahu Transmission Project, in accordance with the provisions of Paragraph 2.3(g)(2) of General Order No. 7. The project is proposed for implementation in two independent phases.

HECO also requests a favorable Commission determination be made that the new 46kV lines for the East Oahu Transmission Project be built below the surface of the ground pursuant to HRS Section 269-27.6 (a). Subsections (b) and (c) of HRS Section 269-27.6, which apply to 138kV or greater lines, do not apply to this project.

EAST OAHU TRANSMISSION PROJECT

Q. What is the East Oahu Transmission Project?

A. The East Oahu Transmission Project is comprised of two independent phases of work. The first phase, "Phase 1", involves the installation of 0.9 miles of underground duct line for 46kV subtransmission lines, and related work at eight substations, in order to interconnect three 46kV circuits out of the Pukele Substation, at the end of HECO's Northern 138kV transmission corridor, to four 46kV lines connected to HECO's Southern 138kV transmission corridor.

The second phase, "Phase 2", involves the installation of 1.9 miles of underground duct line for 46kV subtransmission lines, and related work at one substation, in order to interconnect four out of the five remaining 46kV circuits out of the Pukele Substation to three other 46kV lines connected to HECO's Southern 138kV transmission corridor.

The scope of work is described in detail in the Application for the East Oahu Transmission Project and by Mr. Wong in HECO T-2, and Ms. Ishikawa in HECO T-4. The specific routes for the direct lines and the substations at which related work is performed are identified and described in HECO T-2 and by Mr. Morikami in HECO T-7.

Q. What is the purpose of the project?

A. As discussed by Ms. Ishikawa in HECO T-4, the purpose of the East Oahu Transmission Project is to address several transmission problems that can affect system reliability. The East Oahu Transmission Project was initiated as a result of a study conducted in July 1991 titled, "East Oahu 138kV Requirements." This study was updated in August 1992 and again in March 1998. The issues identified in these studies included:

1) The Koolau/Pukele Overload Situation;

2) The Downtown Overload Situation;

3) The Pukele Substation Reliability Concern; and

4) The Downtown Substation Reliability Concern.

The Koolau/Pukele Overload Situation involves potential transmission line overloads in HECO's 138kV Northern transmission corridor starting in 2005. The Downtown Overload Situation involves potential transmission line overloads in HECO's 138kV Southern transmission corridor starting in 2023. The Pukele Substation Reliability Concern involves the reliability of the Pukele Substation located at the end of 138kV Northern transmission corridor. Pukele Substation serves 16% of Oahu's power demand, which includes critical loads such as Waikiki, State Civil Defense, the Hawaii Army and Air National Guard Headquarters, and the University of Hawaii. The Downtown Substation Reliability Concern involves the reliability of Archer Substation, Kewalo Substation and Kamoku Substation located at the end of HECO's 138kV Southern transmission corridor. These substations serve critical loads such as the Honolulu Police Department Headquarters and the Hawaii Convention Center.

The implementation of Phases 1 and 2 would allow electrical loads currently being served exclusively from Pukele Substation at the end of HECO's 138kV Northern transmission corridor to also be served from Kamoku Substation or Archer Substation of HECO's 138kV Southern transmission corridor. Essentially, this alternative allows load to be shifted among the three substations and also allows the substations to back up each other. These operating features will allow the four transmission problems to be addressed.

Q. What is the estimated schedule for the project?

A. The schedule is addressed by Mr. Wong in HECO T-6. Phase 1 is estimated to be in service by the end of 2006 and Phase 2 by the end of 2008. This estimated schedule incorporates HECO's decision to voluntarily conduct an environmental assessment (EA) for the project.

Q. Why has HECO decided to voluntarily conduct an EA for the project?

A. The need for an EA under Chapter 343 of the Hawaii Revised Statutes is determined by the appropriate permitting agency. Based on past experience with permitting and construction of other underground subtransmission or distribution lines rated 46kV and below within existing roadways, which we have the right to use under our franchise, the preliminary schedules for the two 46kV alternatives (included in the recent process to solicit public input on project alternatives) assumed that an EA would not be required by a permitting agency. As noted by Mr. Alm in HECO T-12, however, there continues to be substantial public interest and continuing debate and concerns regarding project alternatives, community impacts and project need, and requests for HECO to conduct an EA were made in a follow-up community meeting after HECO's preferred 46kV alternative was announced. Given the circumstances, and the unique history of this project, HECO has decided to voluntarily conduct an EA--which will provide a formalized process to address these concerns. HECO does not anticipate that an Environmental Impact Statement (EIS) will be required, but that determination will be up to the accepting agency, which is expected to be the Public Utilities Commission.

Conducting an EA, although itself adding some uncertainty and potential for moderate delay and cost increase, should also mitigate to some extent a risk of greater project uncertainty, delay and cost increase brought on by protracted

litigation if an EA is not performed. As described further in my testimony to follow, the need to address in a timely and cost effective manner the existing transmission system concerns for the eastern half of Oahu is a major factor in selecting amongst the proposed project alternatives and developing a plan for its implementation. As noted by Mr. Wong in HECO T-6, for planning purposes, the estimated schedule impact of conducting an EA appears moderate, although the impact would be substantially greater if HECO is required to do an EIS.

Q. Are there other factors that may affect the schedule for the project?

A. Yes, as discussed by Mr. Wong in HECO T-6. The most significant factor is our need to consult with various City agencies to coordinate the scheduling of the Phase 2 work with City-initiated projects planned for King Street in order to minimize the impact on the community and users of King Street. This may affect when the construction of Phase 2 is actually started and completed.

Q. What is the estimated cost of the project?

A. As discussed by Ms. Oshiro in HECO T-9, the total estimated cost of the project is approximately $55,424,000. This assumes that Phase 1 is implemented in 2006 at an estimated cost of approximately $41,587,000 and Phase 2 is implemented in 2008 at an estimated additional cost of approximately $13,837,000.

WRITTEN TESTIMONIES

Q. What testimonies does HECO present to support its application?

A. A total of eleven witnesses, including myself, have submitted twelve written testimonies with supporting exhibits, which detail and support this application. The witnesses, including myself, and the subject matters of their testimonies are as follows:

Witness Number	Witness	Subject
T-1	Thomas L. Joaquin	Project Need and Selection Process
T-2	Kerstan J. Wong	Description of Project and Background
T-3	Randall Pollock	Transmission System Planning Process Overview, Development and Application of Transmission System Planning Criteria, Review of HECO Transmission Planning Criteria
T-4	Shari Y. Ishikawa	Planning/Project Need
T-5	Andrew H. Stewart	Live Working
T-6	Kerstan J. Wong	Description of Alternatives and Schedule
T-7	Ken T. Morikami	Routing
T-8	Thomas L. Harrington	Construction Schedule
T-9	Earlynne F. Oshiro	Project Costs
T-10	J. Michael Silva	Engineering Evaluation of Electric Magnetic Fields ("EMF")
T-11	William A. Bonnet	EMF Policy
T-12	Robert A. Alm	Public Sentiment

Mr. Pollock, HECO T-3, is Senior Vice President of Power Engineers of Hailey, Idaho. Mr. Stewart, HECO T-5, is President of EDM International, Inc. of Fort Collins, Colorado. Mr. Harrington, HECO T-8, is President of TLH Management Services, Inc. of Honolulu, Hawaii. Mr. Silva, HECO T-10, is President of Enertech Consultants of Campbell, California. All other witnesses are HECO employees.

Q. What are the issues in a proceeding such as this?

A. The Commission will set the issues based on applicable statutory provisions, its rules, and matters raised by the parties to the proceeding. Typically a transmission

project proceeding addresses whether a proposed project will provide facilities that are reasonably required to meet the utility's probable future requirements for utility purposes. Where viable alternatives are available, the Commission also has examined whether the utility's selected routing, location, configuration and method of construction are reasonable and preferable to the utility's other options, comparing factors such as cost, effectiveness in meeting the need, and potential health, safety, construction, aesthetic and other impacts. If all or part of a transmission line included in the project could be placed overhead or underground, the Commission must make a determination after considering the factors listed in Section 269-27.6 of the Hawaii Revised Statutes ("HRS"). In this case, all of the lines in the preferred alternative are 46kV lines and there is no longer a viable 138kV overhead line alternative, so the specific determinations required by HRS Section 269-27.69(b) in the case of 138kV lines are not applicable.

Q. One of the specific factors that must be considered in making the overhead/underground determination in the case of 138kV lines is the "breadth and depth of public sentiment." Did HECO consider public sentiment?

A. Yes. As addressed by Mr. Alm in HECO T-12, HECO conducted a public input process to solicit public feedback on three alternatives. This was in addition to the extensive public input and public scoping process initiated by HECO in 1993 and carried through the EIS process for the partial underground/partial overhead Kamoku-Pukele 138kV line that HECO was not successful in permitting, which is described in the testimony of Mr. Wong in HECO T-2.

Q. Is the Commission required to conduct a public hearing?

A. No. A public hearing is required under HRS Section 269-27.5 when a public

utility plans to place, construct, erect or otherwise build a new 46kV or greater transmission line above the surface of the ground through a residential area. All 46 kV transmission lines under the proposed project will be placed underground. However, the Commission may want to consider conducting a public hearing given the unique history of the project, the continued substantial public interest regarding the need for the project, and recent comments regarding the proposed route.

Q. Has the Commission conducted a public hearing, when a public hearing was not required?

A. Yes, the Commission has held public hearings in other dockets, although not required to do so, including Docket No. 02-0060 (sale of assets of Kauai Electric Division to the Kauai Island Utility Co-op) and Docket No. 95-0333 (HELCO's proposal to purchase and install two dispersed generators).

Q. Why are written testimonies being filed now?

A. Based on public input received on the project, need was a constant issue. Therefore, HECO wanted to provide as much information as possible upfront.

Q. What if the PUC identifies additional issues?

A. HECO will then supplement, as necessary, the various testimonies that have been submitted in support of this project.

Q. What are the transmission planning policy considerations relating to the proposed project that are addressed in your testimony?

A. The primary goal for operating the generation and transmission systems is to keep the power flowing continuously to our customers. If there are system disturbances, we try to isolate the disturbances and minimize their effect on our customers. The installation of critical infrastructure in a timely manner provides a

means to deal with these disturbances quickly and effectively. From a planning perspective, there are basically two types of reliability concerns that we continuously try to guard against. The first type of reliability concern is a catastrophic power outage, where disturbances on the system could potentially throw the entire system into instability. The second type of reliability concern is a localized power outage, where the outage affects a limited area of the island.

Q. What are the respective effects on customers with these two types of reliability concerns described above?

A. A catastrophic power outage has the potential of taking down the entire system for many hours. If the entire system becomes too unstable after system disturbances, generation facilities will eventually shut down, as designed, to protect vital equipment from long-term or permanent damage. The restart of generation facilities is a very involved, complex, and time consuming process. Therefore, a significant amount of customers could be without power for many hours until the system can be restored.

A localized outage is limited to a certain area and is unlikely to cause the entire system to become unstable and cause loss of generation. Certain localized power outages also are of significant concern because of the number of customers affected, the duration of the outages, and the impact of the outages on the impacted customers and the State.

Q. What steps are taken to guard against the reliability concerns described above?

A. As discussed by Mr. Pollock in HECO T-3, and Ms. Ishikawa in HECO T-4, HECO's transmission planning criteria provides a guide to plan and design Oahu's transmission system. The primary focus of the criteria is to minimize outages and ensure that the system survives taking into account operating realities.

The operating realities include the need to periodically take system components out of service for maintenance and repair, and the fact that disturbances will occur unexpectedly from time-to-time. This is not say that all loads must be served under all circumstances. Instead, loads could be dropped to avoid a catastrophic power outage to assure that the system as a whole survives during unexpected disturbances. Therefore, as much as practical, we seek to identify and implement solutions that can address both catastrophic and localized reliability concerns.

Q. How would you characterize the East Oahu transmission problems?

A. The Koolau/Pukele and Downtown Overload Situations could be characterized as problems that increase the risks for catastrophic type power outages. The Pukele Substation and Downtown Substation Reliability Concerns could be characterized as localized outage problems. As discussed in the testimonies of Ms. Ishikawa in HECO T-4 and Mr. Pollock in HECO T-3, the Pukele Substation Reliability Concern is a significant concern, due to factors such as the location of the two transmission lines providing power to the substation and the conditions to which the lines are subjected, the potential duration of a loss of power to the substation and to most of the customers served from the substation, and the potential impacts of an extended outage on the Pukele Substation service area.

Q. Is the proposed project HECO's ideal solution to address the East Oahu transmission problems from an engineering viewpoint?

A. No. The ideal solution to address the East Oahu transmission problems would have been the installation of the Kamoku-Pukele 138kV Transmission Line via Waahila Ridge. This alternative would have involved the installation of a 3.8-mile partial underground/partial overhead transmission line from Kamoku Substation to Pukele Substation. The underground section would have been

located in the urban areas and the overhead section in the mountainous areas (Waahila Ridge). This particular transmission line would have closed the gap in the transmission system between the 138kV Northern and Southern transmission corridors and provided a third 138kV line to Pukele Substation. Thus, all the East Oahu transmission problems would have been addressed effectively.

Q. Why is Kamoku-Pukele 138kV Transmission Line via Waahila Ridge not being proposed as part of this application?

A. As discussed by Mr. Wong in HECO T-2, from 1991-2002, HECO vigorously pursued the permit for the overhead section of the project. After two environmental impact statements (1998, 2000) and a contested case hearing before the Board of Land and Natural Resources ("BLNR"), the BLNR denied the permit for the overhead section of the project. This essentially eliminated the only practical overhead 138kV transmission line alternative to pursue for the project.

Q. What did HECO do after it was determined that the Kamoku-Pukele 138kV Transmission Line via Waahila Ridge was not viable to pursue any further?

A. After the BLNR denied the permit for the Kamoku-Pukele 138kV Transmission Line via Waahila Ridge, an Executive Team of which I was designated to be the Chairperson, was formed. The Executive Team is a cross-functional group comprised of various officers from different areas of HECO (including an officer from Hawaiian Electric Industries). The purpose of the Executive Team is to provide senior executive oversight of the East Oahu Transmission Project and ensure that the project continues to move forward until closure.

SELECTION PROCESS

Q. What was the first directive issued by the Executive Team?

A. The Executive Team directed the project engineers to identify new alternatives and to revisit past alternatives considered during the EIS process. As discussed by Mr. Wong in HECO T-6, the following three alternatives were identified for further consideration: 1) Kamoku-Pukele 138kV Underground Line (via Palolo); 2) Kamoku 46kV Underground Alternative; and 3) Kamoku 46kV Underground Alternative – Expanded. As discussed by Ms. Ishikawa in HECO T-4, other alternatives such as distributed generation and live-line maintenance were also evaluated, but screened out from further consideration.

Q. Please describe the process that led to the selection of the recommended alternative in this Application.

A. The Executive Team was given the responsibility to select the alternative that would be presented in this application. Various studies and reports were updated and developed by HECO engineers and consultants for the Executive Team to review. In addition, the Executive Team attended a presentation by various subject matter experts, which led to further in-depth discussions regarding the studies and reports. From the various studies, reports, and discussions, major factors were identified and placed in a decision matrix, HECO-101, which was used as a tool by the Executive Team to analyze each alternative and to compare against one another.

Q. What were the major factors considered?

A. The major factors considered in evaluating the alternatives were effectiveness, timeliness, construction and other impacts, and public sentiment.

Effectiveness

This factor deals with the effectiveness of each alternative in addressing the East Oahu transmission problems in the long-term and near-term. As discussed by Ms.

Ishikawa in HECO T-4, the Kamoku-Pukele 138kV Underground Alternative is the best alternative to fully address all the transmission problems effectively in the long-term, but not in the near-term due to the estimated time to implement (2010). The Kamoku 46kV Underground Alternative fully addresses the Koolau/Pukele Overload Situation (2005) in the long-term and near-term. This 46kV alternative has limitations in addressing the other problems in the long-term and near-term. The Kamoku 46kV Underground Alternative – Expanded fully addresses the Koolau/Pukele Overload Situation (2005) and the Pukele Substation Reliability Concern in the long-term but not in the near-term due to the estimated time to implement (2008). This alternative has limitations in addressing the other concerns in the long-term and near-term.

Timeliness

This factor deals with the estimated time it would take to implement an alternative factoring in uncertainty. As discussed by Mr. Wong in HECO T-6, the Kamoku-Pukele 138kV Underground Alternative had the longest schedule with implementation estimated in 2010. The Kamoku 46kV Underground Alternative had the shortest schedule with implementation estimated in 2006. The Kamoku 46kV Underground Alternative – Expanded was estimated for implementation in 2008. (As is indicated later in my testimony, we have now determined that this alternative can be implemented in two phases, with the first phase being targeted for completion by the end of 2006.) Of the three alternatives, the 138kV alternative appeared to have the highest degree of schedule uncertainty due to the permits and approvals required.

Construction and Other Impacts

This factor deals with the short-term construction impacts, as well as other

impacts identified through the public input process. Construction impacts such as traffic, noise, and dust were identified for each alternative. As discussed by Mr. Harrington in HECO T-8, there were some differences between the alternatives regarding construction impacts. However, proven techniques can be applied to each alternative to mitigate the respective short-term impacts. Other impacts that were considered were aesthetics and EMF. Aesthetic impacts are considered minimum to none because the three alternatives propose all underground line construction. As discussed by Mr. Wong in HECO T-6, only the pumping facility associated with the High Pressure Fluid Filled ("HPFF") cable technology of the Kamoku-Pukele 138kV Underground Alternative could potentially have aesthetic impacts to consider. EMF is still a public concern especially in residential areas. As discussed by Mr. Silva in HECO T-10, EMF calculations were performed for the three alternatives. HECO's EMF policy is discussed by Mr. Bonnet in HECO T-11.

Q. How was EMF considered in the selection process?

A. As indicated in Mr. Silva's testimony, HECO T-10, there are differences in the EMF levels expected to result from the alternatives considered. At the same time, as discussed in Mr. Bonnet's testimony, HECO T-11, as the Commission found in Docket No. 7256, and has been indicated by the reported findings in significant subsequent studies, the scientific community that has been researching the matter has not established a causal link between EMF and adverse health effects. As discussed in Mr. Alm's testimony, HECO T-12, we also recognized that there are concerns about EMF among some members of the public, particularly where lines pass through residential areas. There are generally fewer concerns, however, where lines are placed underground (as HECO proposes for this project), given the

rapid fall off in EMF levels for underground lines as the distance increases between the lines and the point of measurement. Given these considerations, the differences do not warrant selection of a specific alternative, such as the 138kV line alternative (either the HPFF alternative or less expensive XLPE alternative, which has higher EMF levels than the HPFF alternative) in light of the other factors considered. HECO does, however, plan to exercise "prudent avoidance" in designing the 46kV cable installation, as is discussed in the testimonies of Mr. Bonnet, HECO T-11 (who addresses the concept as defined by the Commission and the Hawaii Department of Health), and Mr. Wong, HECO T-2 (who addresses implementation of prudent avoidance in the case of this project).

Cost

As discussed by Ms. Oshiro in HECO T-9, capital costs, revenue requirements and estimated monthly residential rate impacts were developed for each alternative. The Kamoku-Pukele 138kV Underground Alternative had the highest capital cost at approximately $110 million to $122 million. The Kamoku 46kV Underground Alternative had the lowest capital cost at approximately $41 million. The Kamoku 46kV Underground Alternative – Expanded had an estimated capital cost of $59 million.

Public Sentiment

As discussed by Mr. Alm in HECO T-12, a public input process was conducted to solicit feedback on the three alternatives. Business community participants in the process noted that improved power reliability was important to Waikiki and surrounding areas but cost was also a concern. Other concerns expressed by participants were related to construction impacts, the need for the project, and EMF.

Q. Given these considerations, what alternative did the Executive Team select to present in this application?

A. Given these considerations, the Executive Team selected the Kamoku 46kV Underground Alternative – Expanded and further recommended that it be implemented in two phases. Balancing all the issues, including the time element, this is the best choice. As discussed in Ms. Ishikawa's testimony, HECO T-4, the system is already at risk and that risk will only increase with time. This alternative provides the needed reliability in the shortest time, at a reasonable cost to our customers.

Q. What are the benefits with constructing the Kamoku 46kV Underground Alternative – Expanded as a two-phase project?

A. The two phases are independent of each other, as each one addresses very specific concerns. The completion of the first phase, targeted for the end of 2006, will eliminate the potential transmission line overloads in HECO's 138kV Northern transmission corridor starting in 2005 (Koolau/Pukele Overload Situation). In addition, the completion of the first phase would avoid blackouts of Waikiki, State Civil Defense, and the Hawaii Army and Air National Guard Headquarters that would result if one of the lines serving Pukele Substation located at the end of 138kV Northern transmission corridor were out for maintenance and the second line was lost for any reason (Pukele Substation Reliability Concern). The completion of the second phase, targeted for 2008, will back up other parts of the Pukele Substation service area, which includes the University of Hawaii.

Q. How does the selected alternative compare to the 138kV underground alternative through Palolo Valley?

A. The 138kV underground alternative through Palolo Valley would be the most

desirable from an engineering viewpoint and provide our system operators with the greatest flexibility in the long-term. However, the 138kV underground alternative is also the most expensive and time consuming to implement, leaving critical areas of Oahu at risk of blackouts for a much longer period of time.

SUMMARY

Q. Please summarize your testimony.

A. HECO requests Commission approval to commit approximately $55,424,000 for Item Y48500, East Oahu Transmission Project, in accordance with the provisions of Paragraph 2.3(g)(2) of General Order No. 7. The project is proposed for implementation in two independent phases. Phase 1 is estimated to be in service by December 2006 and Phase 2 by December 2008. There may be potential scheduling conflicts with Phase 2 due to various City initiated projects planned for King Street, which could impact when the construction of Phase 2 is actually started and completed. HECO also requests a favorable Commission determination be made that the new 46kV lines for the East Oahu Transmission Project be built below the surface of the ground pursuant to HRS Section 269-27.6 (a). A total of eleven witnesses have submitted twelve written testimonies with supporting exhibits, which detail and support this application.

Balancing all the issues, including the time element, the Kamoku 46kV Underground Alternative – Expanded is the best choice for the East Oahu Transmission Project. The Koolau/Pukele and Downtown Overload Situations could be characterized as problems that increase the risks for catastrophic type power outages. The Pukele Substation and Downtown Substation Reliability Concerns could be characterized as localized outage problems. The system is

already at risk to these problems and that risk will only increase with time. While the 138kV underground alternative through Palolo Valley is the most desirable alternative from an engineering viewpoint in the long-term, it does not address the transmission problems in the short term. Through the public input process, it was clear that the business community supports increased power reliability in Waikiki and surrounding areas, but that cost is also a concern. The selected alternative provides the needed reliability to address these problems in the shortest time at a reasonable cost to our customers. We take our responsibility very seriously in keeping power flowing to our customers. We are convinced there are transmission problems and it would be irresponsible for us to do nothing in the face of recognized risks.

Q. Does this conclude your testimony?

A. Yes, it does.