

STATE'S EXHIBITS
A97-722

DOCKET NO./PETITIONER: A97-722/Maui Electric Company, Ltd.

PARTY: OFFICE OF PLANNING (OP)

LIST OF WITNESSES

ORIGINAL

NAME/ORGANIZATION/POSITION (List in Order of Appearance)	TO BE QUALIFIED AS AN EXPERT IN:	SUBJECT MATTER	WRITTEN TESTIMONY (Yes or No)	EXHIBIT NUMBER(S)	LENGTH OF DIRECT
RICHARD H. EGGED, JR. Director Office of Planning AND/OR		OP Testimony	Yes	1	20 min.
ABE E. MITSUDA Division Head Land Use Division Office of Planning		OP Testimony	Yes	1	20 min.

Feb 3 10 01 AM '98
LAND USE COMMISSION
STATE OF HAWAII

DOCKET NO./PETITIONER: A97-722/Maui Electric Company, Ltd.

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LIST OF EXHIBITS

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EXHIBIT NUMBER	DESCRIPTION	PARTY: OBJECTIONS	ADMIT
1	Office of Planning Testimony		

FEB 3 10 01 AM '98
LAND USE COMMISSION
STATE OF HAWAII

BEFORE THE LAND USE COMMISSION
OF THE STATE OF HAWAII

ORIGINAL

In the Matter of the Petition of
MAUI ELECTRIC COMPANY, LTD.

DOCKET NO. A97-722

To Amend the Agricultural Land
Use District Boundary into the
Urban Land Use District for
Approximately 65.7 Acres of Land
at Wailuku and Makawao Districts,
Island of Maui, State of Hawaii,
Tax Map Key Numbers: 3-8-03: 23
and 3-8-03: 24

LAND USE COMMISSION
STATE OF HAWAII
1997 DEC -8 A 9:50

STATEMENT OF POSITION OF THE OFFICE OF PLANNING
IN SUPPORT OF THE PETITION

In accordance with Section 15-15-55 of the State Land Use Commission Rules, the Office of Planning (OP) recommends approval of the Petition by the Maui Electric Company (Petitioner), to reclassify approximately 65.7 acres of land in the Wailuku and Makawao Districts, Island of Maui, County of Maui, as identified by Tax Map Key Numbers 3-8-03: 23 and 3-8-03: 24, from the Agricultural to the Urban District.

The Petition and Petitioner's Final Environmental Impact Statement (FEIS), indicate that the Petitioner proposes to design, construct, and operate a 232-megawatt (MW) electrical generating station on 65.7 acres of land located at the intersection of Pulehu and Waiko Roads in Central Maui. Related 69-kilovolt (kV) transmission lines from the site to substations located at the Paia Sugar Mill and Puunene Sugar Mill, are also proposed as part of the project. Distribution lines (12 kV) may also lead from the proposed generating station to Puunene. Existing transmission lines and distribution baseyard and related support facilities, currently located in Kahului, may also be relocated to the new facility. The Petitioner proposes to develop the 232-megawatt (MW) electrical generating station in four 58-MW phases. Completion of the first 58-MW increment is planned for 2006. Site preparation for the subsequent phases will be performed during the initial Phase I construction.

Peak power demand on the island of Maui is forecasted to increase steadily over the next 20 years, and the Petitioner has concluded that there will be a shortfall by the year 2004. The Petitioner has determined that additional generation will be required through the year 2016. The proposed facilities in Central Maui are necessary to: maintain an adequate system margin-of-reserve generating capacity; increase overall system reliability; replace older generation facilities scheduled for retirement; and provide additional capacity to meet projected demand for service.

The Petition and the FEIS, both describe work for the proposed construction, and operation of the 232-MW electrical generating station. At full buildout, the major components required to operate a 232-MW electrical generating station will include: four diesel oil-fired 58-MW dual-train combined-cycle (DTCC) units; four 150-foot-tall stacks; four steam combustion turbines; four steam condensers; four control houses; a control room; fire protection system; supply wells; water treatment facility; wastewater treatment facility injection wells; water and air laboratory; maintenance shop; warehouse and storage areas; relay building; switch yard; fuel storage tanks; fuel storage tank berms; fuel unloading area; administration building; leach field; related 69-kV transmission line corridors; possible 12-kV distribution line corridors; possible gasoline storage area; possible transmission and distribution warehouse/offices; and possible transmission and distribution storage and parking area.

There will be nine fuel storage tanks which will be placed on impervious surfaces and within berms designed to contain any leakage or spills. Two of the tanks will be 50 feet in diameter and approximately 36 feet high. These tanks will each hold approximately 529,000 gallons of fuel. Seven tanks will be 80 feet in diameter and approximately 36 feet high. These tanks will each hold approximately 1.35 million gallons of fuel.

The Petition indicates that the site proposed for the Waena Generating Station encompasses lands owned in fee by Maui Electric Company Limited (MECO). The Petition area is currently leased to Hawaiian Commercial & Sugar Company (HC&S) for sugar cane cultivation.

According to the Petition and Exhibit No. 5, MECO has access to sufficient economic resources to develop the project as a subsidiary of a publicly traded company.

The Petition and Petitioner's FEIS identify the project area as the most appropriate location for the proposed Waena Generating Station. The proposed reclassification from the Agricultural District to the Urban District will allow the Petitioner the flexibility to meet existing demand without over building, and the opportunity to evaluate future improvements in technology should they become available.

The Office of Hawaiian Affairs (OHA) has serious concerns pertaining to the proposed land use reclassification. OHA believes the proposed land use amendment will drastically change the land use pattern in the area, and will result in the irreversible loss of 65.7 acres of prime agricultural land. The Department of Hawaiian Home Lands (DHHL) is concerned about the potential impacts on Hawaiian Home lands in the region, such as traffic and air emissions.

OP's position of support is based on our preliminary review of the petition and information received from Federal and State agencies to date. The U.S. Department of the Interior, Geological Survey, Water Resources Division had no comments to offer regarding the petition.

The U.S. Department of the Interior, National Park Service, stated that the air quality impact analysis correctly addresses the potential impact from the proposed Waena Generating Station.

The following State agencies had no comment regarding the proposed project's impact on their plans or programs: the State Department of Education, Hawaii Coastal Zone Management Program, and the Department of Accounting and General Services.

The Department of Transportation has commented that their transportation facilities can adequately accommodate the proposed project and therefore, they do not anticipate an adverse impact to their systems.

The Housing Finance and Development Corporation, and the Department of Health, provided comments indicating that the information contained in the FEIS, addressed the concerns raised by their Departments in response to the EIS preparation notice and Draft Environmental Statement.

The State Department of Agriculture does not object to the petitioner's request for reclassification, provided that MECO takes every reasonable effort to monitor and mitigate any

unanticipated adverse impact to the irrigation ditch and groundwater used by Hawaiian Commercial and Sugar Company (HC&S) for their sugar operations.

The Office of Environmental Quality Control (OEQC) found the FEIS for the proposed Waena Generating Station to be adequate under Chapter 343 Hawaii Revised Statutes (HRS), and Hawaii Administrative Rules (HAR), 11-200. The document meets prescribed content requirements and the applicant responded to all the comment letters. However, OEQC recommends that the Waena Generating Station be reviewed in light of other projects in the region and that cumulative impacts and comprehensive long-term planning issues be scrutinized.

The Commission on Water Resource Management (CWRM) is concerned about the potential for ground or surface water degradation/contamination.

The Department of Land and Natural Resources, State Historic Preservation Division, commented that the proposed Waena Generation Station will have "no effect" on significant historic sites. Aerial photographs taken in 1972 show that the entire area for the proposed generation station was formerly under sugar cane cultivation. Consequently, it is unlikely that significant historic sites are still present.

The Department of Business and Economic Development and Tourism, Energy, Resources and Technology Division, supports MECO's intent to provide facilities for expansion of its generating facilities.

The Department of Defense has no objections to the proposal, but since there is no siren coverage in the area, the Department recommends that a siren simulator be purchased and installed inside the facility.

OP does have concerns regarding the following areas of State concern: Impacts to air quality; surface and groundwater resources; impact on potable water; and point source pollution. This position statement does not attempt to address in detail all aspects, concerns or potential conditions regarding the subject petition. These and other considerations such as impacts to water resources and sugar operations will be addressed in OP's prepared testimony and recommended conditions before the Land Use Commission for Docket No. A97-722.

DATED at Honolulu, Hawaii, this 8th day of December, 1997.

OFFICE OF PLANNING
STATE OF HAWAII



RICHARD H. EGGED, JR.
Director of Planning

A97-722
CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing Position Statement was served upon the following by either hand delivery or depositing the same in the U. S. Postal Service:

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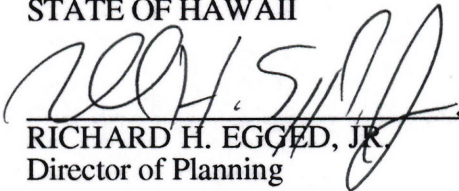
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DATED: Honolulu, Hawaii this 8th day of December, 1997.

OFFICE OF PLANNING
STATE OF HAWAII



RICHARD H. EGGED, JR.
Director of Planning

BEFORE THE LAND USE COMMISSION
OF THE STATE OF HAWAII

ORIGINAL

In the Matter of the Petition
of
Maui Electric Company, Ltd.

DOCKET NO. A97-722

To Amend the Agricultural Land Use
District Boundary into the Urban Land Use
District for Approximately 65.7 Acres of
Land at Wailuku and Makawao Districts,
Island of Maui, State of Hawaii, Tax Map
Key Nos: 3-8-03: 23 and 3-8-03: 24

LAND USE COMMISSION
STATE OF HAWAII
1998 FEB 11 P 2:31

TESTIMONY OF THE OFFICE OF PLANNING
IN SUPPORT OF THE PETITION

The Office of Planning (hereinafter referred to as "OP") recommends conditional approval of the Petition by the Maui Electric Company (Petitioner), to reclassify approximately 65.7 acres of land in the Wailuku and Makawao Districts, Island of Maui, County of Maui, as identified by Tax Map Key Numbers 3-8-03: 23 and 3-8-03: 24, from the Agricultural District to the Urban District.

OP's position for conditional approval is based on the following information and analysis of the petition.

GENERAL INFORMATION

Maui Electric Company, Limited, is the Petitioner whose business and mailing address is P.O. Box 398, Kahului, Maui, Hawaii, 96733-6898

The subject Petition was served upon the Office of Planning on November 1, 1997, by Mark R. Willey, Project Manager for CH₂MHill.

The Property encompasses lands owned in fee by Maui Electric Company, Limited, a subsidiary of Hawaiian Electric Company (HECO), which in turn is a wholly owned subsidiary of Hawaiian Electric Industries (HEI), a holding company with publicly traded stock. Maui Electric Company will develop the Property.

OP
EXHIBIT NO. 1

DESCRIPTION OF THE AREA

The Property is situated in the Wailuku and Makawao Districts, approximately 3 miles from Puunene and approximately 4 miles from Pukalani, located north of Waiko Road at its intersection with Pulehu Road, in Central Maui.

The Property, identified by TMKs 3-8-03:23 and TMK 3-8-03:24 encompasses two adjacent parcels totaling approximately 65.7 acres. Parcel 23, is the smaller of the two parcels with a total acreage of 15.127 acres. Parcel 24 encompasses approximately 50.573 acres.

The Property has eleven (11) easements. HC&S holds 4 easements within the Property for the maintenance and use of its irrigation ditch. Exhibits A and B of Petitioner's Exhibit No. 2, identifies and describes easements 1- 4 held by HC&S, and easements 5-11, granted to MECO for transmission line use.

The Property is currently leased to Hawaiian Commercial & Sugar Company (HC&S) for sugar cane cultivation. Exhibit C, of Petitioner's Exhibit 2, evidences the agreement between A&B-Hawaii, Inc., and MECO, regarding MECO's acquisition from A&B-Hawaii, Inc., of the Property and related transmission line easements for the Central Maui Power Plant project. According to the Letter of Agreement, MECO agreed to lease the Property to HC&S on a month-to-month basis at no rent for sugar cane cultivation, until the Property is required for development by MECO for utility purposes, or until December 31, 2004, whichever comes first, or if cultivation of crops on the premises is no longer permissible by law. According to the Petition, HC&S must use the Property solely for crop cultivation.

Elevations on the Property range from approximately 335 feet above mean sea level (MSL) on the western side nearer Puunene, to approximately 365 feet above MSL on the eastern side near the intersection of Waiko and Pulehu Roads. The Property has a gently sloping topography, with an average slope from the southeast to northwest across the site of about one degree.

The U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, identifies the soils within the Property as belonging to the Waiakoa Series, silty clay loam occurring on 3 to 7 percent slopes. Waiakoa

Series, silty clay loam is composed of generally stony soil, grading to hard bedrock within a depth of approximately 5 feet. Lava flows over the Property are a'a. Due to the undulating nature of the surface a'a flows, the depth of a'a bedrock will vary across the site and can range from 25 to 35 feet thick and consist of clinker zones above and below a massive, highly to moderately fractured a'a core. Runoff potential of this type soil is slow to medium and the erosion hazard is slight to medium.

Surface soils along the preferred and alternate transmission line corridors have been classified as the Molokai Series (M), Paia Series (Pc), Waialoa Series (W), Ewa Series (E), Iao Series (I), Alae Series (A), Pulehu Series (Ps), and Rockland (R). The Molokai and Paia soils evolved from weathered a'a lavas and volcanic ash. At the ground surface, they consist of silty clay loam, grading to saprolite then to soft, highly weathered rock at a depth of approximately six feet. The Ewa, Iao, Alae, and Pulehu Series consist of alluvial soils derived from the weathered a'a flows. The soils reach depths of greater than 5 feet, and range from loams to clays with varying amounts of sands, stones, and cobbles. The Alae soils also contain weathered volcanic ash.

The University of Hawaii Land Study Bureau's Detailed Land Classification rates the productivity rating of soils. Productivity ratings range from "A" lands which are very productive to "E" lands which are considered unproductive for cultivated agriculture. Petitioner's Exhibit 9 indicates that the Land Study Bureau Detailed Land Classification (productivity rating) for the Property is "A". A rating of "A" means that the condition of the soil is very good for agricultural operations.

The Property contains land classified as Prime Agricultural Land according to the Agricultural Lands of Importance to the State of Hawaii (ALISH) map.

According to the Flood Insurance Rate Map, the Property has been classified as Zone C, indicating areas that experience minimal flooding, and not considered to be in a flood plain area.

Surface water in the area is comprised of reservoirs, irrigation ditches and intermittent natural streams within Kalialinui Gulch and Pulehu Gulch. Surface water runoff generated from

the Property and adjacent areas is generally through a series of gulches extending from the upper slopes of Haleakala towards the central isthmus area. The Property is drained by Kalialinui Gulch, located a quarter mile to the north, and by Pulehu Gulch, located a mile to the south of the project site. The proposed Waena Generating Station will be located approximately 1,000 feet from Kalialinui Gulch and 5,000 feet from Pulehu Gulch.

Existing Adjacent Land Uses

Lands immediately surrounding the site are owned by Alexander & Baldwin-Hawaii, and are used for sugar cane cultivation. The County of Maui owns and maintains Pulehu Road, which runs adjacent to the Property. Across Pulehu Road from the site are the Central Maui Sanitary landfill, owned and operated by the County of Maui, and a quarry operated by Ameron HC&D. The quarry activities are located on lands owned by A & B-Hawaii. Both quarry and landfill operations have proposed expansions. The proposed expansion of the landfill will encompass approximately 60 acres, while the expansion of the quarry will encompass approximately 41 acres.

Other potential projects within the Central Maui isthmus include the expansion of Kahului Airport, a development of the Maui Economic Opportunity facility and the County of Maui bus maintenance facilities near the old Puunene Airport.

A request has also been made of the Maui County Council to designate approximately 50 acres near the intersection of Waiko Road and Mokulele Highway to light industrial use to recognize existing land uses and allow for expansion of the Mokulele Baseyard. The Department of Hawaiian Home Lands has indicated that they are acquiring land near the old Puunene Airport for future use.

Approximately 3 miles northwest of the Property is the community of Puunene, the nearest location of residential and commercial uses. Southwest of the Property is the community of Pukalani, approximately 4 miles away from the proposed Waena Generating Station.

Proposed Land Use Developments in Central Maui

According to the FEIS, planned projects near the proposed Waena Generating Station in Central Maui with the potential for development include the expansion of Kahului Airport,

development of the Maui Economic Opportunity facility, and the County of Maui bus maintenance facilities located near the old Puunene Airport. The Department of Hawaiian Home Lands has indicated they are acquiring land near the old Puunene Airport for future use. Further, Maui County has submitted a request to the Maui County Council to redesignate approximately 50 acres near the intersection of Waiko Road and Mokulele Highway to light industrial use, to be more compatible with existing land uses, and to allow expansion of the Mokulele Baseyard facility.

EXISTING POWER GENERATING CONDITIONS

Service Area

The Petitioner provides nearly all the electrical service to the residents and businesses of the County of Maui. The islands of Maui, Molokai, and Lanai, each have their own generation and transmission systems. On the Island of Maui, the Petitioner serves over 91,000 residents with approximately 43,000 metered accounts. Maui County is the fastest growing County in the State. The Petitioner is responding to this growth by planning for additional generation and transmission capacity. After careful and comprehensive evaluations of existing power generating resources, the Petitioner determined that even with demand-side-management programs, peak power demand on the Island of Maui would increase, and by 2004 there would be a shortfall in the system's reserve margin.

Existing Resources

The Petitioner presently owns and operates 22 generating units on Maui: 4 at Kahului and 18 at Maalaea. The Petitioner is currently adding two additional units at its Maalaea facility. After retirement of the existing unit and replacement with the completion of its second 58-MW expansion at Maalaea in 2001, the Petitioner's total firm capacity for the island of Maui will be 254 MW from MECO-owned plants

The Petitioner has two Purchase Power Agreements (PPAs) with Independent Power Producers (IPPs): the Hawaiian Commercial and Sugar Company (HC&S) and the Pioneer Mill Company. The PPA with HC&S is classified as firm capacity and commits the company to provide 16 Megawatts (MW) of firm capacity power through the end of 1999. The second PPA

with Pioneer Mill is classified as-available capacity. Through a Power Exchange and Stand-by Power Agreement with the Petitioner, Pioneer Mill Company will provide 8 MW of power to the Petitioner only when the mill is producing electricity in excess of its own needs.

PPAs cannot always be counted on to meet customer demands, or be included in the Petitioner's firm capacity. The power provided by HC&S is classified as firm capacity and is therefore included in the Petitioner's existing resource plan. However, in the event the PPA with HC&S is not renewed, the Petitioner has removed the 16 MW provided by HC&S from its resource plan beginning in 2000. Faced with a continual drop in bagasse supply, due to reductions in sugar cane production, Pioneer Mill Company has had problems meeting its agreement and cannot be counted on providing firm capacity power to the Petitioner. As a contingency against IPP project delays, the Petitioner pursues parallel planning for the installation of its own capacity.

Transmission, and Distribution Resources

As power is generated on Maui, transformers boost the voltage to either 23 kilovolts (kV) or 69 kV. The power is then transmitted through the 23-kV and 69-kV transmissions grids. When the power reaches the substations, the voltage is reduced from 69 kV and 23 kV to MECO's 12-kV and 4-kV. The power proceeds from the substations along streets and roads through overhead, or where necessary, underground distribution feeders, to small step-down distribution transformers. These transformers are located on poles or pads near the facilities they serve and are sized for the particular load and voltage required by the customer. The 69-kV system consists of approximately 96 miles of overhead lines, and the 23-kV system consists of approximately 137 circuit miles of overhead lines.

PETITIONER'S PROPOSED USE OF THE PROPERTY

The proposed reclassification will allow Petitioner to construct a new power generating facility in Central Maui which will: maintain an adequate system margin-of-reserve generating capacity; increase overall system reliability; replace older generation facilities scheduled for retirement; and provide additional capacity to meet projected demand for electric service. The Petition and Petitioner's Final Environmental Impact Statement (FEIS) (Petitioner's Exhibit No.

4), both describe work for the proposed construction and operation of the 232-megawatt (MW) electrical generating station. The Petitioner proposes to develop the 232-megawatt (MW) electrical generating station in four 58-MW phases.

Project Requirements

At full buildout, the major components required to operate a 232-megawatt (MW) electrical generating station will include:

- Four diesel oil-fired 58-MW dual-train combined-cycle (DTCC) units, exhausted to four two-flue 150-foot-tall stacks
- Four steam turbines
- Four steam condensers
- Four control houses
- A control room, including control equipment, offices, file room, kitchen, restrooms, showers, lockers, and meeting room.
- Fire protection system
- Supply wells
- Water treatment facility
- Injection wells
- Water and air laboratory
- Maintenance shop
- Warehouse and storage areas
- Relay building
- Switch yard
- Fuel storage tanks
- Fuel storage tank berms
- Fuel unloading area
- Administration building

- Leach field
- Related 69-kV transmission line corridors
- Possible 12-kV distribution line corridors
- Possible gasoline storage area
- Possible transmission and distribution warehouse offices
- Possible transmission and distribution storage and parking area

The simple-cycle combustion turbine (CT) consists of a compressor, a combustor, and a turbine coupled to a generator. With a simple-cycle, combustion-turbine configuration, heated exhaust gas is vented out through the stack.

Generating units are designed for and operated along three modes: baseload, cycling, and peaking. Baseload units are best suited for continuous operation, have higher efficiency, since they have one or more waste heat boilers to make use of the exhaust heat, and a steam turbine generator to make electricity from the exhaust gas. However, they also generally have higher capital costs. Cycling units are designed to be capable of withstanding the thermal and mechanical stresses of regular startups and shutdowns, as well as continual changes in output power requirements. Peaking units are relatively small generating units, and are normally operated daily, for approximately 3 to 4 hours to cover the daily peak.

The Petitioner's plans for the proposed Waena Generating Station calls for boosting the efficiency of a simple-cycle configuration by using a combined-cycle configuration which feeds the exhaust gas into a heat recovery steam generator (HRSG) which uses the waste heat to generate steam to power the turbine generator. These combined-cycle units are generally used to provide either baseload or cycling generation and consist of one or more combustion turbines (CTs), one or more waste heat boilers to make use of the exhaust heat, and a steam turbine generator to make electricity from the exhaust gas.

In each of the four phases described by the Petitioner, a dual train combined cycle (DTCC) unit would be added to the station. Each DTCC unit would consist of two 20 MW combustion

turbine (CT) generators fitted with two heat recovery steam generators (HRSGs) and one 18 MW steam turbine (ST) generator.

The first of two 20 MW combustion turbine (CT) generators complete with heat recovery steam generators, is planned to be installed at the Waena Generating Station in calendar year 2004. The second CT unit with heat recovery steam generators plus an 18 MW steam turbine (ST) generator will be added to the station in calendar year 2006 to complete Phase I installation of the first of three DTCC units. The three remaining DTCC units to be installed, each comprised of similar CT, HRSG, and ST modules, are planned to be added to the station in the calendar years 2010 (Phase II) and 2016 (Phase III), and beyond 2020 (Phase IV).

The existing Maalaea-Kealahou and Kanaha-Pukalani 69-kV transmission lines will be reconfigured through the proposed Waena Switchyard. As demand for more power increases, two new transmission lines from the Property will be constructed to connect with the Puunene and Paia Sugar Mill substations to support any growth in demand for additional electricity. Pending demand requirements, two proposed 12-kV distribution lines from the Property to the Puunene area may also be added to these corridors.

Fuel storage tanks will be placed on impervious surfaces which will be constructed within berms equipped with oil/water separators to remove oil before disposal, and specially designed to contain fuel leakage or spills. These containment areas will have the capacity to contain the entire contents of the storage tank within its area.

Fuel Requirements

The combustion turbines will be fueled by No. 2 diesel fuel, which will be transported by tanker trucks from Kahului Harbor. At full buildout, the operation of four DTCC units (eight combustion turbines) will require approximately 44 truckloads of No. 2 diesel fuel daily with deliveries averaging about 9,000 gallons of fuel. At full buildout, the daily supply (44 fuel trips) will be transported from Kahului Harbor in tanker trucks traveling along Hobron Avenue, Hana Highway, and Pulehu Road to the Property. The Petitioner estimates approximately 11 to 12 fuel

trips per day to the Property at the completion of Phase I of the proposed Waena Generating Station in 2006.

A 30-day supply of fuel would be kept at the generating station. Each new combustion turbine requires approximately 39,000 gallons of fuel per day. At full buildout, the operation of a 232-MW generating station using four DTCC units, and operating under continuous baseload conditions, will use approximately 312,000 gallons of fuel per day. The fuel will be stored in nine cylindrical steel tanks. All nine fuel tanks will be approximately 36 feet high. Two of the fuel tanks will be 50 feet in diameter, and will each hold approximately 529,000 gallons of fuel. The remaining tanks will be 80 feet in diameter, and will each hold approximately 1.35 million gallons of fuel.

An independent contractor will be responsible for all handling from the tanker into the bulk storage areas at the project site. The contractor, in compliance with all training requirements imposed by the DOH, will handle the delivery of fuel, acids, and caustic materials used in Plant operations.

The Petitioner examined the feasibility of delivering the No. 2 fuel to the site through a pipeline from Kahului harbor as an alternative to trucking. The 1997 Fuel Transport Study, prepared by Stone & Webster Engineering Corporation, was conducted to determine if a fuel oil pipeline to the Property would be economically feasible when compared to the cost of transporting fuel to the site by truck. The study indicated that at complete buildout, a lower cost Accumulated Present Worth Revenue Requirement (APWRR) is obtained for truck transport, than for any of the pipeline APWRR costs. Cost of transporting fuel via pipeline was estimated at over \$10 million more than trucking the fuel over the anticipated 28-year life expectancy of the pipeline.

PETITIONER'S FINANCIAL CAPABILITY TO UNDERTAKE THE PROPOSED DEVELOPMENT

The proposed Waena Generating Station project will be funded through the Petitioner's customer base and will not require expenditures by either the State of Hawaii, or the County of Maui. MECO can request the authority from the Public Utilities Commission (PUC) to make

expenditures for construction of the proposed generating station and recapture costs through the electricity rate paid by the Petitioner's Customers. Petitioner's Exhibit No. 5 evidences the Petitioner's financial condition and demonstrates that as a subsidiary of a publicly traded company, MECO has access to sufficient economic resources required to develop the project. MECO is also able to issue bonds and stock to finance the project. The monthly financial report for August 1997 provides information on the Petitioner's financial capability and shows MECO net income for the month of August 1997 was \$1,525,414, with an accumulated year to date net income of \$9,231,872.

In February 1996, the Petitioner submitted an Application and Certificate of Service to the Public Utilities Commission (PUC) requesting approval to commit funds in excess of \$500,000 for the acquisition of the site to support the construction of the proposed Waena Generating Station. The PUC found MECO's request for funds reasonable and in the public interest.

PROJECT COST

The Petitioner purchased the site in November 1996, at a cost of \$1,847,648.00. The estimated costs for construction of the initial Phase I are approximately \$105,370,000. Construction costs for the entire Waena Generation Station is estimated at approximately \$417,559,668. The Petitioner has estimated that the cost to rate payers will be an additional \$1.76 per kilowatt-hour for the first DTCC unit.

NEED FOR THE PROPOSED DEVELOPMENT

The requirement for new generation is based upon the need to maintain an adequately sized reserve margin. The Petition and FEIS identify the purpose of the proposed Waena Generating Station as a facility to: maintain an adequate system margin-of-reserve generating capacity; provide a system that meets the projected electrical demand; increase system reliability; replace older generation facilities scheduled for retirement; and provide dependable electrical service to its customers.

The need for additional generating capacity was identified by the Petitioner through the resource planning process which evaluated the following issues:

- existing and forecasted demand for energy and capacity;
- existing and forecasted fuel prices;
- impacts of Demand-Side Management (DSM) and conservation and energy efficiency programs on the demand for energy;
- existing firm capacity;
- maintenance and retirement schedules of generating units; and
- existing Purchase Power Agreements (PPAs) from independent power producers (IPPs).

According to the information provided in the Petitioner's FEIS, peak power demand by MECO's customers has increased an average of 5 percent per year between 1983 and 1996, from 95.4 MW to 174.8 MW. Although the Petitioner considers this growth rate to be above average and anticipates a slower growth rate in the future, peak power demand on the island of Maui is forecasted to increase steadily over the next 20 years, at approximately 2.6 percent per year. MECO has concluded that there will be a shortfall by the year 2004, and that additional generation will be required through the year 2016.

The Petitioner's total firm capacity for the island of Maui, after completion of its second 58-MW expansion at Maalaea in the year 2001 (254 MW from MECO owned plants), will enable the Petitioner to meet demand forecasted through 2003. After completion of the additional units at Maalaea, the plant will have expanded to its full land capacity. The Kahului plant is also built to land capacity. Replacing or repowering existing units at the Kahului and Maalaea Power Plant is not feasible due to the high costs involved.

The Petitioner's resource plan identifies the retirement of 17 older generating units producing a gross 112.64 MW of power. The Petitioner states in the FEIS that while the scheduled retirement of older generating equipment can be deferred for a short time to accommodate anticipated delays during the permitting process, this will neither ensure continued operation

reliability of those units, nor offset the identified need for additional units beginning in the year 2004.

Included in the Petitioner's resource plan is the expiration of the PPA with HC&S in 1999. Power produced by IPP is classified as either firm capacity, or as-available capacity. The Petitioner's resource planning can only evaluate producers of firm capacity. The power provided by HC&S is classified firm capacity. The firm power contract with HC&S expires at the end of 1999 and its renewal is uncertain. Beginning in 2000, the Petitioner has removed the 16 MW provided by HC&S from MECO's resource plan since the Petitioner needs to pursue parallel planning in event the PPA with HC&S is not renewed. It is not appropriate for the Petitioner to use IPPs as parallel path planning for MECO's units. IPPs do not have a legal obligation to serve the public and could relinquish their commitments. Also, even if the Petitioner continued the PPA with HC&S, the power provided through the agreement would not have been enough to offset the identified need for additional generation on Maui.

The power provided by Pioneer Mill is classified as-available capacity. The Petitioner cannot rely on this source of power since the power is available only when the mill is producing electricity in excess of its own needs. Therefore, as-available capacity power is not included in the Petitioner's resource plan. The Petitioner concluded that lack of specific commitment, power purchase agreements, or generation facility data do not allow for the inclusion of any IPP resource proposals into the resource plan at this time. Therefore the Petitioner has determined that IPPs cannot be looked upon to meet or replace the need for additional power beginning in the year 2004.

The proposed Waena Generating Station is designed to meet the increasing demand for electricity on the Island of Maui and to improve system reliability. Based upon the Petitioner's examination of MECO existing generation resources, resource planning, and planned addition of generation capacity over the next 20-30 years, the Waena Generation Station can accommodate changing public demands and allow for the flexibility of future designs and technologies.

In the Petitioner's Application and Certificate of Service submitted to the Public Utilities Commission, February 1996, the Petitioner requested approval to commit funds in excess of

\$500,000 to purchase the Property for the construction of the proposed Waena Generating Station. In its Decision and Order No. 14674, the PUC supported the Petitioner's conclusion that additional generation on the Island of Maui, will be required through 2016. The PUC found the Petitioner's request for funds reasonable and in the public interest. The Petitioner purchased the Property in November 1996.

ALTERNATIVE TECHNOLOGIES & FUELS

No Action Alternative

Under the No Action Alternative, the proposed generating station would not be built and the additional generating needs identified in the Petitioner's Resources Plan would not be met.

Alternative Technologies

The Petitioner evaluated several alternative energy sources which are in the developmental process, or currently in use in Hawaii. These alternative energies include: biomass conversion, geothermal, hydroelectric, solar, wind, ocean thermal energy, and coal. The Petitioner examined the feasibility of employing these alternatives, and determined that these technologies had not reached a stage in either their development, or commercial availability, to provide cost-efficient firm generating capacity for the Island of Maui. Brief summaries of the Petitioner's conclusion regarding the use of these alternatives follows.

Biomass Energy Conversion. A National Renewable Energy Laboratory study that included participants from the Pacific International Center for High Technology Research (PICHTR), the Petitioner, County of Maui, and the State of Hawaii, determined that biomass facilities would be too costly to pursue at this time. The State and PICHTR are currently participating in a biomass gasifier demonstration project at the Paia Sugar Mill. The Petitioner states in the FEIS that a stand alone, biomass generation facility of the firm capacity power required to produce 232-MW of electricity, would cost over \$870 million and would require over 60,000 acres of crop land for the production of fuel. By comparison, the proposed 232-MW Waena Generating facility will be constructed on 65.7 acres, and is estimated by the Petitioner to cost \$400 million.

Geothermal Energy. Although the State has made progress in alternative energy technologies, only geothermal currently has the potential to provide firm, reliable electricity. The southwest rift subzone of Haleakala has been designated as the site for potential geothermal development. However, Maui County has not developed rules and regulations to govern development of and commercial use of this resource. Further, the development of the geothermal resource on the Island of Hawaii has raised religious objections and concerns about noise and sulfuric acid emissions, adding to the impracticality and feasibility of considering geothermal energy as an alternative energy resource.

Hydroelectric Energy. Stream flow in many of Hawaii's stream is variable, therefore any energy produced in this manner would not be considered part of the Petitioner's firm power resources. Proposed development projects have looked at the possibilities for using hydroelectric power. For all the streams examined as potential sites for the development of hydroelectric power, the total power production was estimated at less than 10 MW. Further stream water use would require the construction of diversion dams.

Solar Energy. There are no large-scale, commercial, solar-powered electric generating facilities in the State of Hawaii. The State of Hawaii conducted an assessment of solar electric generating systems for Hawaii (DBEDT, 1992). The study found that Hawaii's amount of direct sunlight was lower than expected, and the costs were too high to make the use of solar power cost effective. The cost of a photovoltaic system is estimated at \$8 to \$10 million per MW of power. Further, the installation of photovoltaic system would require 1,400 to 1,600 acres of land to produce 232 MW of power, and the high dust and salt content of the air within the Central Maui Region make development of a photovoltaic system impractical.

Wind Energy. In 1984, the Petitioner installed a 340 kW Windane machine at its Maalaea facility. After a series of technical problems, the unit was suspended. A long-range energy plan for the island of Maui, developed as part of the Petitioner's Integrated Resource Plan (IRP) process, considered not only traditional supply-side resources, but also customer (demand-side) resources. The Petitioner fully evaluated the alternative of a 10 MW wind farm in the Central Maui

region near Maalaea. Its cost was estimated at \$13.3 million dollars. The installation of midsize wind turbines (250 to 600 kW and larger) cost \$1,050 and \$1,280 per kW. Factors which include high costs, dependence on adequate wind speeds, large land requirements, system limitations, and the impacts from visual intrusions, noise, bird kills, interference to local telephone communications, and television reception, make development of wind energy conversion systems impractical.

Ocean Thermal Energy Conversion (OTEC). The Natural Energy Laboratory of Hawaii Authority (NELHA) off Keahole Point on the Island of Hawaii, operates open-cycle and a closed-cycle OTEC demonstration projects. The open-cycle plant produces approximately 210 kW of gross power. The closed-cycle plant produces 50 kW, but has had problems with ammonia leakage in the flat-plate aluminum heat exchangers. The capital costs of constructing a 50-MW land based OTEC facility have been estimated at over \$300 million. Economic costs and technical constraints on the construction of large scale OTEC facilities, including needed improvements in the design and construction of larger seawater pipes and turbines, do not make OTEC a feasible alternative.

Coal. The use of coal-based technologies including pulverized coal, atmospheric fluidized bed combustion, and coal gasification, received extensive evaluation during the Petitioner's preparation and development of its IRP. Pressurized fluid bed combustion and coal gasification were eliminated because these technologies are still being developed and are not available for commercial installation. The operation of a 232-MW pulverized coal powered plant would require a daily delivery of over 2,500 tons of coal and 70 tons of lime. A facility using atmospheric fluidized bed combustion technology would require slightly more coal--approximately 2,700 tons per day. In order to accommodate delivery by barges, the Petitioner would need to create dock-site facilities that would include a truck loadout station, plant site coal handling facilities to include a truck unloading station and storage areas to accommodate a 15-day supply, and an offsite area to store an additional 20 day supply. The cost was estimated at over \$950 million. These technologies were not considered economically feasible alternatives to power the generating

facility. The Petitioner states that because of the phased installation of the four 58-MW DTCC units and the potential of these units to utilize fuel made from coal gasification, the Petitioner could change to a coal gasification technology should it become more economically and technically feasible

Fuel Cells. This technology produces energy by creating a reaction within an electrolyte substance which uses a combination of heat and a chemical agent. Demonstration projects using phosphoric acid as the electrolyte and natural gas as the fuel, are operating in Japan. A phosphoric acid fuel plant constructed to produce 11-MW of power would require approximately one acre of land and have a capital cost of between \$28 and \$34 million. A 200-kW phosphoric acid fuel cell plant would require approximately 1,200 square feet with a capital cost of approximately \$1 million. However, this technology is still in the research stage, and applications within the U.S. are still limited.

Alternative Fuels

The combustion turbines will be fueled by No. 2 diesel fuel. The Petitioner, through its IRP process, also examined the feasibility of using alternative fuels other than diesel and coal for use with their conventional generation resources.

Landfill Gas and Digester Gas. Landfills containing municipal solid waste can be managed to generate landfill gas as the waste decomposes. Landfill gas has been used in small operations on Oahu by Ameron HC&D, Inc., to help power quarry activities at the Kapaa Landfill. Although the Property is close to the Central Maui Landfill, it does not have the potential to be used as a source of landfill or digester gas. This is because Maui's landfills lack sufficient size to produce a reliable source of digester gas for use within the Petitioner's generation system. The tapping and potential use of landfill gas from the Central Maui Landfill is more suited for smaller operations such as the adjacent Ameron HC&D Quarry.

Propane. The emissions from burning propane are less than emissions when firing diesel fuel. Propane is produced when crude oil is refined and then must be processed more to remove hydrogen sulfide, methyl and ethyl mercaptans, and elemental sulfur. Propane is also collected in

natural gas processing plants. The cost of propane is nearly three times higher than the cost of conventional fuel, and the high cost does not make it a feasible alternative to diesel fuel.

Ethanol. Ethanol, also referred to as ethyl alcohol or grain alcohol, is made from the fermentation of food crops, including sugar cane, beets, corn, wheat, and potatoes. It is generally more expensive than conventional fuels, twice the cost of gasoline, and large quantities are unavailable in Hawaii. For these reasons, the Petitioner did not consider ethanol a feasible alternative fuel for utility power production.

Methanol. Methanol, also referred to as methyl alcohol or wood alcohol, is made from a variety of carbon, including coal and biomass. Coal and biomass are elements which could be used to create methanol on Maui. However, because the burn efficiency is only half that of conventional fuels, the Petitioner would require larger amounts of methanol and more storage space. It is also highly corrosive.

Orimulsion. Orimulsion is an asphalt emulsion produced by Bituminous Orinco SA of Venezuela. When burned, orimulsion produces excessive amounts of sulfur dioxide and particulate matter emissions due to a high sulfur and ash content. The excess sulfur can be separated out when orimulsion is used as a feedstock for coal gasification, producing better thermal efficiencies and high yields than normal gasification of coal/water slurries.

Coal Slurries. Coal Slurries are produced by mixing ground coal with water or oil and an additive to keep the coal in suspension. This process reduces the costs and enables slurries to be handled as easily as a liquid fuel. However, the use of this fuel type in power plants has been limited because existing plants would have to be modified significantly. Coal slurries are less efficient thermally than conventional fuels and capacity reductions of between 20 to 60 percent result from the conversion of existing units to burn coal slurry. To produce the equivalent amount of power as in conventional fuel fired generators, units and boilers would need to be sized differently. This offsets the small differential in price between it and conventional fuels.

Municipal Solid Waste. Waste-to-energy plants are designed primarily for waste reduction, and typically must compete for materials with other government-sponsored programs such as

recycling and composting. A continuous supply at the required levels to meet existing and increased demand would be uncertain. The Petitioner's resource planning can only evaluate producers of firm capacity power, therefore such plants cannot be dispatched to meet load demand.

Naphtha. Naphtha is a light fraction fuel produced through the refinement of crude oil. Data from the Department of Business Economic Development and Tourism for the period of 1991 to 1995 indicate a total average production of 3,000 to 6,000 barrels per day (bpd) of naphtha. The proposed Waena Generating Station would require 10,800 bpd of naphtha. Current naphtha production in Hawaii is insufficient to power the proposed generating station and additional supplies would have to be shipped from refineries outside of Hawaii. Further, storage requirements for naphtha are greater than those for diesel and existing barges used for the Petitioner's interisland transport are unable to accommodate naphtha.

The cost of diesel fuel has remained fairly constant over the past few years at \$0.55 per gallon. Because of naphtha's high demand in the chemical industry, the price of naphtha has ranged from a low of \$125 per ton to a high of \$365 per ton, or \$0.34 to \$1.00 per gallon.

Naphtha has a low capacity to lubricate, which can cause additional wear and tear on the generating equipment. Corrective additives are not an economically viable solution when equipment is operated under continuous baseload conditions.

Naphtha is a low flash point fuel that will vaporize and ignite at low air pressures and has a tendency to be highly volatile. Provisions to prevent the buildup of vapors in valves and fuel nozzles would require additional operational requirements. Because Naphtha is very sensitive to temperature, its use in a generating plant would require additional equipment to ensure that fuel and piping temperatures are maintained at 68°F and 140°F. The fuel may thicken below 68°F and flash above 140°F.

The National Fire Protection Agency (NFPA) has given naphtha a more severe hazard classification for health and flammability than diesel fuel.

Naphtha vapors are heavier than air and require a special ventilation system to remove them to a safe area for disposal. The system must ensure against leakage from hazardous areas into non-

hazardous areas. Some applications may require the use of hydrocarbon detectors in the hazardous and non-hazardous areas and the vent lines.

The Petitioner has concluded that the lack of availability of naphtha to generate 232 MW of power production on Maui over the life of the project, the safety and design concerns, and the lack of existing storage and handling facilities at the harbor to accommodate the fuel do not make it a technically or economically feasible alternative to diesel fuel at this time.

A-21. A-21, a fuel made primarily of naphtha and water, has not been demonstrated in a combustion turbine. The same considerations revolving around availability, costs, safety and design, storage and handling, described for naphtha, also apply to A-21, since it is basically watered down naphtha. Also, because it is naphtha in a diluted form, larger quantities would be needed in order to obtain the same heat input to the combustion turbines.

SITE SELECTION

To determine the optimal location for the proposed Waena Generating Station, several siting studies and site assessments were conducted between 1989 and 1995. The first island-wide study, Site Selection Study, Maui Electric Company, Ltd. (Stone &, 1989), assessed ten candidate sites and identified three viable sites out of the ten, for future generation expansion. These three were the Kahului Power Plant, Puunene Sugar Mill, and the Maalaea Power Plant.

The second study, Candidate Sites Report and Preferred Alternative Site/Technology Report (Black & Veatch, 1991), screened the island of Maui for areas suitable for power plant development, and identified the Central Maui isthmus as the most appropriate location for a new, stand-alone electrical generation facility. The assessment was based on compatible land uses, topographic slope, suitable land area, water availability, air shed availability, fuels, logistics, transmission line integration, land permeability, community acceptance, socioeconomic, and archaeology considerations. The Ameron Quarry, Puunene Airport, and Maalaea sites were identified as feasible locations for a power plant. After evaluating these sites with several technologies (atmospheric fluidized bed combustion (coal), coal gasification, and combined-cycle combustion turbines), and an evaluation of 20 technical and environmental criteria, the report

concluded that a combined-cycle combustion turbine arrangement at the quarry site would be most suitable for the future power generation station with the Puunene Airport site as an alternate.

When the Petitioner further evaluated the quarry and Puunene Airport sites, the owner for both sites, Alexander & Baldwin-Hawaii, raised concerns which resulted in the identification of an alternate site approximately two miles southeast of Puunene Airport. This site was previously identified in the Candidate Sites Report and Preferred Alternative Site/Technology Report, completed in 1991. An Environmental Assessment (Belt Collins, 1992) concluded that the site, identified as site C-3, was a viable candidate for further consideration as a potential site for a Maui baseload generating station.

Further site evaluations found site C-3 to be an acceptable location based on evaluations of several issues including those related to hazardous materials and groundwater issues. An air quality analyses study (Trinity Consultants, 1993) found the Central Maui area an acceptable location for a large baseload generating station. The air quality study also identified areas within the isthmus by the level of difficulty ascertained in obtaining air quality permits. Areas north of the quarry were discovered to have the highest level of difficulty.

The Central Maui Siting Study (Belt Collins, 1994) identified ten 50-acre candidate sites for evaluation. The identification of these sites was based on environmental and technical factors such as air quality impacts, site soils, agricultural potential, visibility, and fuel transportation requirements. Six of the ten sites were selected as “finalists” sites and analyzed further. The remaining four were rejected because they were either inferior, or so similar to one of the six that individual analyses would not have been meaningful.

Three sites identified on Figure 3-5 in the FEIS as Site A-1, A-2, and D-1, ranked highest among the six “finalist sites and were recommended for further analyses. After further evaluations and discussions with the Department of Health, the Petitioner identified the region surrounding Sites A-1, A-2, and D-1 as primary areas of interest. The Central Maui Siting Study Air Quality Analysis by Trinity Consultants identified Site D-1 as having the best air quality.

The Central Maui Siting Study (Dames and Moore, 1995) evaluated Sites A-1, A-2, and D-1 against several environmental factors, including: air quality; topography; soils; ground and surface water; aesthetics; noise; traffic; cultural resources; hazardous materials; botany; engineering considerations; and natural hazards. As a result of the analyses, baseline studies conducted on each site, including the air quality screening analysis (Air Quality Screening Analysis for the Central Maui Generation Project) conducted by Jim Clary and Associates, and reports that outlined anticipated impacts of a 232-MW baseload generating station located on each of the three sites, Site A-2 was identified as the most preferred of the three candidate sites. The air quality screening analysis determined site A-2 to be the best site, and the only site that would not require reductions in the existing emission inventory in order to attain compliance with the air quality standards.

The MECO Generation Study, Central Maui (Stone and Webster, 1995) conducted a final site evaluation of Sites A-1, A-2, and D-1. The evaluation was based upon more technical issues including but not limited to: constructability; modeled impacts to air quality; proximity to wells, need for infrastructure improvements to adjacent roadways; overall project schedule; and costs. Site A-1 was eliminated from further consideration because Sites A-1 and A-2 were in the same air quality area and Site A-2 ranked higher. Site D-1 was retained as a final candidate, because although it was found to be the least environmentally desirable site in the Pulehu area, it had been found to have the best air quality in previous analyses (Trinity Consultants, 1993). Site C-3 was included as one of the final sites since it was not being used for sugar cane, and the owner said it was available.

Air quality constituted one of the more important environmental screening factors in the site selection process. The Stone and Webster study utilized air quality modeling data, predicted air emissions, national ambient air quality standards, and the Federal Prevention of Significant Deterioration (PSD) increment limits, to screen the candidate sites. As the result of this site analysis, Site A-2 was considered the preferred site for the proposed Waena Generating Station. Of the three sites under consideration, Site A-2 had the least impact on: air quality; biological resources; area traffic and transportation; and infrastructure costs. Other factors were also

considered by the Petitioner in the site selection process for the proposed generation facility, including the compatibility of the proposed use of the site with the quarry, landfill, and the surrounding agricultural uses; its distance from more sensitive urban uses; and its centralized location within the Petitioner's existing generation and transmission systems.

STATE AND COUNTY PLANS AND PROGRAMS

State Plan Objectives and Policies for Facility Systems--in General:

The proposed Waena Generating Station is designed to meet the increasing demand for electricity on the Island of Maui and to improve system reliability. Due to the incremental nature of its construction, the Waena Generation Station can accommodate changing public demands and allow for the flexibility of future designs and technologies. A 58-MW, dual-train combined-cycle unit is economical in terms of both initial and long-term costs. Sec. 226-14(a) and (b)

State Plan Objectives and Policies for Facility Systems

Energy/Telecommunications:

The proposed Waena Generating Station will provide a system that meets the projected electrical demand, increases system reliability, and provides dependable electrical service to its customer. Sec. 226-18 (a) (1) and (b)

After examining the alternatives (including coal, non-firm renewable energy sources such as wind or hydro power, increased emphasis on DSM programs, and IPP proposals), the Petitioner has determined that the proposed Waena Generating Station is the only reasonable way to meet its PUC obligations of providing high-quality, reliable service at the least cost to the customer with the necessary time frame. Sec. 226-18 (c) (1) (2)

Resource limitations and environmental, public health, and safety concerns were considered in selecting the site and appropriate technology for the Generating facility. A comparison of costs and benefits for both alternative fuels and alternative technologies was performed. Currently, alternative fuels and technologies do not represent the least-cost energy supply option or the maximum efficient technology. Sec. 226-18 (c) (3)

Through the Integrated Resource Plan (IRP) process, the Petitioner has developed a long-range energy plan for the Island of Maui by considering not only the traditional supply-side resources but also the customer (demand-side) resources that are available. Sec. 226-18 (c) (4) A

The Petitioner is cooperating with the Pacific International Center for High Technology Research, the County of Maui, and the State of Hawaii, in examining biomass to electricity applications for Hawaii. Sec. 226-18 (c) (4) B

The Petitioner has contributed to and constructed facilities for alternative and renewable energy resources, such as wind and hydroelectric power. The Petitioner also has power purchase contracts with independent power producers. These power purchase contracts are based on alternative and renewable technologies and include sugar cane bagasse and biomass-fueled steam turbine generators. Sec. 226-18 (c) (4) C

A comparison of costs and benefits for both alternative fuels and alternative technologies was performed during the development of the Petitioner's Integrated Resource Plan. Alternative fuels and technologies do not represent the least cost energy supply option or the maximum efficient technology. The use of diesel-fueled dual-train combined-cycle units currently are justified over alternative fuels and technologies, while other renewable energy projects are being developed. Sec. 226-18 (c) (5)

Demand-Side Management (DSM) programs, which are a component of the Integrated Resource Plan (IRP), were designed to influence customer consumption of electricity in a manner that will produce changes in the utility's demand. The Petitioner formed four DSM resource programs based upon the common end-uses and market segments that they address. These programs include the: Commercial and Industrial Energy Efficiency Program; Commercial and Industrial Customized Rebate Program; Commercial and Industrial New Construction Program; Residential Efficient Water Heating Program. Potential programs include conservation, energy efficiency, load management, and fuel substitution. Sec. 226-18 (c) (6)

The Petitioner continues its program of installing small photovoltaic systems on public schools through their Sun Power for Schools project. Sec. 226-18 (c) (7)

The Property is currently designated as "Interim" under Maui County's Zoning Code. Use of the Property for the proposed generating Station project will require a change in the current County zoning classification from "Interim" to "Heavy Industrial." An "M-2 Heavy Industrial District" as defined under Chapter 19.26, Maui County Code, allows for uses which "may be obnoxious or offensive by reason of emission of odor, dust, smoke, gas, noise, vibration and the like and not allowed in any other district."

The Wailuku-Kahului Community Plan designation for the Property is "Agricultural." The proposal to construct and operate a generating facility will require a change in the existing Community Plan designation to "Heavy Industrial." The four-phased planned construction and operation of the proposed Waena Generating Station will be a compatible use with existing and planned uses in the vicinity. These other industrial uses include the Central Maui Sanitary landfill, which will be expanded to approximately 60 acres, and Ameron HC&D quarry operations which will be expanded by approximately 41 acres.

IMPACTS UPON THE RESOURCES OF THE AREA

Groundwater

The site for the proposed Waena Generating Station is located in the Paia Aquifer System, one of four aquifer systems within the Central Maui Hydrologic Sector of the Central Maui isthmus. Rainfall in Central Maui averages approximately 28 inches per year, over an area of approximately 200 square miles. Due to dry and windy conditions, only a small percentage of rain infiltrates deep enough to become groundwater recharge. The Property is located in a dry area with the median rainfall amounting to 17 inches a year.

The lands surrounding the Property are irrigated with surface waters collected from various streams on the windward lobes of East Maui by an elaborate irrigation ditch system operated by HC&S. Water from this system is distributed throughout the Paia Aquifer System by the Haiku, Lowrie, Kauhikoa, and Hamakua Ditches. The system extends 4 miles inland, 1 mile seaward, and more than 2 miles on either side of the project site.

The Paia Aquifer System covers an area of 61 square miles and has a sustainable yield of less than 8 million gallons per day (mgd). The groundwater in the Paia Aquifer consists of less dense fresh-to-brackish basal water, floating upon dense salt water. Significant amounts of water recharge around the Property results from excess sugar cane irrigation in the area. The sustainable yield of 8 mgd represents only natural recharge from rainfall, and does not include the large amounts of artificial recharge resulting from drip irrigation of the surrounding sugar cane fields.

Groundwater with chloride levels higher than 250 milligrams per liter (mg/l) is classified as nonpotable. The basal groundwater throughout the central isthmus generally contains a chloride levels higher than 250 mg/l and is classified as nonpotable. Certain areas, such as near the Property, contain significantly lower chloride levels because the irrigation ditch system contributes to a significant amount of artificial recharge in the area which dilutes the chloride and significantly lowers the chloride content of the groundwater. The ditch system distributes approximately 164 mgd of surface water, and contributes a significant but undetermined amount of fresh irrigation water recharge in the area, resulting in lower chloride levels. However, this artificial recharge from excess irrigation is undependable and subject to contamination. Therefore, the artificially recharged groundwater is still considered non-potable.

The Department of Land and Natural Resources, Commission on Water Resource Management (CWRM) provided the following comments:

“The CWRM is currently in the process of assessing recharge from irrigation and other sources and assessing the effect on the net sustainable yield. Furthermore, while estimates of drawdown and water quality appear to be reasonable, these issues will be further addressed, and possibly validated via pump tests during the well construction and pump installation permitting phase.” The CWRM further commented that a Well Construction Permit and a Pump Installation Permit would be required before ground water is developed as source of supply for the generating station.

The project site is underlain by a thin cover of topsoil lying on top of andesitic lava flows of the Kula volcanic series, which in turn overlie much older basaltic lava flows of the Honomanu volcanic series. These series erupted from Haleakala East Maui Volcano.

Subsurface conditions along the preferred, and alternative line corridors are anticipated to generally consist of clays and clayey silts underlain by hard andesitic bedrock. The corridor along most of Pulehu Road extends across the youngest lava a'a flows in the study area and hard bedrock is anticipated to be present within about 3 feet below the existing ground surface. The remainder of the corridors cross over soils consisting of alluvium derived from surrounding a'a flows and weathered volcanic ash. Hard bedrock is anticipated to be present at depths greater than 5 to 6 feet below the existing ground surface.

Due to the Property's gently sloping topography, and the varying depths of the bedrock some grading and rock excavation will be necessary. The FEIS cites several methods by which rock excavation can be accomplished. These include using large bulldozers with rippers, hydraulic rock breakers, drilling and blasting. The use of an appropriate method will depend on factors such as rock hardness, strength, degree of weathering and fracturing, and fracture orientation and spacing.

Groundwater in the project area is developed from a dozen or more wells and shafts. Most of the water is used for sugar cane irrigation, with small amounts used for landscape irrigation and industrial purposes. The Property is surrounded by five large capacity wells within a 3-mile radius. These wells produce 80.6 mgd of nonpotable water for irrigation. Other wells within the 3-mile radius include 3 monitor wells in the Central Maui landfill. These wells provided data on groundwater quality expected on the Property

The wells nearest the Property are used for monitoring purposes only and are located a half mile north in the existing Central Maui Landfill. The nearest producing well is HC&S' Puunene Pump 6 located 1.5 miles downslope of the Property and has a chloride content reported a between 335 to 490 mg/l.

There are no existing municipal wells near the property, or elsewhere in the Central Hydrologic Sector.

Water Use for the Project

Four wells are proposed to provide the nonpotable water needs for the generating plant. One well will be required for each of the four DTCC units planned and consequently their construction will be phased along with the proposed installation of each DTCC unit (2006, 2010, 2014 and 2017 or later). The hydrogeologic survey prepared by Water Resources Associates in May 1997, concluded that the proposed development of 0.88 mgd of nonpotable water required for the Waena Generating Station at full buildout will not have any adverse impact on the basal groundwater aquifer. The estimated water use for one DTCC unit is approximately 220,000 gallons per day (gpd). The projected average daily water requirements for the four DTCC units proposed for the Waena Generating Plant would be 880,000 gpd. Two separate 240,000-gallon storage tanks will be constructed to meet Maui County Water Systems Standards for a fire flow requirement of 2,000 gallons per minute (gpm) for 2 hours.

The four brackish groundwater supply wells with pump capacities of 225 gpm will be developed on the Property to meet water requirements for operation of the CTs and related facilities.

The Department of Land and Natural Resources, Commission on Water Resource Management (CWRM) indicated that a well Construction Permit and a Pump Installation Permit from the CWRM would be required before groundwater is developed as a source of water supply for the project. The Department further recommended coordination with the County to incorporate the project into the County's Water Use and Development Plan.

Surface Water

Surface water in the area is comprised of intermittent natural streams within Kalialinui and Pulehu gulches, reservoirs, and irrigation ditches. The reservoirs and ditches are owned and operated by HC&S only for the impoundment and transport of irrigation water. An irrigation ditch runs through the Property. The Property is approximately 1,000 feet from Kalialinui Gulch and

5,000 feet from Pulehu Gulch. Both gulches are normally dry and flow only during storm runoff conditions. and the streambeds are heavily vegetated.

The development of the proposed Waena Generating Station will remove 65.7 acres from sugar cane cultivation. Fifteen acres will remain in open space reserved for easements and approximately 50 acres will be developed. Stormwater over the developed 50 acres will increase from 34 cfs to 204 cfs. Based on the conceptual design for the proposed generating plant, stormwater runoff would increase from approximately 45.5 cubic feet per second (cfs) to approximately 215.4 cfs.

The Hawaiian Commercial & Sugar Company provided the following comments:

“In addition to implementation of Best Management Practices (BMPs) to prevent runoff into the ditch, any storm water discharges during construction activities at the site will require coverage under and compliance with the State’s General Permit for Discharge of Storm Water Associated with Construction Activity, or an individual discharge permit.”

Wastewater

Development of the 232-MW generating station will generate an average of 440,000 to 480,000 gallons of wastewater per day and will be disposed of by means of injection wells. The principal source of wastewater will be from a process designed to produce relatively pure water from brackish groundwater. The treatment, identified as reverse osmosis, will produce a concentrated solution of salts and minerals. The treated water will be used for nitrogen oxide control and steam generation

Another source of wastewater will be from the backwashing of cation and anion resin beds used to remove minerals from process water. The wastewater from backwashing will contain mineral removed from the water, acid and caustic solutions used for neutralization, and traces of the resin chemicals.

The Department of Health has the following comments regarding wastewater.

“A National Pollutant Discharge Elimination System (NPDES) general permit is required for the following discharges to waters of the State:

- a. Storm water discharges relating to construction activities, such as clearing, grading, and excavation, for projects equal to or greater than five acres;
- b. Storm water discharge from industrial activities;
- c. Construction dewatering activities
- d. Noncontact cooling water discharge less than one million gallons per day;
- e. treated groundwater from underground storage tank remedial activities; and
- f. Hydrotesting water

Any person requesting to be covered by an NPDES general permit for any of the above activities should file a Notice of Intent with the Department's Clean Water Branch at least 30 days prior to commencement of any discharge to waters of the State.

After construction of the proposed facility is completed, an NPDES individual permit will be required if the operation of the facility involves any wastewater discharge into State waters."

The Department of Agriculture provided comments supporting the proposed reclassification of land use from Agriculture to Urban, but had the following concerns relating to the potential impacts from surface runoff and wastewater injection on surrounding sugar cane operations:

"Since groundwater downslope of the generating station is used by HC&S for irrigation and cooling water for their power plant, we believe that the petitioner should take every reasonable effort to monitor and, if necessary mitigate any unanticipated adverse impact to this water source attributable to power plant wastewater injection."

The Department of Land and Natural Resources, Commission on Water Resource Management (CWRM), provided the following comments:

"We are concerned about the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality. A Well Construction Permit and a Pump Installation Permit

from the CWRM would be required before ground water is developed as a source of supply for the project.”

Water Quality

According to the information provided in the FEIS, nonpotable water needs for the proposed Waena Generating Station can be met by drilling and developing wells on site without impacting basal ground water quality. A net loss of 0.15 mgd of irrigation recharge to the aquifer would result from the withdrawal of 65.7 acres of land from active sugarcane cultivation. Half of the groundwater withdrawn (0.44 mgd) will be returned to the aquifer by means of injection wells, and according to a letter dated November 3, 1997, from the Petitioner to OP, would represent a net loss of approximately 0.6 mgd from the underlying aquifer. The disposal of wastewater from the generating station is not expected to have any hydrologic impact on existing wells or the basal aquifer because the Property lies makai of the Department of Health's Underground Injection Control (UIC) line. Any potential impact from the use of injection wells will be mitigated by appropriate well design and testing. Further, the injection wells will be constructed and operated in full compliance with DOH UIC regulations. According to the information provided in the Petitioner's Groundwater Resource Assessment, the disposal of 0.44 mgd of wastewater will not negatively impact the aquifer for the following reasons:

- The rate of the wastewater injection is extremely small when compared to the rate of groundwater movement indicated by the large withdrawals of groundwater in the area;
- The quality of the wastewater is estimated to be similar to the existing groundwater quality; and
- The wastewater plume will be diluted by mixing and diffusion and is not expected to be detectable at any existing well or coastal area as the plume becomes dispersed and diluted to ambient groundwater quality.

According to the FEIS, the variation in groundwater quality downgrade of the site is not precisely known, but groundwater quality generally becomes more brackish in a northwesterly

direction toward the coast. Data obtained from three monitor wells located in the Central Maui Landfill, indicates the basal aquifer underlying the Property is approximately 4.8 feet and has a chloride content of 192 to 216 mg/l. Although the chloride content is lower than the benchmark of 250 mg/l, for potable water, the aquifer is not a potential source of drinking water because it contains recharge from excess irrigation and is subject to contamination.

HC&S provided the following comments regarding potential impacts of the proposed project on water quality. "Since HC&S has irrigation wells down slope of the power plant., we are concerned about the effect on existing ground water quality due to the wastewater injection wells and concerned about the potential impact the MECO wells could have on the yields on HC&S' existing wells."

The Department of Agriculture provided the following comments regarding the impact of the proposed Waena Generating Station on ground water quality: "...we believe that the Petitioner should take every reasonable effort to monitor and, if necessary, mitigate any unanticipated adverse impact to this water source attributable to power plant wastewater injection."

The Department of Land and Natural Resources, Commission on Water Resource Management (CWRM), stated the following concerns:

"We are concerned about the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality."

The Petitioner's Groundwater Resource Assessment recommended that an on-site test well should be drilled to provide more detailed information on aquifer parameters and potential impacts.

Agricultural Resources

The Agricultural Lands of Importance to the State of Hawaii (ALISH) system classifies lands as Prime, Unique, and Other Important Agricultural Lands. The remaining lands are Unclassified. The Property is listed as Prime Agricultural Land according to the ALISH map.

Soils within the Property are classified as coral outcrop by the U.S. Department of Agriculture (USDA) Soil Conservation Service as coral outcrop. Coral outcrop is unsuitable for cultivating crops. The University of Hawaii Land Study Bureau's Detailed Land Classification system rates lands on a scale of A to E, reflecting land productivity characteristics. The University of Hawaii Land Study Bureau's Detailed Land Classification (productivity rating) for the Property is "A" on a scale of A to E.

The proposed reclassification from the Agricultural District to the Urban District will remove approximately 65.7 Acres of Prime Agricultural land from sugar cane cultivation. According to the Petitioner's FEIS, Maui County has approximately 360,000 acres of land classified as farmland. Of this acreage, approximately 89,000 acres of land are considered cropland, of which 36,500 acres are cultivated by HC&S and 11,000 are cultivated by Maui Land and Pine Co., LTD. (ML&P). The Property represents approximately 0.02 percent of Maui's total farmland, 0.07 percent of Maui's County's total cropland, and .18 percent of HC&S total acreage.

The Office of Hawaiian Affairs opposes the proposed reclassification and provided the following comments relating to the agricultural productivity of the Property:

"OHA believes the proposed amendment will drastically change the land use pattern in the area and will result in the irreversible loss of 67 acres of prime agricultural land."

Comments received from the Department of Agriculture indicate that HC&S will offset the loss of 65.7 Acres of sugar cane land by expanding their acreage by 1,400 acres on two sites near Kuihelani Highway, and on vacant Wailuku Agribusiness lands.

Air Quality

Petitioner's FEIS states that existing air quality on Maui is heavily influenced by agriculture, the airport, and motor vehicles. Air pollutants include particulate matter, carbon monoxide, and hydrocarbon emissions.

The FEIS cites several significant industrial sources of air emissions located within a few miles of the Property. These include:

- Puunene Sugar Mill, approximately 2.5 miles to the northwest

- Kahului Airport, approximately 3 miles to the north
- Kahului Power Plant, approximately 4 miles to the northwest
- Paia Sugar Mill, approximately 4.5 miles to the northeast
- Maalaea Power Plant, approximately 5 miles to the southwest

Existing Conditions

An air quality monitoring station was operated at Maalaea Monitoring Station 235. Data from Station 235 provided a conservative estimate of the existing air quality at the Property because the station is a post-construction site located close to the Maalaea Power Plant. The concentrations of sulfur dioxide, particulate matter less than 10 microns in diameter, ozone, nitrogen dioxide and carbon monoxide measured at Station 235, and shown in Petitioner's FEIS-Table 4-1, are expected to be found in less concentrations at the Property which is approximately 6 miles upwind from Maalaea.

Air Quality Control Technologies

The Best Available Control Technology (BACT) is defined by the Clean Air Act as "an emissions limitation...based on the maximum degree of reduction for each pollutant...which the review authority, on a case by case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable...through the application of production processes or available methods, systems and techniques...." In no event can the application of BACT result in emissions of any pollutant that would exceed the level allowed by an applicable New Source Performance Standard (NSPS) or National Emissions Standard for Hazardous Air Pollutants (NESHAP).

The FEIS summarizes BACT used in other utility projects in Hawaii which may be appropriate for use at the proposed Waena Generating Station to control the following air pollutants:

- Sulfur dioxide (SO₂) and sulfuric acid mist (H₂SO₄)
- Particulate matter (PM_{2.5} and PM₁₀)
- Carbon monoxide (CO)

- Hydrocarbon/volatile organic compounds (VOC)
- Nitrogen oxide (NO_x)

Sulfur dioxide and sulfuric acid mist are the resultant emissions from all combustion sources that fire sulfur-bearing fuels. The use of flue gas desulfurization (FGD) systems and limitation of fuel sulfur content are two options available to control sulfur dioxide and sulfuric acid mist emissions.

Although flue gas desulfurization (FGD) systems (including sodium scrubbing, dual alkali scrubbing, and dry scrubbing), have proven effective for decreasing sulfur dioxide emissions from the combustion of high-sulfur fuels in broilers, they are not an effective method to use for combustion turbines for two reasons: excess air flow through the turbines lowers the sulfur dioxide content of the flue gas below levels that would make the use of an FGD system efficient; and exhaust temperatures of combustion turbines are generally higher than what the FGD system can tolerate.

The Petitioner has found that limiting the fuel sulfur content by firing 0.05 percent fuel rather than 0.4 percent fuel does not make this technology an attractive option for controlling sulfur dioxide emissions because of the higher incremental costs to achieve reduced air emissions which are considered minimal.

Particulate matter can be controlled by electrostatic or fabric filters. However, reductions from either of the two filters are considered technically inferior to the use of a properly designed combustion turbine. The high exhaust rates and low particulate emissions (less than 1 micron in diameter) from properly designed combustion turbines are a better alternative for reducing PM emissions.

Carbon monoxide can be reduced through a method identified as catalytic oxidation. In this method, carbon monoxide and hydrocarbons are oxidized to carbon dioxide and water vapor as the turbine exhaust gases are passed through a catalyst bed. Sulfur dioxide (SO₂) is also oxidized to SO₃, producing a visible plume with high levels of SO₃ and sulfuric acid (H₂SO₄) mist. When

compared to other methods, the high cost of employing this technology (\$3,500 and \$5,000 per ton of CO removed), makes it economically prohibitive.

Volatile Organic Compounds (VOC). There are no known required applications of add-on technologies for VOC control on oil-fired combustion turbines. However, the process of catalytic oxidation described for the reduction of Carbon monoxide can also be used to reduce VOC/hydrocarbon emissions.

Nitrogen oxide (NO_x) emissions from CTs can result in either thermal NO_x , or fuel NO_x . Thermal NO_x is created by the high temperature reaction of nitrogen and oxygen in the combustion air. Fuel NO_x is created by the gas-phase oxidation of fuel-bound nitrogen and depends on fuel nitrogen content and combustion oxygen levels. The control technologies available to reduce NO_x emissions are wet injection and selective catalytic reduction (SCR).

In wet injection control, moisture (either demineralized water or steam), injected into the gas turbine combustion chamber, reduces the peak flame temperature, thereby reducing the formation of thermal NO_x .

In selective catalytic reduction (SCR), ammonia is injected into the exhaust gas upstream of a catalyst bed. The ammonia reacts on the catalyst surface with NO_x emissions from the combustion turbine and forms molecular nitrogen and water vapor. The greatest NO_x reduction occurs at temperatures between 500° F and 700 ° F. Temperatures below 500 ° F, greatly reduce the catalyst activity and allows unreacted ammonia to slip through. Temperatures higher than 850° F cause the ammonia to oxidize and form additional NO_x .

To determine the technical feasibility of using SCR in applications with high temperatures sulfur-bearing fuels, and simple cycle and combined cycle operations, the Petitioner conducted a demonstration project. The results of the demonstration project which lasted nearly 2 years, are being reviewed by the DOH and the EPA. Several issues remain unresolved from the demonstration project. These include; the impact of the SCR technology on the heat-recovery steam generator HRSG; the process for treating wastewater resulting from the high pressure

washing procedure to remove ammonium bisulfate deposits from HRSG; the expense of acquiring the ammonia; and potential hazards in transporting, storing, and using ammonia.

The Best Available Control Technology (BACT) for the proposed Waena Generating plant has yet to be determined by the Petitioner. The BACT cannot be determined until the DOH and the US Environmental Protection Agency (EPA) review the design-specific elements and modeled air emissions through the air quality permit process. When the appropriate technologies have been determined by the DOH and EPA, the final design for the generating station will reflect the necessary BACT requirements.

Emissions of air pollutants are regulated at the Federal level pursuant to the Clean Air Act. Major components of the Clean Air Act include:

- National Ambient Air Quality Standard (NAAQS)
- New Source Review
 - Prevention of Significant Deterioration (PSD) Program
 - Non-attainment Regulations
- New Source Performance Standards(NSPS)
- National Emissions Standards for Hazardous Air Pollutants (NESHAP)
(NESHAP regulations do not apply to fossil-fuel fired power plants);
- Good Engineering Practice (GEP) Stack Height Provisions.

National Ambient Air Quality Standard (NAAQS)

NAAQS represents the maximum pollution levels considered to be acceptable, with an adequate margin of safety, to protect public health and welfare. NAAQS have been established for sulfur dioxide (SO₂), carbon monoxide (CO), ozone (O₃), particulate matter less than 10 microns in diameter (PM₁₀), and lead (Pb). Hawaii's State Ambient Air Quality Standards have stricter standards for CO, O₃ and nitrogen dioxide (NO₂,) and also include a standard for hydrogen sulfide.

New Source Review

Under the Prevention of Significant Deterioration (PSD) regulations the proposed Waena Generating Station will be classified as a major stationary source of pollutants. A PSD review is required for all pollutants from a major source showing significant net increases in emissions because of a modification, and for which the project area is in compliance with the applicable National Ambient Air Quality Standards. The regulations also require one year of continuous air monitoring if pollutants exceed those levels below which the DOH may exempt a stationary source or modification from the air quality analysis pre-construction monitoring analysis. According to the FEIS, the proposed Waena Generating Station will be subject to the PDS permitting review process for nitrogen oxide (NO_x), SO_2 , CO, PM/PM₁₀, sulfuric acid (H_2SO_4) mist as follows:

- Application of Best Available Control Technology (BACT);
- Analysis of ambient air quality impacts from the project (Prevention of Significant Deterioration Class II increments for SO_2 , PM/PM₁₀, and NO_2 ; National Ambient Air Quality Standards/Hawaii State Ambient Air Quality Standards for SO_2 , NO_2 , PM/PM₁₀, and CO);
- Analysis of air quality and or/or visibility impacts on Class 1 areas;
- Analysis of air-quality-related values such as soils, vegetation, and visibility that are affected directly as a result of the project and general commercial, residential and other growth associated with the project.

PSD regulations provide for the classification of all geographic areas into one of three classes, with Class I designation being the most stringent, where any deterioration in air quality would be significant, and Class III designation the least stringent, allowing the greatest degree of air quality deterioration. The DOH has designated the area around the Property as Class II. Class II designations allow for moderate, well controlled, and sited industrial growth.

The closest area to the proposed Waena Generating Station having a Class I designation is Haleakala National Park, approximately 12 miles southeast. The National Park Service requested the Petitioner to perform an analysis of sulfur dioxide, particulate matter, and nitrogen dioxide using the EPA Rough Terrain Dispersion Model (RTDM). Modeling methodology followed the procedures outlined in Permit Application Guidance for New Air Pollution Sources (Bunyak, 1993). The RTDM was used to determine the impact of the proposed four 58-MW units. The predicted concentrations of emissions summarized in Table 4-7 of the Petitioner's FEIS, show that with all four units operating, the predicted pollutant emissions would consume less than 27 percent of the protective Class I Increments. Therefore, the Waena Generating Station will not have an adverse impact on Haleakala National Park. Also, at the request of the National Park Service, measurements were calculated for the amount chemical concentrations which may be deposited on plants and in the soil thereby impacting sensitive plant species. The measurements, or deposition levels for SO₂ and Nitric Acid (HNO₃), were calculated based on the procedure contained in the Interagency Workgroup on Air Quality Modeling Phase I Report: Interim Recommendation for Modeling Long Range Transport and Impacts on Regional Visibility (EPA, 1993). However, the National Park Service does not have any data on what deposition levels would adversely affect Haleakala National Park. The National Park Service will need to assess the potential impact on plant species by conducting detailed analyses for specific plant species and soil conditions within the park. The National Park Service provided the following comments: "The air quality impact analysis applied the Environmental Protection Agency (EPA) Rough Terrain Dispersion Model (RTDM) to calculate the impact of sulfur dioxide (SO₂), nitrogen dioxide (NO_x) and Particulate Matter in the park. The Modeling analysis indicate that the Waena project by itself will not totally consume the Prevention of Significant Deterioration (PSD) Class I increments."

The FEIS lists the maximum potential emission increases for a single 58-MW unit based on a worse case operation of 8,760 hours per year in Table 4-4. Under this scenario, the proposed generating station is a significant source of NO_x, SO₂, CO, NO₂, PM/PM₁₀, and H₂SO₄. The Table shows that the generating station will not be a significant source for beryllium, mercury,

lead, or fluoride. It is stated in the FEIS that the project is subject to PSD review only for NO_x, SO₂, CO, NO₂, PM/PM₁₀ and H₂SO₄.

Good Engineering Practice (GEP) Stack Height Provisions

The four stacks (one for each of the four dual-train combined-cycle units proposed for the generating station) will be 150 feet high and 24 feet in diameter, and arranged with the stacks running perpendicular to the prevailing trade winds. This stack height will allow adequate dispersion, preventing excessive concentrations of air pollutants. The stack heights satisfy all EPA and State requirements.

New Source Performance Standards (NSPS)

NSPS are national emission standards that apply to new, modified, or reconstructed stationary source categories that include the emission limitations that apply to a new, oil-fired combustion turbine. The standards are as follows:

- Sulfur dioxide-0.015 percent sulfur dioxide in the exhaust gas at 15 percent oxygen, or 0.8 percent sulfur by weight.
- Nitrogen oxide (NO_x)-75 parts per million (ppm) in the exhaust gas at 15 percent oxygen.

The Maui Vortex

As wind patterns cross the Maui Isthmus, their interactions with Haleakala and West Maui, create a circular wind pattern described as the Maui Vortex. These wind patterns could cause emissions from the proposed generating plant to be drawn into and contained in the vacuum created in the center of the vortex. A July 1997 study prepared by Dr. Thomas A. Schroeder and Jim Clary & Associates, evaluated the potential impact of the Maui Vortex on the emissions from the proposed Waena Generating Station. The objective of the study was to determine whether generating plant emissions would be entrained into, and accumulated within the vacuum the vortex. The study found no significant plume impacts on the vortex and further concluded that even a

persistent vortex would not result in a significant concentrations of SO₂, NSO₂, PM₁₀, sulfuric acid mist (H₂SO₄) and ethylene.

The Petitioner States during construction, vehicle and equipment exhaust emissions will be small, localized, and transient. Dust emissions generated during site excavation and equipment movement will be elevated due to large-scale grading. According to the FEIS, it is stated that "As long as precautions are taken to water the site during dry or windy periods, construction emissions are not expected to be significant."

The OEQC commented that several projects in the Central Maui area illustrate the pace of development taking place near the Property. The OEQC further recommended that the LUC review the proposed Waena Generating Station in light of these developments, and to carefully measure cumulative impacts and comprehensive long term issues. The OEQC provided the following list of documents on projects in the central Maui area:

- Puunene Water System, FONSI (07/23/84)
- Central Maui Sanitary Landfill, FEIS (03/01/86)
- Humane Society Animal Shelter, Pulehunui, FONSI (03/23/87)
- Maui Army National Guard Armory, EISPN (10/08/95)
- Central Maui Sanitary Landfill Expansion, FEIS (05/23/96)
- Mokulele Highway Puunene Bypass, FONSI (07/23/97)
- Kuihelani Highway Widening, DEA (10/23/97)
- A.C. Partnership Construction Related Baseyard and Office Project DEA (11/08/97)
- Mokulele Highway Puunene Avenue Widening Project, NEPA (11/08/97)
- Mokulele Baseyard Storage Community Plan Amendment, DEA (11/23/97)

Aural Quality

The unit commonly used for describing the magnitude of a sound is the decibel (dB). In order to approximate the response of the ear, a weighting scale is sometimes used because the human ear is less sensitive to sounds in the high and low frequency ranges. This is called A-weighting and is abbreviated as dBA. Whereas sound levels vary with time, several methods are

used to quantify sound over a given time. One method uses the equivalent sound level (Leq) and the day-night sound level (Ldn). Leq describes the energy average of the sound pressure level for a stated period of time. Ldn describes a 24 average sound level with an additional 10 dBA added to night time sound levels to account for increased human sensitivity to night time noise.

Two different noise level regulations are available for assessing noise impacts from the proposed Waena Generating Station. These are: DOH noise regulations under Title 11, Chapter 46 Community Noise Control; and those under the U.S. Department of Housing and Urban Development.

According to DOH noise regulations under Title 11, Chapter 46 Community Noise Control, noise limits cannot be exceeded for more than 2 minutes in any 20 minute time period. For properties within the agricultural District, the noise limits are 70 dBA for both the daytime and nighttime periods.

According to HUD noise regulations, and exterior day-night noise level of 65 Ldn or less is considered normally acceptable for residential housing developments. There are no housing developments located in the vicinity of the Property, therefore the HUD regulations can only be used as a guideline.

In studies prepared by Dames and Moore, 1995, and Belt Collins, 1992, existing short term daytime background noise levels in the vicinity of the Property were measured using the Day-Night Sound Level (Ldn) for describing environmental noise. The Ldn descriptor averages instantaneous A-weighted sound levels as measured on a standard Sound Level Meter. These measured sound levels are referred to as meter readings in dBA. The studies measured short-term daytime background ambient noise levels in the vicinity of the Property with average values ranging from 54 to 60 dB. The measured levels obtained in the Dames and Moore/Belt Collins studies were well below the 70 dBA DOH Property line noise limit for agricultural and industrial uses.

An acoustic study of existing and anticipated noise conditions at and adjacent to the Property was prepared by Y. Ebisu & Associates in May 1997. The hourly average [Leq(h)] and

Day/Night sound Level (Ldn) noise descriptors were both used to describe the future noise levels in the environs of the proposed Waena Generating Station.

Y. Ebisu & Associates used the hourly average [Leq(h)] and Day-Night Sound Level (Ldn) noise descriptors to describe existing and future noise levels in the environs of the Property. The average noise level during a one hour period is called the hourly equivalent sound level and is designated as Leq(h) or Leq. The Leq contours were used to evaluate risks of exceeding the 70 dBA State Department of Health noise limit along the Property boundary lines of the proposed generating plant. The study selected several locations to measure varying noise levels. These areas represented areas 50 feet from major roadways, areas removed from existing developments, and areas closest and normally downwind of the Property. The results showed that for areas 50 feet from a major roadway, average daily traffic noise level was estimated to be 68 Ldn, and considered to be typical for major roadways in the area, such as Hana Highway and Haleakala Highway. The results of traffic noise measurement for areas removed from existing developments and areas closest to the Property (Waiakoa), demonstrated that existing background ambient noise levels in the areas removed from the major roadways are very low, and ranged from 35 to 44 Leq. Existing background noise levels in the communities closest to the Property are believed to be very low and similar to those measured at the other locations, particularly if they are removed from major roadways.

Anticipated future noise emission levels from the proposed Waena Generating Station were evaluated for the four phases of planned station expansion. According to the noise study prepared by Y. Ebisu & Associates, May 1997, the closest noise sensitive properties to the proposed generating station are day-care and social services facilities located in Puunene beyond 2 miles from the Property. Residences in the other closest communities of Kahului, Pukalani, Paia, Spreckelsville, and Waiakoa are located beyond 3 miles from the station. Using a Linear-Weighting filter (instead of the A-weighting filter), the predicted noise levels from the proposed generating station at these communities ranged from 19.7 to 36.2 dBL for Phase I; 22.7 to 39.2 dBL for Phase II; 24.5 to 41.0 dBL for Phase III of the development; and 25.7 to 42.2 dBL for

Phase IV of the development. Due to the large separation distances between the Property and the nearest communities, the predicted A-weighted Sound Levels (dBA) are approximately 28 dB units less than the dBL values measured in these communities and should not be audible at the levels computed with the Linear-Weighting filter. Even with the added 12 dB of reduced attenuation due to sound ducting (worst case scenario), predicted noise from the proposed generating station should not be audible.

Measured background ambient noise levels at the surrounding communities also indicate that the predicted sound levels from the proposed Waena Generating Station probably will be inaudible during even the night time and early morning hours. The noise levels generated by the generating station at full build out would exceed the DOH 45 dBA night time Class A residential and preservation zone noise limits at locations up to 4,600 feet from the station boundaries. Therefore future development of lands for residential/preservation uses within 4,600 feet and for commercial/multi-family uses within 2,500 feet should be discouraged unless it can be demonstrated that local shielding effects from buildings, tanks, etc. on the station site allow for shorter buffer areas. No special noise mitigation measures will be required from the Petitioner for the operation of the proposed generating station.

Construction Noise

When measured 600 feet from the source, noise levels associated with the operation of diesel equipment typically range from about 57 to 67 dBA. Predicted noise levels for the nearest noise sensitive properties (day-care and social services facilities) located in Puunene are not expected to exceed 24 dBA, below the existing ambient noise levels during construction and well drill activities. Also, twenty-four hour well drill operations should be possible without causing adverse noise impacts because of the Property's distance from noise sensitive properties.

According to the FEIS, no adverse noise impacts to the closet noise sensitive properties at Puunene are expected from construction noise due to the very low noise levels anticipated and due to the temporary nature of the work.

The intensity of the louder construction noise sources and the exterior nature of the work, make it impractical to mitigate construction noise along the Property to levels less than 70 dBA. A construction noise variance will be requested from DOH prior to construction and well-drilling activities.

Archaeological Resources

According to Petitioner's FEIS, the documentary research provided no evidence of prehistoric sites or utilization of the area. An archaeological inventory survey of the Property and the proposed and alternative transmission line routes was conducted by Scientific Consultant Services on March 13, 1997. No archaeological resources were identified in any of the proposed transmissions line corridors or at the Property. In a letter dated August 29, 1997, the Department of Land and Natural Resources, provided the following comments: "Aerial photos taken in 1972 show that the entire area for the proposed station was under sugar cane cultivation. Unlikely that significant sites are still present. The proposed project will have "no effect" on significant historic sites. Archeological inventory will be prepared."

Flora Fauna

A biological survey, prepared by Botanical Consultants, identified two species of native Hawaiian plants (ilima and pauahiiaka) along Pulehu Road near the access road to the Central Maui Landfill. Surveys of the Property and the corridors of the preferred and alternative transmission line corridors identified two major vegetation types, Sugarcane Fields and Ruderal (weedy) vegetation. During the survey, no rare or endangered species, or species listed as candidate for such status, were found either on the Property, or within the preferred or alternative transmission line corridors.

A study (Potential Ethylene and Sulfuric Acid Impacts of Proposed Waena Generating Station-Robert E. Paull, June 1997), evaluated the potential effects of ethylene and sulfuric acid emissions from the proposed generating station.

Gasoline, diesel engines and fires are the major urban and rural sources of ethylene. While ethylene is a natural plant growth regulator used in agriculture to induce flowering of pineapple and

ripening of bananas, high concentrations over extended periods of time can adversely impact plant growth. High concentrations of ethylene can cause general reduction in growth, stimulation of lateral growth, leaf chlorosis and abscission, bud and flower abscission, and fruit chlorosis and ripening. There are no national standards for ethylene. The threshold concentration for plant response to ethylene is continuous exposure to 0.01 microliters per liter ($\mu\text{l/l}$). Another study of emissions on the Maui Vortex (Schroeder and Clary) Associates, already found that a persistent vortex would not result in a significant concentrations of SO_2 , NSO_2 , PM_{10} , sulfuric acid mist (H_2SO_4) and ethylene. The Paull study used models from the Schroeder and Clary study, and determined that with all four DTCC units operating, it would take 1,363 days of continuous vortex, with no loss of ethylene from the vortex, to reach a plant response threshold concentration of 0.01 $\mu\text{l/l}$. The study concluded that higher concentrations of ethylene will be generated from normal farm operation involving diesel and gas engines.

Sulfuric acid (SO_2) is commonly produced as the result of fossil fuel burning. A major source of SO_2 in Hawaii is volcanism. Symptoms of adverse impacts of high concentrations of sulfuric acid on plants includes bleached brownish or yellowish spots or blotches with areas of dead tissue. Plant sensitivity to SO_2 varies. Some plant species (beans) are very sensitive, while others (celery, corn, potatoes) are very tolerant. The level anticipated from the proposed generating station is less than the EPA significance level of 5 micrograms per meter cubed ($\mu\text{g}/\text{m}^3$). Exposure to sulfuric acid mist (H_2SO_4) can cause damage with a threshold for growth reduction being 0.5 parts per million (ppm). Assuming 100% of the sulfur is converted into H_2SO_4 , the Paull study demonstrated that the time required to reach an H_2SO_4 concentration of 0.01 ppm is 274 days, and that such infrequent and very low concentrations would never reach acute plant injury concentrations. Other sources of H_2SO_4 (sea spray, plants, algae, and bacteria) may be expected to have a more significant impact.

A field survey for fauna was conducted in march 1997. Neither the Hawaiian hoary bat or the Hawaiian owl was observed during the survey. Hawaiian hoary bats are known to roost at higher elevations. Although the Hawaiian hoary bat was not observed during the survey periods,

they have been recorded at elevations as low as 400 feet and within gulches, and it is likely that they utilize the air space above the Property.

The proposed Waena Generating Plant is not expected to have a significant negative impact on flora or fauna communities because construction and operation of the plant will occur on lands presently under sugar cultivation. Further, according to the FEIS, the Property has almost no value as native bird habitat. None of the species observed are listed as threatened or endangered, or candidates for the threatened or endangered species list.

Scenic/Visual Resources

The Property is situated within an area of gently sloping terrain which extends to the slopes of Haleakala. There are few significant topographic barriers to limit views. The area surrounding the project site is in active sugar cane production. The proposed 232-MW Waena Generating Station will constitute a relatively large industrial complex. The structures housing the generating machinery, support equipment, and offices will be between 15 and 70 feet high and will cover approximately 25 acres. The four stacks will be 150 feet high and 24 feet in diameter. The Petitioner analyzed the visual impacts of the proposed project in terms of distance, screening (vegetation) and backdrop (mountains), and provided computer generated photographic simulations to assess the impact of the proposed facility on surrounding scenic features. The Petitioner concluded that the facility would not have an adverse impact upon the area's visual resources because of proposed facility's large distance from sensitive viewer locations. The generation station and exhaust stacks will represent only a co-dominant feature within the landscape up to 3 miles distance, and only a subordinate feature within the landscape beyond 3 miles. Large distances from viewing locations will make the apparent size of the facility small to the viewer and should not become a focus of attention.

Haleakala National Park is classified as Class I under the Clean Air Act. To determine the impact of emissions from the four 58 MW units in the generating plant on the visibility in Haleakala National Park, the Petitioner used EPA VISCREEN recommended by the U.S. Department of the Interior, National Park Service. The level 1 analysis conducted for the proposed

generating station identified potentially significant plume visual impacts. Using this procedure, if significant impacts are determined at level 1, then level 2 analysis is performed using actual meteorological conditions to determine the worst-case conditions possible. According to the visibility study, the VISCREEN model identifies the entire visibility study area as the "Class I area". The United States Department of the Interior, National Park Service, provided the following comments on potential visible plume impacts inside Haleakala National Park:

"The Level 2 VISCREEN visibility analysis indicates that the Waena project will not impact the park with a coherent plume."

Lighting used within the plant for nighttime security and operations will be visible to residents located upslope of the project site due to the absence of other urban uses surrounding it and the overall size of the proposed facility. The petitioner indicates that some night glow impacts will be noticeable to Upcountry residents from reflective lighting and general multiple light sources at the facility. These impacts will lessen with the distance, and will diffuse into the ambient background within the 4 miles to the nearest Upcountry residents.

Impacts from night lighting at the plant will be mitigated by properly shielding all outside lighting to direct light downward and pavement will be made as non-reflective as possible. The Petition will avoid the use of halogen or intense white lights. According to the information provided in the FEIS, the project will not have a negative impact on the visual character of its immediate environs, and will not have an adverse impact to scenic views or vistas related to coastal areas within the Central Maui region.

Visual impacts will be mitigated through landscaping and choices of paint colors appropriate to the area. The color of the facility and its exhaust stacks will be blended with the tones of the background landscape to minimize the visible impact of the facility on the surrounding environs. A landscaping plan is being developed to assist in the overall visual mitigation. Landscaping will be installed during phase I to allow for full maturation of vegetation by the installation of the final phase.

ADEQUACY OF PUBLIC SERVICES AND FACILITIES

Highway and Roadway Service

The development of the site for the installation of the first unit of generation by the year 2006 will include full grading of the site, and construction of the main access and fuel delivery access driveways needed to support all four DTCC generating units. Due to the change in topography between the Property and Pulehu Road, site distance analyses will need to be conducted prior to project design to determine the best placement of the access driveways into the Property. The Petitioner will coordinate site access issues along Pulehu Road the County of Maui.

At full buildout, the operation of four DTCC units (eight combustion turbines) will employ 46 new employees, and require approximately 44 truckloads of No. 2 diesel fuel daily with deliveries averaging about 9,000 gallons of fuel. At full buildout, the daily supply (44 fuel trips) will be transported from Kahului Harbor in tanker trucks traveling along Hobron Avenue, Hana Highway, and Pulehu Road to the Property.

Future traffic improvements, currently in the environmental processing or design stage are planned for completion by 1999. These improvements, including the construction of new roadways and traffic signals, will be implemented prior to the operation of the Waena Generating Station. Some of these improvements include DOT's installation of traffic signals at the intersection of Hana Highway, Kamehameha Avenue, and Hobron Avenue. DOT is also proposing modifications to the present road network in the vicinity of the Property including the construction of a new four-lane Airport Master Plan as part of the Kahului Airport Master Plan. These modifications are anticipated to result in the diversion of regional and airport traffic from Dairy Road to the Airport Access Road, leaving Dairy Road to Serve local traffic.

A traffic impact analysis was prepared for the Petitioner May 1997, by Austin Tsutsumi & Associates, Inc. Trip generation estimates were developed for 2016, following Petitioner's installation of Phase III of the project when the plant is expected to have its full compliment of employees (46). The estimates included the number of employees per shift, service and delivery trips, and the number of fuel haul trucks to the plant on a daily basis. According to the analysis,

the project will generate approximately 210 vehicle trips during the morning peak hour, 145 entering the site, and 65 exiting the site. Approximately 192 vehicle trips were estimated during the afternoon peak hour, 56 entering the site and 136 exiting the site. Using a qualitative measure identified as Level of Service (LOS) to describe the conditions of traffic flow, ranging from LOS A (free flow conditions) to LOS F (congested conditions), analyses were conducted at major intersections near the Property. To these, the Petitioner added plant generated traffic data to estimated future traffic volumes. Although the analysis showed that a small number of individual approaches and turning movements will experience drops in LOS, the analyses further found no significant adverse impacts in the level-of-service for the area roadways. No intersection is expected to experience an approach or turning movement greater than LOS E, and the vehicle to capacity ratio for the signalized intersection will not increase by any significant amount.

The Petition and the FEIS state that the proposed Waena Generating Plant will not require extension of existing County or State infrastructure to the site, and the project is not expected to have any direct impact that will require the expenditure of public funds for infrastructure. The project will have no significant adverse impact on regional traffic which will require mitigation.

The Department of Transportation offered the following comments:

“Our State transportation facilities can adequately accommodate the subject project. We do not anticipate an adverse impact to our systems.”

Water Service

The proposed development of 0.88 mgd of nonpotable water required for the Waena Generating Station at full buildout will not have any adverse impact on the basal groundwater aquifer. Petitioner’s studies have shown that nonpotable water needs can be met by drilling and developing one or more wells on the Property without impacting basal ground water quality. The wells will be constructed in accordance with all applicable regulatory requirements. The Department of Land and Natural Resources, Commission on Water Resource Management (CWRM), provided the following comments: “A well construction Permit and a Pump Installation

Permit from the CWRM would be required before ground water is developed as a source of supply for the project.”

No existing potable water service from the County of Maui exists near the Property. The only existing municipal well source in the Central Maui Sector, is located approximately 4.5 miles northwest of the Property outside of Kahului. Potable bottled water will be delivered by truck to the proposed Waena Generating Station. The Petitioner anticipates no extension of the County water delivery system.

Sanitary Wastewater Treatment and Disposal

There is no existing domestic sewer service from the County of Maui near the Property. Sanitary wastewater facilities will be constructed on the Property. Petitioner will use a septic tank and a leach field to treat effluent from sanitary facilities. The Petitioner will submit detailed plans for the domestic wastewater treatment system to DOH for review and approval. According to the Petitioner, the treatment system will conform to applicable provisions of DOH Administrative Rules Chapter 11-62, including but not limited to Section 11-62-32 (spacing for individual wastewater systems), and Section 11-62-33,1(a) (requirements for septic tanks). The Petitioner does not anticipate extension of the county wastewater system.

Drainage and Flooding

According to the FEIS, drainage in the area is generally through a series of gulches extending radially from the upper slopes of Haleakala towards the central isthmus area. Slopes on the Property are minimal at approximately one degree. The Property is drained by Kalialinui Gulch, approximately 1,000 feet or a quarter mile to the north, and by Pulehu Gulch, located approximately 5,000 feet or a mile to the south of the Property. The flow from the Property is directed to the northwest, away from both gulches.

The development of the site for the installation of the first unit of generation by the year 2006, will include full grading of the site, and the installation of necessary infrastructure to include drainage improvements supply and injection wells, domestic wastewater systems, and roads to support all four DTCC generating units. At full buildout, approximately 50 acres will consist of

both impervious, asphalt areas and more pervious, gravel-covered areas. The proposed project is anticipated to increase stormwater runoff from approximately 45.5 cubic feet per second(cfs) to approximately 215.4 cfs. Stormwater over the developed 50 acres is anticipated to increase from approximately 34 cfs to 204 cfs.

According to the Petition, drainage containment will be designed in accordance with applicable County of Maui Standards and approved by the County of Maui Department of Public Works. To protect adjacent sugar cane fields from project specific runoff, the proposed project will include stormwater runoff and infiltration ponds to collect and contain storm water on site. The ponds will have special sumps with oil/water separators to remove any oil before disposal of the storm runoff into an infiltration pond. A fifteen-foot landscape buffer around the facility will also aid in stormwater percolation.

The HC&S provided the following comments regarding drainage. "In addition to implementation of BMPs to prevent runoff into the ditch, any storm water discharges during construction activities at the site will require coverage under and compliance with the State's General Permit for Discharge of Storm water Associated with Construction Activity, or an individual discharge permit."

Solid Waste Disposal

According to the FEIS, solid waste generated by the proposed Waena Generating Station will consist of the following:

- Construction waste;
- Materials associated with plant operation, administration, housekeeping, and maintenance operations
- Parts, material, and equipment replaced during maintenance.

Solid waste disposal systems on Maui consist of the Central Maui Landfill, and the Hana Landfill. The Central Maui Landfill accepts commercial, industrial, and residential waste. It does

not accept hazardous materials or construction materials. Construction materials and waste from the project will be disposed of by the construction contractor into the Maui Demolition and Construction Landfill. The Waena Generating Station will salvage or recycle parts, materials, and equipment to the fullest extent possible in order to reduce the anticipated minimal amount of solid waste which will be generated during operation of the plant. The remaining waste will be disposed of at the Central Maui Landfill. Solids from the sanitary septic system will be disposed of periodically at a County wastewater treatment facility.

Hazardous Waste and Materials

The proposed Waena Generating Station will generate an average of 440,000 to 480,000 gallons of wastewater per day. The wastewater will be collected in wastewater storage tanks and will be at ambient air temperature when it is pumped into the four injection wells designed and constructed for this purpose. The average daily injection rate will be approximately 100 gpm per well. If Selective Catalytic Reduction (SCR) is required as Best Available Control Technology as a condition of the PSD permit, the wastewater will pass through additional steps which will remove excess metals, adjust the pH level of the water, and air strip out the ammonia used in the SCR process. According to the Petitioner's FEIS, any potential impact from the use of injection wells will be mitigated by appropriate design and testing to determine aquifer characteristics. Further, the design, construction and operation of the injection wells will be in compliance with DOH Underground Injection Control (UIC) regulations.

Civil Defense

There is no siren coverage in the area. The State Department of Civil Defense recommends that a siren simulator be purchased and installed inside the facility.

Police

The Maui County Police Department provides police protection for the Wailuku-Kahului, Kihei, and Upcountry areas. Development of the Property is expected to have minimal impact on any requirement for police and fire protection. The Petitioner will develop on site security

procedures. The Petitioner will also construct a fence around the Property and install checkpoints at the access driveways.

Fire Protection

Fire prevention, suppression, and protection services for the Wailuku-Kahului region are provided by the County Department of Fire Control. The nearest fire station to the project site is the Kahului Station, approximately 4 miles away. Other fire protection facilities in the Central Maui area include a fire station in Paia and another in Wailuku.

The Petitioner currently has fire control plans for its existing generation facilities. A fire control plan will be designed specifically for the proposed Waena Generating Station. Emergency plans detailing the procedures to be followed when there is a fire or fuel spill will be coordinated with the district fire department and health care facilities. A fire flow requirement of 2,000 gallons per minute for 2 hours must be provided to meet Maui County Water Systems Standards. Two separate 240,000-gallon storage tanks will be constructed to store water for use in fire protection. All Federal and State regulations regarding the operation of a generating station and worker safety will be followed.

Electrical and Telephone Service

The Property is undeveloped and has no telephone or communications service.

According to the FEIS, the Petitioner has two 69-kV transmission lines running adjacent to the Property. The first transmission line (Maalaea-Kealahou 69-kV) runs along Waiko Road to the intersection of Pulehu Road, then turns south and extends along Pulehu Road towards Kealahou. The second transmission line (Kanaha-Pukalani) runs from Kanaha Substation along Pulehu Road past the project site to the intersection of Waiko Road, crosses Pulehu Road diagonally and continues across cane lands towards Pukalani. In addition to the Petitioner's transmission system, HC&S has some smaller distribution lines which run through cane land to service irrigation and water pumps. Currently the site is undeveloped and has no telephone or communication service.

Electric and Magnetic (EMF) Levels

The proposed transmission lines will pass through undeveloped land used for sugarcane cultivation. No residential areas or other sensitive receptors are located within 250 feet of any of the proposed transmission lines, and no development exists around the Property proposed for the Waena Generating Station.

Enertech Consultants calculated the Electric and Magnetic (EMF) levels for the proposed generating station and transmission lines in May, 1997. Their computer modeled calculations were based on five power configuration--the two 69-kV existing transmission lines running adjacent to the Property, and three proposed transmission lines. The configurations are listed below:

- Existing Maalaea-Kealahou 69-kV single-circuit transmission line;
- Existing Kanaha-Pukalani 69-kV single-circuit transmission line;
- Proposed Pulehu Road-North Firebreak Road 69-kV single-circuit transmission line with a 12-kV double-circuit distribution line;
- Proposed North Firebreak Road-Paia 69-kV single-circuit ; and the
- Proposed North Firebreak Road-Puunene 69-kV single-circuit transmission line with a 12-kV double-circuit distribution line.

The distances modeled to calculate the impacts from EMF levels ranged from -250 feet out to +250 feet from the centerline directly beneath the proposed powerlines. Loading differences on the Kanaha-Pukalani and Maalaea-Kealahou lines entering and leaving the proposed station were also modeled. Table 4-18 in the Petitioner's FEIS shows the modeled magnetic field levels for the five transmission line configurations given in milliGauss (mG).

The results indicated that the generating station equipment, due to its location near the center of the station, and the switchyard equipment, will not contribute significantly to the magnetic field levels at the perimeter of the station. The major source magnetic fields at the proposed

station's boundaries and beyond is due primarily to the 69-kV and 12-kV overhead transmission lines which enter and leave the station along Pulehu and Waiko Roads. Although the proposed generating station will represent an increase in the magnetic field levels found along Pulehu Road and North Firebreak Road, studies to date have been inconclusive as to the health impacts from electric and magnetic fields.

Parks and Recreation

According to the Petition and the Petitioner's FEIS, the proposed project will not have an adverse impact on the public's access and use of the shoreline area, and there will be no adverse impact to nearshore waters from point and non-point sources of pollution. The FEIS states that the nearest outdoor recreational facilities to the project site in the Central Maui area are over 4 miles away. Recreational and ocean related facilities occur along the coastline from Kahului Harbor to Spreckelsville Beach. Existing facilities include Kahului Harbor Park and Kahului Beach, Kanaha Beach Park, and Spreckelsville Beach. The electricity generated by the proposed Waena Generating Station will provide the energy required for existing and planned recreational facilities throughout the entire Island of Maui.

CONFORMANCE WITH THE HAWAII STATE PLAN

The proposed reclassification is generally consistent with the objectives and policies for the economy, facility systems energy and telecommunications. The proposed reclassification will allow Petitioner to construct a new power generating facility in central Maui which will: maintain an adequate system margin-of-reserve generating capacity; increase overall system reliability; replace older generation facilities scheduled for retirement; and provide additional capacity to meet projected demand for electric service. The proposed Waena Generating Station will create approximately 46 new jobs. The proposed facility will require between 80 to 100 construction workers during the initial installation. The proposed development will have an impact on Maui's economic future. The electricity provided by the proposed generating facility will support continued economic expansion for the island and provide the necessary energy to support affordable housing programs as they are developed. Although the proposed Waena Generating

Station will remove 65.7 acres of agricultural land from active production, the power generated from this facility will support further expansion and diversification of agricultural activities on Maui.

CONFORMANCE WITH THE STATE LAND USE COMMISSION RULES

The proposed reclassification is in general conformance to §15-15-18 of the Land Use Commission rules, standards for determining “U” Urban District boundaries.

The Property will be developed zoned for heavy industrial use. The Property is located close to other heavy industrial uses, the Central Maui Landfill and the Ameron HC&D Quarry.

ANALYSIS

The need for additional generating capacity to meet forecasted demand was identified by the Petitioner in 1996 through a process referred to as resource planning. During the resource planning process, the Petitioner evaluated the following issues: existing and forecasted demand for energy and capacity; existing and forecasted fuel prices; impacts of Demand-Side Management (DSM) and conservation and energy efficiency programs on the demand for energy; existing firm capacity; maintenance and retirement schedules of generating units; existing Purchase Power Agreements (PPAs) from the independent power producers (IPPs); and proposal for future PPAs from IPPs.

Use of the Property for the proposed generating Station project will require a change in the current County zoning classification from “Interim” to “Heavy Industrial.” An “M-2 Heavy Industrial District” as defined under Chapter 19.26, Maui County Code, allows for uses which “may be obnoxious or offensive by reason of emission of odor, dust, smoke, gas, noise, vibration and the like and not allowed in any other district.”

The proposal to construct and operate the proposed Waena Generating Station will require a change in the existing Wailuku-Kahului Community Plan designation from “Agricultural” to “Heavy Industrial.” The four-phased planned construction and operation of the proposed Waena Generating Station will be compatible with existing and planned expansion of existing uses in the area which include the Central Maui Sanitary landfill, and Ameron HC&D quarry operations.

The Petitioner will seek a Community Plan Amendment and Change in Zoning from the County of Maui, and according to the County's Position Statement, appropriate mitigation measures can be imposed by the County of Maui at the time of the request.

The proposed reclassification from the Agricultural District to the Urban District, will remove approximately 65.7 Acres of Prime Agricultural land from sugar cane cultivation. However, the amount is insignificant when compared to HC&S's total acreage under cultivation. According to the FEIS, HC&S's plans for expansion will replace more than the 65.7 acres the Petitioner will use for the proposed generating station, therefore the proposed reclassification will not have a significant adverse impact on prime agricultural land production.

Surrounding agricultural operations will not be negatively impacted by the activities of the proposed generating station. According to the Petition, the proposed use of the site will not significantly diminish the available supply of land used for agricultural activities. Information provided in the FEIS identifies how the Petitioner will coordinate the drainage design to direct storm water flows during and after construction, away from the HC&S irrigation ditch. On-site placement of stormwater runoff and infiltration ponds to collect and contain storm water on site, will protect adjacent sugar cane fields from project specific runoff. Petitioner's proposal for a fifteen-foot landscape buffer around the facility will also aid in stormwater percolation.

The generating station will not be negatively impacted by agricultural operations. The Petitioner and HC&S have developed a cooperative relationship to ensure compatibility of agricultural and generating station operations. As demonstrated by the long standing working relationship between the Petitioner and HC&S at the Petitioner's Maalaea generating facility, little impact occurs from the adjoining sugar cane operations. The Petitioner is notified well in advance of any agricultural operations which may impact the generating facility or its employees, such as cane burning or harvesting activities. The Petitioner's safety personnel keep an active watch during burning and the Petitioner's facility employees are advised to have breathing aides and other protective measures available in case of wind shifts.

According to the FEIS, the approximate fuel load of 9,000 gallons per truck will be unloaded at a site on the Property designed to contain fuel spills. The nine steel fuel storage tanks will be placed on impervious surfaces and within berms designed to contain any leakage or spills. The berms will be designed with oil-water separators to remove any oil before disposing. These, and other best management practice precautions including training employees in the proper procedures for handling fuel and detecting and controlling fuel leaks minimize the possibility of fuel leaks, and if any fuel were to spill, it would be promptly contained.

In the 1995 MECO Generation Study, the Petitioner determined that site selected for the Waena Generating Plant would have the least impact on air quality, biological resources; area traffic and transportation; and infrastructure costs. The Petitioner also evaluated the Property in terms of its location and compatibility with other industrial uses in the area which include the quarry, landfill, and surrounding agricultural uses. Also taken into consideration was the Property's distance from more sensitive urban uses; and its centralized location within the Petitioner's existing generation and transmission systems. However, the Petitioner acknowledges that the exact nature of impacts to air quality and the mitigation measures that will be necessary are still unresolved at this time. Mitigation measures will be identified if the results of the air quality modeling, performed by the Petitioner and reviewed during the PSD/Covered Source Air Permit review performed by the DOH, show that operation of the Waena Generation will exceed any air quality standards. The FEIS identifies possible measures to address this issue which include:

- Changing the type of fuel;
- Raising the stack height;
- Scaling back the scope of size of the project;
- Reducing the operating hours; and
- Determining type of air emission reduction equipment.

The Petitioner has evaluated the use of alternative energies, including geothermal, ocean thermal, biomass, hydropower, wind, and solar power during the site selection and IRP processes. Although alternative technologies and fuels may play an increasing role in the energy

production and use, the Petitioner found that these alternatives were not economically feasible to provide baseload energy to the Island of Maui. Geothermal energy is the only commercially mature, indigenous resource available in larger quantities that can be converted to baseload (24 hour a day) electricity. However, Maui County has not developed rules and regulations to govern development and commercial use of this resource to provide firm electrical power. The Petitioner will continue to monitor these technologies for possible use should they become cost-effective.

No residential areas or other sensitive receptors are located within 250 feet of any of the proposed transmission lines, and no development exists around the Property proposed for the Waena Generating Station. The community of Puunene, approximately 3 miles Northwest of the Property, is the nearest location of residential and commercial uses. The community of Pukalani, is approximately 4 miles away and southwest of the Property.

The Petitioner evaluated the potential impact of the Maui Vortex on the emissions from the proposed Waena Generating Station to determine whether the emissions would be drawn into the vortex and accumulate within the vacuum. The evaluations found no significant plume impacts on the vortex. The evaluations further determined that even with a worse case scenario of a persistent vortex entrapping emissions for a month, worse case concentrations of the significant criteria pollutants (SO_2 , NO_2 , PM_{10} ,) would be well below the EPA's 24-hour significance levels concentrations.

The FEIS summarized the Best Available Control Technology (BACT) currently used in other utility projects in Hawaii which may be appropriate for use at the proposed Waena Generating Station. The BACT for the proposed Waena Generating Station cannot be determined until the DOH and the US Environmental Protection Agency (EPA) review the design-specific elements and modeled air emissions through the air quality permit process. Regardless of the BACT required through the PSD permit process, air emissions will meet all applicable standards and regulations. The construction and operation of the proposed Waena Generating Station will be permitted only if the Petitioner demonstrates to the satisfaction of State and Federal regulatory agencies that the proposed facility fully complies with the applicable rules, regulations, and air

quality standards. The Best Available Control Technology for the proposed generating station will be determined during the PSD permitting process.

RECOMMENDATION

Based on the foregoing information and analysis, the Office of Planning recommends that the Petition by the Maui Electric Company, to reclassify approximately 65.7 acres of land in the Wailuku and Makawao Districts, Island of Maui, County of Maui, as identified by Tax Map Key Numbers 3-8-03: 23 and 3-8-03: 24, from the Agricultural District to the Urban District be approved subject to the following conditions:

1. Petitioner shall participate in an air quality monitoring program, coordinated with and approved by the State Department of Health (DOH) to monitor air quality impacts attributable to the operations of the Waena Generating Station. Mitigation measures for air quality impacts attributable to the operations of the Waena Generating Station shall be implemented by Petitioner if, based on applicable State and Federal air quality standards, the results of the monitoring program warrant them. Mitigation measures shall be developed in coordination with the DOH and implemented by Petitioner.
2. Petitioner shall participate in a groundwater quality monitoring program in consultation with the County Department of Water and approved by the State Department of Health (DOH), to monitor groundwater quality impacts directly attributable to the operations of the Waena Generating Station. The Petitioner shall implement mitigation measures should the results of the monitoring program warrant them based on applicable State and Federal water quality standards. Mitigation measures shall be developed in coordination with the DOH and implemented by Petitioner.

3. Petitioner shall provide at its own expense, adequate non-potable water source, storage, and transmission facilities and improvements to accommodate the proposed project. The non-potable water improvements shall meet all applicable County, State, and Federal standards and shall be consistent with the County of Maui adopted water use and development plan.
4. Petitioner shall consult with the State Department of Health (DOH) and, if necessary, prepare a wastewater disposal plan subject to review and approval by the DOH. Petitioner shall provide at its own expense adequate wastewater treatment, transmission and disposal facilities for wastewater directly attributable to the operations of the Waena Generating Station.
5. Petitioner shall establish appropriate systems to contain spills and prevent materials associated with heavy industrial uses attributable to the operations of the Waena Generating Station, such as petroleum products, chemicals or other pollutants, from leaching or draining into above ground or subsurface storm drainage collection areas. Based on applicable State and Federal standards, Petitioner shall use best management practices to minimize non-point source pollution into irrigation ditches. Petitioner shall consult with the State Department of Health and County Department of Public Works and Waste Management and obtain any permits required or construct improvements required for storm water discharge on the Property.
6. Storage and/or disposal of hazardous wastes attributable to the operations of the Waena Generating Station shall be approved by the applicable Federal, State, and/or County agencies prior to their establishment on the Property.
7. Petitioner shall participate in the funding and construction of local and regional transportation improvements and programs attributable to the operations of the Waena

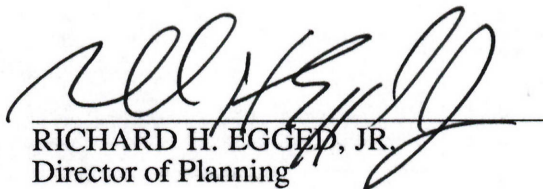
Generating Station as determined by the State Department of Transportation (DOT) and the County of Maui.

8. Petitioner shall coordinate with the surrounding property owner to ensure that the proposed project will not adversely impact the use of cane haul roads and irrigation ditches or adversely impact the continued agricultural operation of adjoining sugar cane cultivation areas.
9. Petitioner shall participate in the pro rata funding and construction of adequate civil defense measures as determined by the State of Hawaii and County of Maui civil defense agencies.
10. Petitioner shall implement effective soil erosion and dust control measures during and after construction in compliance with the applicable rules and regulations of the State Department of Health and the County of Maui.
11. Should any human burials or any historic artifacts, such as charcoal deposits, stone platforms, pavings or walls be found, Petitioner shall stop work in the immediate vicinity and contact the State Historic Preservation Division (SHPD). The significance of these finds shall then be determined and approved by the SHPD and, if applicable, an acceptable mitigation plan shall be approved by the SHPD. The SHPD must verify

that the fieldwork portion of the mitigation plan has been successfully executed prior to work proceeding in the immediate vicinity of the find. Burials must be treated under specific provisions of Chapter 6E, HRS.

DATED at Honolulu, Hawaii, this 11th day of February 1998.

OFFICE OF PLANNING
STATE OF HAWAII



RICHARD H. EGGED, JR.
Director of Planning

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing Position Statement was served upon the following by either hand delivery or depositing the same in the U.S. Postal Service:

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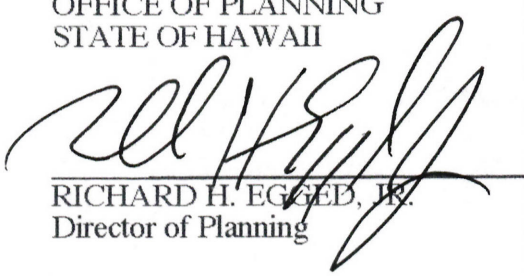
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DATED: Honolulu, Hawaii, this 11th day of February, 1998.

OFFICE OF PLANNING
STATE OF HAWAII


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Director of Planning