

PROPOSED

COVERED SOURCE PERMIT REVIEW - 0234-01-C
Application No. 0234-02

Facility: Kanoelehua Hill Generating Station

Located at: Hilo, Hawaii, UTM: Zone 5, 248.3 km east, 2179.8 km north

Applicant: Hawaii Electric Light Company, Inc. (HELCO)

Responsible Official: Dan V. Giovanni

Manager, Production Department
(808) 969-0421

POC: Michael Watanabe

Environmental Department
(808) 543-4517

Company's Mailing Address: HELCO

P. O. Box 1027
Hilo, HI 96721-1027

SICC: 4911

Background:

The Kanoelehua Generating Station produces electrical power through the combustion of fossil fuels. The station houses two boilers, one combustion turbine generator, four diesel engine generators, and six fixed roof petroleum storage tanks.

Diesel fuel no. 2 will be used on the DEGs and CT. Fuel oil nos. 2 and 6 and spec used oil will be burned in the two boilers.

This application is for the renewal of 0234-01-C. In 2003, HELCO installed silencers on the exhaust stacks of diesel engine generators, unit nos. D-11, 15, 16, and 17, and the combustion turbine, unit no. CT-1. This resulted in an increased stack height, but no changes to the exhaust flow. Aside from the installation of the silencers, no other physical changes are being proposed and the facility will operate under the same means and methods as permitted in the initial covered source permit issued on May 17, 1999. This permit renewal is based on the renewal application dated April 30, 2003, the additional information provided on March 10, 2004 and August 26, 2004, and the initial covered source permit issued on May 17, 1999.

Equipment:

Unit Description

- Hill 5 14.1 MW Combustion Engineering Boiler, Model No. VU 60;
- Hill 6 23 MW Combustion Engineering Boiler, Model No. VU 60;
- CT-1 11.6 MW General Electric Combustion Turbine, Model No. MS5001D;
- D-11 2.0 MW Fairbanks Morse Diesel Engine Generator;
- D-15 2.75 MW General Motors Diesel Engine Generator, Model No. EMD 20-645;
- D-16 2.75 MW General Motors Diesel Engine Generator, Model No. EMD 20-645; and
- D-17 2.75 MW General Motors Diesel Engine Generator, Model No. EMD 20-645.

Air Pollution Controls:

None of the emission units have any air pollution control devices.

Applicable Requirements:

Hawaii Administrative Rules (HAR):

Chapter 11-59, Ambient Air Quality Standards

Chapter 11-60.1 Air Pollution Control

Subchapter 1, General Requirements

Subchapter 2, General Prohibitions

11-60.1-31 Applicability

11-60.1-32 Visible Emissions

11-60.1-38 Sulfur Oxides from Fuel Combustion

Subchapter 5, Covered Sources

Subchapter 6, Fees for Covered Sources, Noncovered Sources, and

Agricultural Burning

11-60.1-111 Definitions

11-60.1-112 General Fee Provisions for Covered Sources

11-60.1-113 Application Fees for Covered Sources

11-60.1-114 Annual Fees for Covered Sources

11-60.1-115 Basis of Annual Fees for Covered Sources

PROPOSED

CERR (Consolidated Emission Reporting Rule):

40 CFR part 51, Subpart A – Emission Inventory Reporting Requirements, determines applicability based on the emissions of each pollutant from any individual emission point within the facility that emits at the triggering levels. The emissions from each unit exceed the trigger level for NO_x and thus, are subject to CERR.

CDS (Compliance Data System):

CDS is an inventory system for covered sources subject to annual inspections. CDS requirements apply because the facility is a covered source

Non-Applicable Requirements:

BACT:

A BACT analysis is required for new or modified sources if the net increase in pollutant emissions exceeds significant levels as defined in HAR §11-60.1-1. This is a renewal for an existing source with no proposed modifications. Therefore, a BACT analysis is not required.

CAM:

The purpose of Compliance Assurance Monitoring (CAM) is to provide a reasonable assurance that compliance is being achieved with large emissions units that rely on air pollution control device equipment to meet an emissions limit or standard. Pursuant to 40 Code of Federal Regulations, Part 64, for CAM to be applicable, the emissions unit must: (1) be located at a major source; (2) be subject to an emissions limit or standard; (3) use a control device to achieve compliance; (4) have potential pre-control emissions that are 100% of the major source level; and (5) not otherwise be exempt from CAM. CAM is not applicable because the units are not subject to any emission limits or standards.

NESHAP:

40 CFR Part 63, Subpart YYYY National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines is not applicable to combustion turbine CT1 because the facility is not a major source of HAPs and the construction occurred prior to January 14, 2003.

PROPOSED

40 CFR Part 63, Subpart ZZZZ National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines is not applicable to the diesel engines because the facility is not a major source of HAPs.

NSPS:

The fixed roof petroleum storage tanks are insignificant activities and are not subject to the New Source Performance Standards (NSPS) Subparts K, Ka and Kb because the true vapor pressure of the fuels stored are less than 3.5 kPa.

The boilers are not subject to NSPS Subparts D, Da, and Db because the date of construction precedes the trigger dates.

NSR:

NSR is not applicable since the facility is located in an attainment area and PSD applicability has been reviewed.

PSD:

Prevention of Significant Deterioration is not applicable to any of the emission units. Since no changes or modifications were proposed to the existing units, a PSD review is not necessary.

Synthetic minor:

A synthetic minor is a facility that without limiting conditions, physical or operational, emits above the major source triggering levels as defined by HAR 11-60.1-1 for either criteria pollutant(s) or hazardous air pollutant(s). This facility is a major source and thus, is not a synthetic minor.

Insignificant Activities/Exemptions:

No new insignificant activities were listed and the insignificant activities identified in the initial permit application are listed in the initial permit write-up.

<u>Basis for Exemption</u>	<u>Description</u>
HAR § 11-60.82(f)(1)	The Kanoelehua Hill Facility contains VOC storage tanks with capacities less than 40,000 gallons that are not subject to Section 111 or 112. At the gasoline dispensing station there is a 10,000 gallon gasoline underground storage tank and a 6,000 gallon diesel underground storage tank.

PROPOSED

- HAR § 11-60.82(f)(5) There is one existing 60 kW standby diesel generator on site.
- HAR § 11-60.82(f)(7) The station could have fugitive equipment leaks from valves, flanges, pump seals and VOC water separators; gasoline dispensing; one propane igniter system for Hill 5 which emits to the stack and operates 5 minutes daily on propane to start Hill 5; one diesel igniter for Hill 6 which operates 5 minutes daily on diesel to start Hill 6; storage of up to 500 gallons of H₂SO₄ which is used for wastewater treatment; solvents are used for maintenance purposes; and acid or vertan may be used for periodic boiler cleaning.

Insignificant activities in addition to those listed in subsection (f) are:

<u>Basis for Exemption</u>	<u>Description</u>
HAR § 11-60.82(g)(1)	The Kanoelehua Hill Facility uses welding booths for maintenance purposes.
HAR § 11-60.82(g)(2)	The Kanoelehua Hill Facility uses several types of hand held equipment for maintenance and testing purposes. Sandblasting equipment is the most likely to generate particulate emissions. Reasonable precautions are taken to prevent particulate matter from becoming airborne.
HAR § 11-60.82(g)(3)	The Kanoelehua Hill Facility uses laboratory equipment for chemical and physical analysis.
HAR § 11-60.82(g)(4)	Containers and tanks are for maintenance purposes.
HAR § 11-60.82(g)(8)	The facility uses gasoline-fired equipment less than 25 hp.
HAR § 11-60.82(g)(9)	A variety of maintenance and upkeep actives are performed at the facility.
HAR § 11-60.82(g)(12)	The facility has stacks and vents for sewer gases.
HAR § 11-60.82(g)(13)	The facility uses office equipment and products.

Alternate Operating Scenarios:

No new alternate operating scenarios were proposed. Below is a list of current alternate operating scenarios.

1. The first alternate operating scenario is temporary unit replacement in the event of failure or major overhaul of an installed unit.

PROPOSED

2. A second alternate scenario is the unit operating during start-up, shutdown, maintenance, and testing. Boiler startup operations may range up to 7 hours. Maintenance activities include soot blowing which shall not exceed 1.5 hours in durations, two times a day.
3. A third scenario is the ability to switch fuels.
4. A fourth occurs during emergency load conditions. The equipment may operate at 110% load for no more than 30 minutes in duration.
5. A fifth alternative operating scenario involves the use of fuel additives to reduce corrosion, control biological growth, and enhance combustion, etc.

Project Emissions:

The operations of the emissions units at the Kanoelehua-Hill Maalaea Generating Station are unchanged from the initial permit application. As such, no new emission calculations were necessary. The table below lists the emissions from each of the emission units. Emissions were estimated using emission factors from AP-42. The heat content of fuel No. 2 and No. 6 were assumed to be 19,372 Btu/lb and 18,161 Btu/lb, respectively. Table Nos. 1 to 5 summarize the potential emissions from the facility.

**TABLE 1
NITROGEN OXIDES (NO_x) EMISSIONS**

Emission Unit No.	AP-42 EF (lb/MMBtu)	Assumed EF (lb/MMBtu)	Heat Input (MMBtu/hr)	Emission Rate (lb/hr)	Emission Rate (TPY)
Hill 5	0.444	0.701	197	138	604
Hill 6	0.278	0.474	249	118	517
CT-1	0.698	0.838	177.2	148	648
D-11	3.1	3.72	20.2	75	329
D-15	3.1	3.72	29.1	108	473
D-16	3.1	3.72	29.1	108	473
D-17	3.1	3.72	29.1	108	473

**TABLE 2
SULFUR DIOXIDE (SO₂) EMISSIONS**

Emission Unit No.	AP-42 EF (lb/MMBtu)	Assumed EF (lb/MMBtu)	Heat Input (MMBtu/hr)	Emission Rate (lb/hr)	Emission Rate (TPY)
Hill 5	NA	2.2	197	433	1,897
Hill 6	NA	2.2	249	548	2,400
CT-1	NA	0.41	177.2	73	320
D-11	NA	0.41	20.2	8	35
D-15	NA	0.41	29.1	12	53
D-16	NA	0.41	29.1	12	53
D-17	NA	0.41	29.1	12	53

**TABLE 3
CARBON MONOXIDE (CO) EMISSIONS**

Emission Unit No.	AP-42 EF (lb/MMBtu)	Assumed EF (lb/MMBtu)	Heat Input (MMBtu/hr)	Emission Rate (lb/hr)	Emission Rate (TPY)
Hill 5	0.033	0.066	197	13	57
Hill 6	0.033	0.066	249	16	70
CT-1	0.048	0.096	177.2	17	74
D-11	0.81	1.62	20.2	33	145
D-15	0.81	1.62	29.1	47	206
D-16	0.81	1.62	29.1	47	206
D-17	0.81	1.62	29.1	47	206

PROPOSED

**TABLE 4
PARTICULATE MATTER LESS THAN 10 μ m (PM₁₀) EMISSIONS ^a**

Emission Unit No.	AP-42 EF (lb/MMBtu)	Assumed EF (lb/MMBtu)	Heat Input (MMBtu/hr)	Emission Rate (lb/hr)	Emission Rate (TPY)
Hill 5	0.144	0.292	197	58	254
Hill 6	0.144	0.403	249	100	438
CT-1	0.061	0.073	177.2	13	57
D-11	.0763	0.168	20.2	3.4	15
D-15	.0763	0.092	29.1	2.7	12
D-16	.0763	0.092	29.1	2.7	12
D-17	.0763	0.092	29.1	2.7	12

^a All particulate matter from these sources are assumed to be less than 10 microns in diameter.

**TABLE 5
VOLATILE ORGANIC COMPOUNDS (VOC) EMISSIONS**

Emission Unit No.	AP-42 EF (lb/MMBtu)	Assumed EF (lb/MMBtu)	Heat Input (MMBtu/hr)	Emission Rate (lb/hr)	Emission Rate (TPY)
Hill 5	0.005	0.01	197	2.0	9
Hill 6	0.005	0.01	249	2.5	11
CT-1	0.017	0.03	177.2	6.0	26
D-11	0.1	0.2	20.2	4.0	18
D-15	0.1	0.2	29.1	5.8	25
D-16	0.1	0.2	29.1	5.8	25
D-17	0.1	0.2	29.1	5.8	25

PROPOSED

Air Quality Assessment:

All modeling was performed in accordance with the USEPA modeling guidelines outlined in 40 CFR Part 51 Appendix W, as well as the Department guidelines. The impacts of the Kanoelehua Hill Generating Station were predicted using the ISCST3 air quality dispersion model. ISCST3 is capable of modeling the terrain associated with the generating station. The maximum concentrations predicted by this model were used to determine the impact on ambient air.

Using land-use classifications, the area surrounding the generating station was determined to be rural. BPIP was used to determine building downwash. Table 6 below lists the emission rates and stack parameters used in the model.

**TABLE 6
EMISSION RATES AND STACK PARAMETERS**

Unit No.	Emission Rates				Stack Parameters			UTM		Elev. (m)
	SO ₂ (g/s)	NO _x (g/s)	CO (g/s)	PM ₁₀ (g/s)	Height (m)	Velocity (m/s)	Dia. (m)	East (m)	North (m)	
CT-1	9.22	18.70	2.14	1.63	8.5	22.80	1.50	283,602	2,180,516	14.4
Hill 5	54.67	17.39	1.64	7.24	39.9	14.60	1.52	283,727	2,180,434	16.2
Hill 6	69.10	14.87	2.08	12.65	39.9	11.67	2.29	283,735	2,180,408	16.7
D11	1.05	9.47	4.12	0.43	6.4	58.60	0.46	283,510	2,180,548	13.4
D15	1.51	13.64	5.94	0.34	6.6	23.30	0.81	283,510	2,180,542	13.6
D16	1.51	13.64	5.94	0.34	6.6	23.30	0.81	283,511	2,180,536	13.7
D17	1.51	13.64	5.94	0.34	6.6	23.30	0.81	283,511	2,180,529	13.7

PROPOSED

Since five years of meteorological data from the Hilo Airport were used in the modeling, the second-highest modeled concentrations were used for the short-term averages for SO₂ and CO. The annual SO₂ concentrations were predicted to be greater than 75 percent of the SAAQS. Thus, a refined grid spacing of 30 meters was used to determine the maximum impacts for SO₂. Background concentrations were not added to the modeled results because the generating station is an existing source and the addition of the silencers are not a significant modification. Table 7 below summarizes the results of the ambient air quality assessment.

**TABLE 7
SUMMARY OF THE AIR QUALITY IMPACT RESULTS**

Pollutant	Averaging period	Kanoelehua (µg/m ³)	SAAQS, (µg/m ³)	% of SAAQS	Peak Location (UTM)	
					East (m)	North (m)
NO ₂ ^a	annual	49	70	70	283,512	2,180,485
SO ₂ ^b	3-hr	1,132	1,300	87	283,512	2,180,485
	24-hr	240	365	66	283,512	2,180,485
	annual	34	80	43	283,000	2,178,700
CO ^b	1-hr	1,979	10,000	20	283,512	2,180,472
	8-hr	902	5,000	18	283,512	2,180,485
PM ₁₀ ^c	24-hr	79	150	53	283,512	2,180,485
	annual	6	50	12	283,000	2,178,700

^a Based on 75% NO_x to NO₂ conversion.

^b Short-term concentrations are the 2nd highest values.

^c All particulate matter was assumed to be less than 10 microns in diameter.

Conclusion and Recommendation:

The proposed changes to the stacks are a benefit, as it reduces the noise emissions, and the modeled impacts are within the NAAQS and SAAQS. The facility has been operating in compliance since the initial operating permit was issued in May 1999. Since the means and methods of operation remain the same, the facility should continue to operate in compliance.

Recommend renewal of operating permit.