

COVERED SOURCE PERMIT REVIEW - PERMIT 0237-01-C
RENEWAL APPLICATION NO. 0237-02

Facility Title: Waimea Generating Station

UTM: 217.7 km East, 2,216.9 km North, Old Hawaiian

Located at: Kamuela, Hawaii

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

Responsible Official: Norman Verbanic

Manager, Production Department

(808) 969-0421

Point of Contact: Barry Nakamoto, (808) 543-4515

Company's Mailing Address: Hawaii Electric Light Company, Inc.

Waimea Generating Station

P.O. Box 1027

Hilo, HI 96721

Background:

The Waimea Generating Station (WGS) operates three 2.5 MW diesel engine generators, unit nos. D12, D13 and D14, for commercial electric power generation. The three diesel engine generators are fired on fuel oil no. 2 with a maximum sulfur content of 0.5 percent by weight and may operate 24 hours per day, 7 days per week.

The fuel oil no. 2 is delivered to the generators from two 1,015 barrel above ground storage tanks nos. TK-1 and TK-2.

There are no proposed changes in the renewal application.

Air Pollution Controls:

Sulfur emissions are controlled by limiting the fuel sulfur content to 0.5 percent by weight.

PM, PM₁₀, CO, and VOCs are controlled by good combustion practices.

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

CERR (Consolidated Emission Reporting Rule):

40 CFR part 51, Subpart A – Emission Inventory Reporting Requirements, determines the annual emissions reporting frequency based on the actual emissions of each pollutant from any individual emission point within the facility that emits at or above the triggering levels. The diesel engines are subject to annual CERR reporting requirements because each diesel engine has the potential to emit more than 100 tons per year of NO_x. The CERR trigger level for NO_x is 100 tons per year.

Non-Applicable Requirements:

BACT:

A Best Available Control Technology (BACT) analysis is required for each new or modified emissions unit located within a stationary source that has a net emissions increase equal to or greater than the significant levels defined in HAR §11-60.1-1. The diesel engines are existing equipment and no modifications are being proposed. As such, BACT does not apply.

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. The diesel engines do not have an emission limit and thus, CAM does not apply.

NESHAP/MACT:

40 CFR 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:

NSPS is not applicable since there is no specific NSPS for the specific source category of diesel engine generators. 40 CFR Part 60 Subparts K, Ka, and Kb are not applicable to the petroleum storage tanks because the petroleum liquids stored have a true vapor pressure of less than 3.5 kPa.

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 review is not applicable to any of the emission units because no changes or modifications were proposed to the existing units.

Synthetic minor:

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

Insignificant Activities/Exemptions:

The two 1,015 barrel above ground petroleum storage tanks, TK-1 and TK-2, store fuel oil no. 2 and are insignificant activities based on the low vapor pressure of fuel oil no. 2. The tanks are

exempt from NSPS for the same reason. Other insignificant activities based on size, emission level, or production rate, are as follows:

- Several paint spray booths are used for maintenance purposes;
- Welding booths are used for maintenance purposes;
- Handheld power tools are used for maintenance and testing purposes;
- Laboratory equipment is used for chemical and physical analysis; and
- Sewer stacks and vents prevent escape of sewer gases through plumbing traps.

Alternate Operating Scenarios:

There are five alternate operating scenarios that were requested by the permittee.

1. In the event of a sudden malfunction or a planned major overhaul, the diesel engine generators maybe replaced with temporary replacement unit. The operation of the temporary replacement unit must comply with all permit conditions that apply to the permitted unit.
2. Start-up, shutdown, maintenance, and testing. During start-up and shutdown, the unit may exceed the 40 percent opacity limit for brief periods - no more than six minutes in any 60-minute period. Aside from the temporary replacement of a unit, there are no special conditions for maintenance and testing.
3. The ability to switch primary fuel. Upon written approval from the Department, the permittee could switch fuels. The burning of an alternative fuel cannot result in an increase in emissions of any air pollutant or in the emission of any air pollutant not previously emitted.
4. The use of fuel additives to control algae and inhibit corrosion. Additives associated with this scenario will not affect emission estimates.

Project Emissions:

Emissions from the three diesel engine generators were estimated using AP-42 emission factors, section 3.4 revised 10/96. SO₂ emissions were estimated using AP-42 emission factor of 1.01S, where S is the sulfur content of the fuel. HELCO is proposing to burn fuel oil no. 2 with a maximum sulfur content of 0.5 percent sulfur by weight. Thus, S = 0.50.

Emission estimates for all pollutants were calculated assuming the units operated 24 hours per day, seven days per week. The heating value used for fuel oil no. 2 was 138,356 Btu/gal. This heating value has been used by HELCO in the past to calculate annual emissions and fees.

Tables 1 and 2 lists the emissions factors and estimated maximum potential emissions for each diesel engine generator.

Table 1
Maximum Potential Emissions (each DEG)

Pollutant	Emission Factor (lb/MMBtu)	Emissions (TPY)	Emissions (lb/hr)
SO ₂	0.51	64.4	14.69
NO _x	3.20	407.8	93.11
CO	0.85	108.3	24.73
TOC/VOC	0.09	11.5	2.62
PM ₁₀	0.06	7.3	1.671

Table 2
Maximum Potential HAP Emissions (each DEG)

Pollutant	Emission Factor (lb/MMBtu)	Emissions (TPY)
Acetaldehyde	2.52 x 10 ⁻⁵	3.21 x 10 ⁻³
Acrolein	7.88 x 10 ⁻⁶	1.00 x 10 ⁻³
Benzene	7.76 x 10 ⁻⁴	9.89 x 10 ⁻²
Formaldehyde	7.89 x 10 ⁻⁵	1.01 x 10 ⁻²
Naphthalene	1.30 x 10 ⁻⁴	1.66 x 10 ⁻²
Toluene	2.81 x 10 ⁻⁴	3.58 x 10 ⁻²
Xylene	1.93 x 10 ⁻⁴	2.46 x 10 ⁻²

For the two petroleum storage tanks, VOC emission rates were calculated using AP-42, Section 7.1, revised 9/97. The estimated emissions for each storage tank are tabulated in Table 3 below.

Table 3
Maximum Potential Emissions (each storage tank)

Pollutant	Emission Rate (lbs/hr)	Emissions (TPY)
VOC	8.22×10^{-3}	3.6×10^{-2}
Hazardous Air Pollutants		
Benzene	8.50×10^{-5}	3.72×10^{-4}
Hexane	3.03×10^{-5}	1.32×10^{-4}
o-Xylene	1.06×10^{-5}	4.66×10^{-5}
Ethylbenzene	1.06×10^{-5}	4.66×10^{-5}
p-Xylene	1.31×10^{-5}	5.73×10^{-5}
m-Xylene	3.76×10^{-5}	1.65×10^{-4}
Toluene	1.74×10^{-4}	7.63×10^{-4}

The maximum potential emissions for the facility are summarized in Table 4. The Waimea Generating Station is a major covered source because the NO_x (as NO₂), SO₂, and CO emissions are each greater than 100 tons per year. The facility is not a major source for HAPs, as the HAP emissions are less than 10 tons per year individually and less than the 25 tons per year combined.

Table 4
Maximum Potential Emissions, Facility-wide

Pollutant	Total Emissions (TPY)
NO ₂	1,223
SO ₂	193
PM10	22
CO	325
VOC	35
Hazardous Air Pollutants	
Acetaldehyde	1.0×10^{-2}
Acrolein	3.0×10^{-3}
Benzene	3.0×10^{-1}
Ethylbenzene	9.3×10^{-5}
Formaldehyde	3.0×10^{-2}
Hexane	2.6×10^{-4}
Naphthalene	5.0×10^{-2}
Toluene	1.1×10^{-1}
Xylene	7.0×10^{-2}
Total HAP emissions (TPY)	5.7×10^{-1}

Air Quality Assessment:

An ambient air quality assessment was not performed for this renewal because no modifications were proposed. The ambient air quality assessment that was submitted in the initial permit application remains valid. The tables below list the inputs and results of the initial ambient air quality assessment using the ISC_RTDM model. Details of the assessment can be found in the initial permit write-up.

Table 5
Source Emissions Rates and Stack Parameters

Unit No.	EMISSION RATES				STACK PARAMETERS				STACK COORDINATES		
	SO ₂ (g/s)	NO _x (g/s)	CO (g/s)	PM ₁₀ (g/s)	Height (m)	Temp. (K)	Velocity (m/s)	Dia. (m)	Easting (m)	Northing (m)	Base Elev. (m)
D12	1.89	11.73	4.46	0.28	6.1	677.6	23.35	0.81	217,715	2,216,913	749.8
D13	1.89	11.73	4.46	0.28	6.1	677.6	23.35	0.81	217,723	2,216,921	749.8
D14	1.89	11.73	4.46	0.28	6.1	677.6	23.35	0.81	217,729	2,216,922	749.8

TABLE 6
Ambient Air Quality Impact Analysis

Pollutant	Averaging Period	Maximum Concentration (µg/m ³)	NAAQS (µg/m ³)	SAAQS (µg/m ³)	Percent of SAAQS
SO ₂	3-hr	1,209	1,300	1,300	93%
	24-hr	214	365	365	58%
	annual	12	80	80	15%
PM ₁₀	24-hr	32	150	150	21%
	annual	2	50	50	4%
NO ₂ ^a	annual	56	100	70	80%
CO	1-hr	4,796	40,000	10,000	48%
	8-hr	1,296	10,000	5,000	26%

^a – assumes NO₂ = NO_x * (0.75), 40 CFR 51 Appendix W, section 6.2.3.

Conclusion and Recommendation:

This is an existing source and the applicant has operated the facility in compliance with the initial Covered Source Permit. No changes are being proposed for the facility and there are no indications that the facility will operate out of compliance. As such, it is recommended that the renewal of this covered source permit be granted.