

Covered Source Permit Review Summary (Renewal)

Application No.: 0686-03

Permit No.: 0686-01-C

Applicant: Hawaiian Electric Company, Inc. (HECO)

Facility: Honolulu International Airport Dispatch Standby Generators
Rogers Blvd., Honolulu, Hawaii 96819
UTM Coordinates: Zone 4, 612,067 m E, 2,359,750 m N,
(NAD-83)

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Application Date: November 30, 2013

Proposed Project:

SICC 4911 (Electrical Services)

HECO is applying for the renewal of its existing Covered Source Permit (CSP) No. 0686-01-C which consists of four (4) 2.5 MW diesel engine generators at the Honolulu International Airport. This is a joint project between the Department of Transportation Airports Division (DOT Airports) and HECO. DOT Airports has built and owns the ten (10) MW Emergency Power Facility (four (4) 2.5 MW units peak), feeding Honolulu Airport via HECO's system. HECO will operate the four (4) generating units for utility system needs and will dispatch these units at the continuous rating of 8 MW total (i.e., 2 MW per unit). HECO and DOT have negotiated a Dispatchable Standby Generation (DSG) agreement, subject to PUC approval, to govern HECO's operation of the units and DOT's use of HECO's substation and electric lines. This project is critical to bolster the Airport's emergency power needs.

In the amendment to CSP No. 0686-01-C dated April 3, 2012 (Significant Modification Application No. 0686-02), the following modifications for Units 1, 2, 3, and 4 were incorporated into the covered source permit:

PROPOSED

- Addition of biodiesel as a primary fuel with a maximum sulfur content of fifteen (15) ppm. Authorization will allow firing of 100% biodiesel (B100) and blends of biodiesel and Ultra Low Sulfur Diesel (ULSD), and 100% ULSD.
- Stack height increase to 87.5 feet for Units 1, 2, 3, and 4;
- Combined annual fuel limit of 1,562,276 gallons per rolling twelve-months (12-months);
- NO_x emission rate increase to 54.8 lb/hr from 48.10 lb/hr; and
- Incorporation of applicable notification and testing requirements as required in accordance with 40 Code of Federal Regulations (CFR) Part 60 Subpart IIII.

The increase in stack height is to address the higher NO_x emission rate anticipated when firing biodiesel, the combined annual fuel limit, and the one-hour (1-hour) NO₂ NAAQS which became effective in April 2010.

HECO increased the NO_x emission rate up to the applicable 40 CFR Part 60, Subpart IIII NO_x emission standard for the following reasons:

- Caterpillar has not certified its Model 3516C-HD on biodiesel;
- Emissions data for biodiesel is not available for the Caterpillar model 3516C-HD; and
- Based on biofuel testing, it is anticipated that NO_x emissions will increase when firing biodiesel.

40 CFR Part 60 Subpart IIII contains tiered emission standards. Non-emergency diesel engines greater than 3,000 hp, with displacement less than ten (10) liters per cylinder, manufactured between January 1, 2007 and December 31, 2010, must meet the EPA Tier-1 emission standards. Engine manufacturers are required to certify their engines to meet these applicable NSPS Subpart IIII emission standards. Caterpillar has certified its Model 3516C-HD to meet the EPA Tier-2 emission standards on diesel fuel, but has not certified this engine on biodiesel.

Caterpillar has limited biodiesel emissions data for its engines. Currently, Caterpillar does not have B100 emissions data for the engines purchased for this project.

An application fee of \$3000.00 was submitted and processed for the renewal of the covered source permit.

Equipment Description:

1. Four (4) 2.5 MW diesel engine generators each consisting of a Caterpillar Model 3516C-HD TA diesel engine generator with ACERT Technology
Maximum fuel consumption rate @ 2 MW load = 142 gal/hr
Maximum fuel consumption rate @ 2.5 MW load = 172 gal/hr

Air Pollution Controls:

1. The diesel engine generators burn diesel no. 2, biodiesel (B100), and blends of biodiesel (B100) and diesel no. 2 with a maximum sulfur content of 0.0015% by weight for controlling SO₂ emissions and HAPs.
2. The diesel engine generators are equipped with Caterpillar's ACERT Technology to meet EPA's Tier 2 emission standards for NO_x, CO, HC, and PM. ACERT Technology

reduces emissions at the point of combustion using air and fuel management and electronic controls.

Site Inspection:

An inspection of the HECO Airport DEGs was made on 8/8/2013 at 9:00 a.m. Jon Yanagida (with Karin Kimura and Glen Kashiwabara) from HECO were present to provide a tour of the new facility. The facility is still undergoing construction. The earliest startup date is November 2013. There are some problems with the electrical controls that is delaying construction. The facility has two (2) 50,000 gallon internal floating roof storage tanks used to store biodiesel, with room for an additional 50,000 gallon storage tank, if necessary, in the future. One tank can supply fuel for the facility for 2-½ to 3 days. There are four (4) 2.5 MW Caterpillar DEGs installed. Providing cooling for the DEGs are fifty (50) hp fans. The exhaust stacks have raincaps installed that will be later removed. The building has additional insulation, and baffles for noise attenuation on both the intake and exhaust and on the cooling system.

Applicable Requirements:

Hawaii Administrative Rules (HAR)

Title 11, Chapter 59	Ambient Air Quality Standards
Title 11, Chapter 60.1	Air Pollution Control
Subchapter 1	General Requirements
Subchapter 2	General Prohibitions
HAR 11-60.1-31	Applicability
HAR 11-60.1-32	Visible Emissions
HAR 11-60.1-38	Sulfur Oxides from Fuel Combustion
Subchapter 5	Covered Sources
Subchapter 6	Fees for Covered Sources, Noncovered Sources, and Agricultural Burning
HAR 11-60.1-111	Definitions
HAR 11-60.1-112	General Fee Provisions for Covered Sources
HAR 11-60.1-113	Application Fees for Covered Sources
HAR 11-60.1-114	Annual Fees for Covered Sources
Subchapter 8	Standards of Performance for Stationary Sources
Subchapter 9	Hazardous Air Pollutant Sources

Federal Requirements

40 CFR Part 60 - Standards of Performance for New Stationary Sources (NSPS)

40 CFR Part 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. NSPS Subpart IIII applies to diesel engines manufactured after April 1, 2006.

40 CFR Part 63 - National Emission Standards for Hazardous Air Pollutants for Source Categories (Maximum Achievable Control Technologies (MACT) Standards)

40 CFR Part 63, Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. (RICE NESHP). This MACT standard applies to stationary reciprocating internal combustion engines

This facility emits at the AERR triggering level for NO_x. Therefore, AERR is applicable.

The Clean Air Branch also requests annual emissions reporting for all covered sources and from those facilities that have facility-wide emissions of a single air pollutant exceeding in-house triggering levels. Annual emissions reporting is required for this facility because it is a covered source.

Compliance Assurance Monitoring (CAM):

40 CFR Part 64

Applicability of the CAM Rule is determined on a pollutant specific basis for each affected emission unit. Each determination is based upon a series of evaluation criteria. In order for a source to be subject to CAM, each source must:

- Be located at a major source per Title V of the Clean Air Act Amendments of 1990;
- Be subject to federally enforceable applicable requirements;
- Have pre-control device potential emissions that exceed applicable major source thresholds;
- Be fitted with an “active” air pollution control device; and
- Not be subject to certain regulations that specifically exempt it from CAM.

Emission units are any part or activity of a stationary source that emits or has the potential to emit any air pollutant.

CAM is not applicable since this facility does not have equipment with an “active” air pollution control device.

Synthetic Minor Source:

This facility is not a synthetic minor source, it is a major source.

Insignificant Activities:

1. Three (3) internal floating roof diesel storage tanks (62,000 gallons), VOC emissions < 2 tons/yr, insignificant per HAR, Section 11-60.1-82(f)(7).
2. Plant maintenance and upkeep activities, insignificant per HAR, Section 11-60.1-82(f)(2).

Alternate Operating Scenarios:

The following alternate operating scenarios are proposed:

1. The first alternate operating scenario is the use of a replacement unit in the event of a failure or major overhaul of an installed unit. In the event that the projected down-time of the installed unit increases the likelihood of an interruption in electrical service, the installed unit would be replaced with an equivalent unit. Emissions from the replacement unit shall be equal or less than the original unit's emissions.
2. The second alternate operating scenario is the ability to burn an alternate fuel. Should cheaper fuel become available or the supply of diesel no. 2 or biodiesel become limited, HECO proposes an alternative scenario that would allow the burning of an alternate fuel provided that all conditions of the Covered Source permit are complied with.

Project Emissions:

Emissions for (4) 2.5 MW Diesel Engine Generators

Pollutant	Emission Factor (lb/MMBtu)	Heat Input ³ (MMBtu/hr)	Emission Rate (lb/hr)	Emission Rate ⁴ (tpy)
NO _x	2.275	24.1	54.8 ¹	249.04
SO ₂	1.51 E-03	24.1	0.036 ⁵	0.17
CO	0.243	24.1	5.86 ¹	26.61
PM	0.017	24.1	0.4 ¹	1.82
PM ₁₀	0.017	24.1	0.4 ¹	1.82
PM _{2.5}	0.017	24.1	0.4 ¹	1.82
VOC	0.0485	24.1	1.17 ¹	5.31
H ₂ SO ₄ Mist		24.1	0.005 ⁶	0.02
Fluorides		24.1	2.43 E-04 ⁷	1.06 E-03
Acetaldehyde	2.52 E-05 ²	24.1	6.07 E-04	2.76 E-03
Acrolein	7.88 E-06 ²	24.1	1.90 E-04	8.62 E-04
Benzene	7.76 E-04 ²	24.1	1.87 E-02	8.49 E-02
Formaldehyde	7.89 E-05 ²	24.1	1.90 E-03	8.64 E-03
Toluene	2.81 E-04 ²	24.1	6.77 E-03	3.08 E-02
Xylene	1.93 E-04 ²	24.1	4.65 E-03	2.11 E-02
1,3 Butadiene	1.60 E-05 ²	24.1	3.86 E-04	1.75 E-03
Naphthalene	1.30 E-04 ²	24.1	3.13 E-03	1.42 E-02
Arsenic	1.10 E-05 ²	24.1	2.65 E-04	1.20 E-03
Beryllium	3.10 E-07 ²	24.1	7.47 E-06	3.39 E-05
Cadmium	4.80 E-06 ²	24.1	1.16 E-04	5.25 E-04
Chromium	1.10 E-05 ²	24.1	2.65 E-04	1.20 E-03
Lead	1.40 E-05 ²	24.1	3.37 E-04	1.53 E-03
Manganese	7.90 E-04 ²	24.1	1.90 E-02	8.65 E-02
Mercury	1.20 E-06 ²	24.1	2.89 E-05	1.31 E-04
Nickel	4.60 E-06 ²	24.1	1.11 E-04	5.03 E-04
POM	2.12 E-04 ²	24.1	5.11 E-03	2.32 E-02
Selenium	2.50 E-05 ²	24.1	6.03 E-04	2.74 E-03
Total HAPS			6.22 E-02	0.28

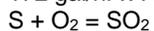
¹ Based on manufacturer's emission rates at 100% load. This engine meets EPA Tier 2 standards.

² Emission factors based on AP-42 (10/96) Table 3.4-3, Speciated Organic Compound Emission Factors for Large Uncontrolled Stationary Diesel Engines and Table 3.4-4, PAH Emission Factors for Large Uncontrolled Stationary Diesel Engines and AP-42 (4/00) Table 3.1-4, Emission Factors for Hazardous Air Pollutants from Distillate Oil-Fired Stationary Gas Turbines and Table 3.1-5, Emission Factors for Metallic Hazardous Air Pollutants from Distillate Oil-Fired Stationary Gas Turbines

³ Based on a maximum hourly fuel flow rate of 172 gal/hr and using a heating value of 140,000 Btu/gal for no. 2 diesel fuel = 24.1 MMBtu/hr

⁴ Based on (1,562,276 gallons/yr) / (172 gallons/hr) = 9,083 hrs/yr (total combined rate for the four (4) DEGs)

⁵ SO₂ emissions are based on a mass balance method and 0.0015% maximum sulfur content for fuel
172 gal/hr x 7.05 lb/gal x 0.000015 = 0.0182 lb/hr sulfur



32.06 g/mol + 32 g/mol = 64.06 g/mol

SO₂ = 32.06 / 64.06 = 0.0182/x

x = 0.036 lb/hr

⁶ H₂SO₄ emission rate based on 13.83% of the SO₂ emission rate (0.73 lb/hr / 5.28 lb/hr). This ratio is derived from the August 19, 1994 SCEC report of Maalaea M13 source tests.

⁷ Emission rate for Fluorides based on fuel test results of 0.2 ppm dated 04/11/85.

Greenhouse Gas (GHG) Emissions:

Mass Greenhouse Gas (GHG) Emissions

Unit No.	Fuel Type	Annual Operating Hours	Heat Input Capacity (MMBtu/hr)	CO ₂ Emission Factor ¹ (lb/MMBtu)	CO ₂ Annual Emissions (ton/yr)	N ₂ O Emission Factor ¹ (lb/MMBtu)	N ₂ O Annual Emissions (tons/yr)	CH ₄ Emission Factor ¹ (lb/MMBtu)	CH ₄ Annual Emissions (tons/yr)
(4) 2.5 MW Diesel Engine Generators	No. 2 Diesel	9,083	24.1	163.1	17,851	1.32E-03	0.15	6.62E-03	0.725
Total Annual Greenhouse Gas Emissions					17,851		0.145		0.725

¹ 40 CFR Part 98 Subpart C, Table C-1 and Table C-2

CO₂ Equivalent (CO₂e) Emissions

Unit No.	CO ₂ e (tpy) ¹		
	CO ₂	N ₂ O	CH ₄
(4) 2.5 MW Diesel Engine Generators	17,851	45.0	15.2
Total Annual CO₂e(tpy) = 17,911			

¹ CO₂e calculated using global warming potential (GWP) from 40 CFR Part 98 Subpart A, Table A-1.
GWP: CO₂ = 1, N₂O = 310, CH₄ = 21

Air Quality Assessment:

An ambient air quality assessment was not required for this permit renewal since operations would remain the same and there are no proposed changes.

Significant Permit Conditions:

There were no significant permit conditions added to this permit renewal since operations would remain the same and there were no proposed changes to the covered source permit.

Conclusion and Recommendations:

Recommend issuing the renewal for Covered Source Permit (CSP) No. 0686-01-C, subject to the significant permit conditions shown above, a 30-day public comment period and 45-day EPA review period. The facility will be in compliance with all State and National ambient air quality standards. This permit will supersede Covered Source Permit (CSP) No. 0686-01-C issued on December 11, 2008 and amended on April 3, 2012, in its entirety.

Reviewer: Darin Lum
Date: 8/2013