

Initial Covered Source Permit Review Summary

Application No.: 0088-21

Permit No.: 0088-03-C

Applicant: Chevron USA Products Company

Facility Title: One (1) 350 kW Black Start Diesel Engine Generator
Located At: 91-480 Malakole Street, Kapolei, Oahu

Mailing Address: Chevron USA Products Company
91-480 Malakole Street
Kapolei, Hawaii 96707

Responsible Official: Mr. Alan Davis
Refinery Manager
Chevron Products Company
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Point of Contact: Mr. Marcus Ruscio
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Application Dates: December 18, 2013 and revised application dated January 22, 2014

Proposed Project:

SICC 2911 (Petroleum Refining)

Chevron Products Company is applying for a Significant Modification to a Covered Source Permit. Chevron proposes to install and operate a 350 kW (755 hp) black start diesel engine generator. The generator will be providing emergency backup power to a cogeneration unit turbine in the event of a power loss. The unit is to be only operated during emergency situations and required maintenance and performance testing, and excludes operation in emergency demand response or operation where there is a deviation of voltage or frequency of five (5) percent or greater below standard voltage or frequency.

The permit modification application fee of \$1000.00 for a significant modification was submitted by the applicant and processed.

Equipment Description:

One (1) 350 kW (755 hp) Cummins Power Generation black start diesel engine generator, Model No. DFEG, (Tier 2 rated).

Air Pollution Controls:

The black start diesel engine generator burns only ultra low sulfur diesel no. 2 with a maximum sulfur content of 0.0015% by weight to control SO₂ emissions.

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 Prohibition
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
HAR 11-60.1-115	Basis of Annual Fees for Covered Sources
Subchapter 8	Standards of Performance for Stationary Sources
HAR 11.60.1-161	New Source Performance Standards
Subchapter 9	Hazardous Air Pollutant Sources
HAR 11.60.1-174	Maximum Achievable Control Technology (MACT) Emission Standards

Federal Requirements

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

40 Code of Federal Regulations (CFR) Part 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. NSPS Subpart IIII applies to stationary CI internal combustion engines that commence construction (date engine ordered) after July 11, 2005 and 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 NESHAP). This MACT standard applies since this is a stationary reciprocating internal combustion engines more than 500 hp located at a major source of HAPs that commence construction on or after December 19, 2002. This is considered to be a new stationary RICE.

A new emergency stationary RICE with a site rating of more than 500 hp located at a major source of HAPs that does not operate or is not contractually obligated to be available for more than fifteen (15) hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii) does not have to meet the requirements of this subpart and of subpart A of this part except for the initial notification requirements of §63.6645(f).

Emergency stationary RICE with a site rating of more than 500 hp located at a major source of HAPs do not need to comply with the emission limitations in Tables 1a, 2a, 2c, and 2d, to this subpart or the operating limitations in Tables 1b and 2b to this subpart.

Non-Applicable Requirements:

Hawaii Administrative Rules (HAR)

- Title 11, Chapter 60.1 Air Pollution Control
 - Subchapter 7 Prevention of Significant Deterioration
 - Subchapter 9 Hazardous Air Pollutant Sources
 - HAR 11.60.1-174 Maximum Achievable Control Technology (MACT) Emission Standards

Federal Requirements

- 40 CFR Part 52.21 – Prevention of Significant Deterioration of Air Quality
- 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants (NESHAPS)

Best Available Control Technology (BACT):

A Best Available Control Technology (BACT) analysis is applicable only to new covered sources and significant modifications to covered sources that have the potential to emit or increase emissions above significant levels as defined in HAR §11-60.1-1. The project emissions for the new black start diesel engine generator are below the significant levels. Therefore, a BACT analysis is not applicable.

Pollutant	Potential Emissions (tpy)	Significant Level (tpy)	Significant ?
NO _x	1.62	40	no
SO _x	1.25 E-03	40	no
CO	0.17	100	no
PM	0.03	25	no
PM ₁₀	0.03	15	no
VOC	1.62	40	no
Lead	7.59 E-06	0.6	no

Prevention of Significant Deterioration (PSD):

A PSD major modification is defined as a project at an existing major stationary source that will result in a significant emissions increase and a significant net emissions increase of any pollutant subject to regulations approved pursuant to the Clean Air Act as defined in 40 CFR §52.21. Since there are no significant emission increases for this project, PSD is not triggered.

Air Emissions Reporting Requirements (AERR):

40 CFR Part 51, Subpart A – Air Emissions Reporting Requirements, is based on the emissions of criteria air pollutants from Type A and B point sources (as defined in 40 CFR Part 51, Subpart A), that emit at the AERR triggering levels as shown in the table below:

Pollutant	Type A Triggering Levels ^{1,2} (tpy)	Type B Triggering Levels ¹ (tpy)	Pollutant	In-house Total Facility Triggering Levels ¹ (tpy)
NO _x	≥2500	≥100	NO _x	≥25
SO ₂	≥2500	≥100	SO ₂	≥25
CO	≥2500	≥1000	CO	≥250
PM ₁₀ /PM _{2.5}	≥250/250	≥100/100	PM/PM ₁₀	≥25/25
VOC	≥250	≥100	VOC	≥25
Pb		≥5	Pb	≥5
			HAPS	≥5

¹ Based on potential emissions

² Type A sources are a subset of Type B sources and are the larger emitting sources by pollutant

The Chevron Hawaii petroleum refinery (in which the black start diesel engine generator is located within) exceeds the Type A triggering levels. Therefore, AERR requirements are applicable.

The Clean Air Branch also requests annual emissions reporting from those facilities that have facility-wide emissions of a single air pollutant exceeding in-house triggering levels or is a covered source. Annual emissions reporting for the facility will be required for in-house recordkeeping purposes since this 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 pre-control device potential emissions do not exceed applicable major source thresholds.

Synthetic Minor Source:

This source is not a synthetic minor source since it is part of the Chevron Hawaii petroleum refinery which is a major stationary source.

Insignificant Activities:

This project did not propose any insignificant activities.

Alternate Operating Scenarios:

This project did not propose any alternate operating scenarios.

Project Emissions:

Black Start DEG Emissions

Pollutant	Emission Factor (grams/hp-hr)	Emission Rate (lb/hr)	Emission Rate (500 hrs/yr) (tpy)
NO _x	3.9 ¹	6.49	1.62
SO ₂	mass balance method	0.005	1.25 E-03
CO	0.4 ¹	0.67	0.17
PM/PM ₁₀	0.08 ¹	0.13	0.03
VOC	3.9 ¹	6.49	1.62
HAPs			1.34 E-03

¹ Based on manufacturers data sheet (Test Results – CARB Diesel Fuel (< 15 ppm Sulfur))

HAP Emissions

Pollutant	Emission Factors (lb/MMBtu)	Heat Input Capacity ¹ (MMBtu/hr)	Emission Rate (lb/hr)	Emissions (500 hrs/yr) (tpy)
Acetaldehyde	2.52 E-05 ²	3.374	8.50 E-05	2.13 E-05
Acrolein	7.88 E-06 ²	3.374	2.66 E-05	6.65 E-06
Benzene	7.76 E-04 ²	3.374	2.62 E-03	6.55 E-04
Formaldehyde	7.89 E-05 ²	3.374	2.66 E-05	6.66 E-05
Toluene	2.81 E-04 ²	3.374	9.48 E-04	2.37 E-04
Xylenes	1.93 E-04 ²	3.374	6.51 E-04	1.63 E-04
Total PAH	2.12 E-04 ²	3.374	7.15 E-04	1.79 E-04
Lead	9.00 E-06 ³	3.374	3.04 E-05	7.59 E-06
HAPs				1.34 E-03

¹ Heat Input Capacity = 24.1 gal/hr x 0.14 MMBtu/gal = 3.374 MMBtu/hr

² Emission Factors based on AP-42 (10/96), Section 3.4 – Large Stationary Diesel and All Stationary Dual-fuel Engines

³ Emission Factor based on AP-42 (5/10), Section 1.3 – Fuel Oil Combustion

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)
Black Start DEG	No. 2 Diesel	500	3.374	163.1	137.6	1.32E-03	1.1E-03	6.62E-03	5.6E-03
Total Annual Greenhouse Gas Emissions					137.6		1.1E-03		5.6E-03

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
Black Start DEG	137.6	0.3	0.1
Total Annual CO₂e(tpy) = 138.0			

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

Ambient Air Quality Assessment (AAQA):

A modeling analysis was performed by the applicant for the proposed black start diesel engine generator using EPA's AERMOD model (ver. 13350), AERMET (ver. 12345) with Kalaeloa Airport data, and AERMAP with USGS NED data. AERMOD was run in rural mode. The BPIIP model was used to generate appropriate building dimensions for input into AERMOD. Five (5) years (2008 – 2012) of meteorological data from Kalaeloa Airport was used, with upper air data from Lihue, Kauai.

The receptor grid consisted of three Cartesian grids. The first Cartesian grid extended to approximately 5 km from the fence in all directions. Receptors in this region were spaced at 100 m intervals. The second grid extended to 10 km. Receptor spacing in this region were 250 m. The third grid extended to approximately 15 km with a spacing of 500 m. The grid was designed such that maximum refinery impacts fall within the 100 m spacing of receptors. Receptors were also placed along the fenceline at 50 m intervals.

Compliance with the 1-hr SO₂ standard was conservatively assessed based upon the fourth highest value as modeled over five years of meteorological data, not on the form of the standard which is the 99th percentile (the fourth highest value) of the annual distribution of the daily maximum 1-hr values from the 5-year meteorological dataset. Compliance with the 1-hr NO₂ standard was assessed based upon the form of the standard which is the 98th percentile (the eighth highest value) of the annual distribution of the daily maximum 1-hr values from the 5-year meteorological dataset. Compliance with the 3-hr and 24-hr standards was based upon the highest second high value from each of the five years of meteorology. Compliance with the annual standards was based upon the highest value from the 5 year dataset. The EPA Tier 2 Ambient Ratio Method values for NO_x to NO₂ conversion of 0.75 for the annual average and 0.80 for the 1-hr average were employed. The results were combined with the maximum values from CY 2010-2012 DOH monitoring data (background data) to produce final estimates for comparison with the NAAQS/SAAQS. The ambient air quality assessment showed that the facility will be in compliance with all Federal and State ambient air quality standards.

Stack Parameters

Unit	Stack Height (ft)	Stack Diameter (ft)	Stack Velocity (ft/s)	Stack Temperature (°F)
Black Start DEG	8.82	0.50	220.6	809

Comparison of Modeled Impacts with NAAQS/SAAQs

Pollutant	Averaging Period	Modeled Result (µg/m ³)	Background Concentration (µg/m ³)	Total Concentration (µg/m ³)	SAAQs (µg/m ³)	Percent of SAAQs (%)
SO ₂	1-hr (99 th)	0.3	47	47.3	196	24.1
	3-hr	0.2	34	34.2	1,300	2.6
	24-hr	0.04	11	11.04	365	3.0
	Annual	0.006	4	4.006	80	5.0
NO ₂	1-hr (98 th)	118.6	45	163.6	188	87.0
	Annual	6.3	6	12.3	70	17.6
PM ₁₀	24-hr	1.2	59	60.2	150	40.1
	Annual	0.2	16	16.2	50	32.4
PM _{2.5}	24-hr (98 th)	1.2	14.8	16.0	35	45.7
	Annual	0.2	7.1	7.3	12	60.8
CO	1-hr	41.8	1,832	1873.8	10,000	18.7
	8-hr	10.4	1,217	1227.4	5,000	24.5

Notes:

1. Background data from Kapolei monitoring station (max value from CY 2010-2012).
2. Only the State Ambient Air Quality Standards (SAAQs) are shown as they are the same or more restrictive than the National Ambient Air Quality Standards (NAAQS).

Significant Permit Conditions:

Attachment II, Special Condition No. C.1

1. The black start diesel engine generator shall meet the definition of an Emergency Stationary RICE as described in 40 CFR §60.4219 and 40 CFR §63.6675 and Black Start Engine as described in 40 CFR §63.6675. The black start diesel engine generator shall comply with the requirements specified in 40 CFR §60.4211(f) and 40 CFR §63.6640(f), with the following exceptions:
 - i. The total hours of operation (emergency operation, maintenance checks and readiness testing) of the black start diesel engine generator shall not exceed 500 hours in any rolling twelve-month (12-month) period;
 - ii. The black start diesel engine generator may be operated for up to 100 hours per calendar year for maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine; and
 - iii. The black start diesel engine generator shall not operate or is not contractually obligated to be available for up to 15 hours per calendar year for the purposes specified in 40 CFR §63.6640(f)(2)(ii) and (iii).

Reason: The permittee is requesting to permit the black start diesel engine generator as an emergency stationary RICE per the definitions in 40 CFR Part 60 Subpart IIII and 40 CFR Part 63 Subpart ZZZZ. The exceptions are the use of a 500 hours/year limitation (emergency operation, maintenance checks and readiness testing) versus no time limitation (emergency operation), a 100 hours/year limitation (maintenance checks and readiness testing) per 40 CFR Part 60 Subpart IIII and 40 CFR Part 63 Subpart ZZZZ, and 15 hours/year limitation for the purposes specified in 40 CFR §63.6640(f)(2)(ii) and (iii).

Attachment II, Special Condition No. C.2.

2. Fuel Limits

The black start diesel engine generator shall be fired only on diesel no. 2 with a maximum sulfur content of 0.0015% by weight and a minimum cetane index of forty (40) or a maximum aromatic content of thirty five (35) volume percent.

Reason: 40 CFR Part 60 Subpart IIII requires the use of ultra low diesel fuel, but 40 CFR Subpart ZZZZ doesn't if it's a stationary RICE subject to limited requirements, i.e., is a new emergency stationary RICE with a site rating of more than 500 hp located at a major source of HAPs that does not operate or is not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii).

Attachment II, Special Condition No. D.1

1. Hours of Operation

- a. The permittee shall install, operate, and maintain a non-resetting hour meter, on the black start diesel engine generator for the continuous and permanent recording of the total hours of operation of the black start diesel engine generator for the purpose of showing compliance with Special Condition No. C.1 of this Attachment.
- b. The non-resetting meter shall not allow the manual resetting or other manual adjustments of the meter readings. The installation of any new non-resetting meter or the replacement of any existing non-resetting meter shall be designed to accommodate a minimum of five (5) years of equipment operation, considering any operational limitations, before the meter returns to a zero reading.

Reason: 40 CFR Part 60, Subpart IIII requires the installation of a non-resetting hour meter.

Attachment II, Special Condition No. D.2.a

2. The permittee shall maintain records on the following items:

- a. The total hours of operation of the black start diesel engine generator on a monthly and rolling twelve-month (12-month) basis to demonstrate compliance with Special Condition No. C.1.i of this Attachment. Records of the hours of operation of the black start diesel engine generator should include the reason the black start diesel engine generator was in operation during that time. Monthly records shall include:
 - i. Date of meter reading;
 - ii. Meter reading at the beginning of each month;
 - iii. Total hours of operation for each month;
 - iv. Total hours of operation on a rolling 12-month basis;
 - v. Total hours of operation associated with maintenance checks and readiness testing to demonstrate compliance with Special Condition No. C.1.ii of this Attachment; and
 - vi. Total hours of operation associated with the purposes specified in 40 CFR §63.6640(f)(2)(ii) and (iii) to demonstrate compliance with Special Condition No. C.1.iii of this Attachment.

Reason: The permittee needs to track the hours of operation of the black start diesel engine generator for compliance purposes.

Attachment II, Special Condition No. E.6

6. Initial Notification

The permittee shall submit to the Department of Health and U.S. EPA Region 9, an initial notification of applicability within 120 days after initial startup of the black start diesel engine generator. The notification shall include the information in 40 CFR §63.9(b)(2)(i) through (v), and a statement that the black start diesel engine generator has no additional requirements and an explanation of the basis of the exclusion.

Reason: 40 CFR Part 63 Subpart ZZZZ requires an initial notification, although 40 CFR Part 60 Subpart IIII doesn't.

Conclusion and Recommendations:

Recommend issuing an initial covered source permit (CSP No. 0088-03-C) for the proposed Black Start Diesel Engine Generator versus amending the existing covered source permit (CSP No. 0088-01-C) for the existing petroleum refinery in order to expedite the processing of this application. The existing covered source permit (CSP No. 0088-01-C) currently is expired, but the permit is shielded since the renewal application was submitted on time. The renewal application is currently being amended with new federal requirements. The emissions from the black start diesel engine generator are minimal. The facility will be in compliance with all Federal and State ambient air quality standards. A 30-day public comment period and 45-day EPA review period are also required.

Reviewer: Darin Lum
Date: 7/2014