

PROPOSED

PERMIT APPLICATION REVIEW TEMPORARY COVERED SOURCE PERMIT NO. 0780-01-CT Application for Initial Permit No. 0780-01

Company: Grace Pacific Corporation

Mailing Address: P.O. Box 78
Honolulu, Hawaii 96810

Facility: 300 TPH Portable Drum Mix Asphalt Plant

Location: Various Temporary Sites, State of Hawaii

Initial Location: U.S. Army Pohakuloa Training Area (PTA) Quarry, Waimea, Hawaii

SIC Code: 2951 (Asphalt Paving Mixtures and Blocks)

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Equipment:

300 TPH Portable Drum Mix Asphalt Plant with:

- a. 300 TPH Astec drum mixer/dryer, model no. PDB-8435, serial no. TBD, with 75 MMBtu/hr Astec Whisper Jet burner, model no. WJ-75D-O;
- b. Astec baghouse, model no. PEBH-52, servicing the drum mixer/dryer;
- c. 1.2 MMBtu/hr Heatec hot oil heater, model no. HCS-100, with 2.2 MMBtu/hr Powerflame burner;
- d. 818 kW Cummins diesel engine generator, genset model no. 900DQFAC, engine model no. QST30-G5, serial TBD;
- e. 4' x 12' scalping screen;
- f. 500 bbl Astec dry additive (lime) silo system, model no. DA-500, with Astec baghouse, model no. JVB-24, and pug mill;
- g. Astec four-compartment cold feed bin;
- h. Astec self-erecting bin;

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- i. 30,000 gallon asphalt cement storage tank; and
- j. Various conveyors.

BACKGROUND

Grace Pacific Corporation has submitted an application for an initial temporary covered source permit to operate a 300 TPH portable drum mix asphalt plant. The plant is powered by an 818 kW diesel engine generator and seventy-two (72) kW diesel engine generator (considered an insignificant activity). The plant production will be limited to 500,000 tons of hot mix asphalt (HMA) in any rolling twelve-month (12-month) period. There will be no operating hour limits for the 818 kW diesel engine generator.

The applicant is proposing the following fuels:

Drum mixer/dryer, each fuel with a maximum sulfur content not to exceed 0.05% by weight:

1. Fuel oil no. 2;
2. Unitek Ecodiesel;
3. Grease trap oil;
4. Biodiesel; or
5. Any combination thereof.

Hot oil heater:

Fuel oil no. 2 or biodiesel with a maximum sulfur content not to exceed 0.05% by weight.

818 kW diesel engine generator:

Fuel oil no. 2 or biodiesel with the following specifications:

1. Maximum sulfur content not to exceed 0.0015% by weight; and
2. Minimum cetane index of forty (40) or maximum aromatic content of thirty-five (35) volume percent.

The 818 kW diesel engine generator is a Tier 2 engine that was customized with an add-on emissions package that brings it to Tier 4 final. According to Grace Pacific, the manufacturer Cummins had not officially released Tier 4 engines in this size class when the engine was ordered. This is the same configuration as the Cummins Tier 4 generator, model no. 900DQFAG.

Process

Virgin aggregate with an average moisture content of 5% are stored in stockpiles of different sizes. Aggregate is moved from the stockpiles to the cold feed bins by a front-end loader. The plant is designed to utilize up to 50% recycled asphalt product (RAP). The aggregate is conveyed to the scalping screen, which is mounted over the inclined conveyor to the drum mixer/dryer. The scalping screen removes any oversized or extraneous material from the aggregate. The aggregate is conveyed to the drum mixer/dryer to be heated, dried, and mixed with asphalt cement. Asphalt cement is stored in heated storage tanks. The finished HMA is stored in storage bins to await truck load-out.

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

11-60.1-31, Applicability

11-60.1-32, Visible Emissions

11-60.1-33, Fugitive Dust

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

Subchapter 8, Standards of Performance for Stationary Sources

11-60.1-161, New Source Performance Standards

Subchapter 9, Hazardous Air Pollutant Sources

Subchapter 10, Field Citations

Standard of Performance for New Stationary Sources (NSPS), 40 CFR Part 60

Subpart I - Standards of Performance for Hot Mix Asphalt Facilities is applicable to the three hundred (300) TPH hot mix asphalt facility because the facility commenced construction or modification after June 11, 1973.

Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines is applicable to the 818 kW diesel engine generator (manufactured in 2012) because the engine commenced construction after July 11, 2005, and was manufactured after April 1, 2006. For purposes of Subpart IIII, the date that construction commences is the date the engine is ordered.

National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 61

This source is not subject to NESHAPs because there are no standards in 40 CFR Part 61 applicable to this facility.

NESHAPs for Source Categories (Maximum Achievable Control Technology (MACT)), 40 CFR Part 63

Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE) is applicable to the 818 kW diesel engine generator because the engine is a new stationary RICE. A stationary RICE located at an area source of HAP emissions is new if you commenced construction of the stationary rice on or after June 12, 2006. A new stationary RICE located at an area source must meet the requirements of this part by meeting the requirements of 40 CFR Part 60, Subpart IIII. No further requirements apply for such engines under this part.

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Prevention of Significant Deterioration (PSD), 40 CFR Part 52, §52.21

This source is not subject to PSD requirements because it is not a major stationary source as defined in 40 CFR §52.21 and HAR Title 11, Chapter 60.1, Subchapter 7.

Compliance Assurance Monitoring (CAM), 40 CFR 64

This source is not subject to CAM because the facility is not a major source. The purpose of 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.

Consolidated Emissions Reporting Rule (CERR), 40 CFR Part 51, Subpart A

CERR is not applicable because emissions from the facility do not exceed CERR thresholds.

DOH In-house Annual Emissions Reporting

The Clean Air Branch requests annual emissions reporting from those facilities that have facility wide emissions exceeding in-house reporting levels and for all covered sources. Annual emissions reporting will be required because this facility is a covered source.

Best Available Control Technology (BACT)

This source is not subject to BACT analysis because potential emissions are below significant levels. BACT analysis is required for new sources or modifications to sources that have the potential to emit or increase emissions above significant levels considering any limitations as defined in HAR, §11-60.1-1.

Synthetic Minor Source

A synthetic minor source is a facility that is potentially major, as defined in HAR, §11-60.1-1, but is made non-major through federally enforceable permit conditions. This facility is a synthetic minor source because potential CO emissions exceed major source thresholds when the facility is operated without limitations for 8,760 hours/year.

Greenhouse Gas Tailoring Rule

Title V permitting for greenhouse gas (GHG) emissions is not applicable because the potential to emit of CO₂ equivalent (CO₂e) emissions are less than 100,000 tons per year. Total GHG emissions on a CO₂e basis using the global warming potential (GWP) of the GHG are shown in the table below.

GHG	GWP	GHG Mass-Based Emissions (TPY)	CO ₂ e Based Emissions (TPY)
Carbon Dioxide (CO ₂)	1	15621.5	15621.5
Methane (CH ₄)	21	3.09	64.9
Nitrous Oxide (N ₂ O)	310	0.02	5.5
Total Emissions:			15691.9

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INSIGNIFICANT ACTIVITIES / EXEMPTIONS

Seventy-two (72) kW Cummins Diesel Engine Generator

The seventy-two (72) kW Cummins diesel engine generator, generator model no. 80DGDA, engine serial no. 46642529, is considered an insignificant activity in accordance with HAR §11-60.1-82(f)(2) because the heat input capacity is less than one (1) MMBtu/hr ($6.1 \text{ gal/hr} \times 0.14 \text{ MMBtu/gal} = 0.85 \text{ MMBtu/hr}$).

Storage Tanks

The 3,000, 5,000, and 9,000 gallon diesel fuel storage tanks are considered insignificant activities in accordance with HAR §11-60.1-82(f)(1) because their capacities are less than 40,000 gallons.

ALTERNATIVE OPERATING SCENARIOS

Diesel Engine Generator

The permittee may replace the diesel engine generator with a temporary replacement unit of similar size with equal or lesser emissions if any repair reasonably warrants the removal of the diesel engine generator from its site (i.e., equipment failure, engine overhaul, or any major equipment problems requiring maintenance for efficient operation).

AIR POLLUTION CONTROLS

The drum mixer/dryer is equipped with a baghouse to control particulate matter emissions. Water suppression will be used as necessary to control fugitive dust.

PROJECT EMISSIONS

300 TPH Drum Mixer/Dryer

Emissions were based on the maximum capacity of the drum mixer/dryer, which is equipped with a baghouse to control PM emissions. Emissions were based on emission factors from AP-42 Section 11.1 (3/04) - Hot Mix Asphalt Plants and Section 1.3 (5/10) – Fuel Oil Combustion. NO_x emissions from biodiesel was increased by 10% over fuel oil no. 2 based on EPA's report, *A Comprehensive Analysis of Biodiesel Impacts on Exhaust Emissions*, October 2002.

300 TPH Drum Mixer/Dryer			
Pollutant	Emissions (lb/hr)	Emissions (TPY) [500,000 TPY]	Emissions (TPY) [8,760 hr/yr]
CO	39.00	32.50	170.82
NO _x	18.15	15.13	79.50
SO ₂	1.90	1.58	8.32
PM	9.90	8.25	43.36
PM-10	6.90	5.75	30.22
PM-2.5	6.90	5.75	30.22
VOC	9.60	8.00	42.05
HAPs	2.64	2.20	11.57

HMA Silo Filling and Truck Load-Out Operations

Emissions for HMA silo filling and truck load-out operations were based on emission factors from AP-42 Section 11.1 (3/04) - Hot Mix Asphalt Plants.

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HMA Silo Filling Operation		
Pollutant	Emissions (TPY) [500,000 TPY]	Emissions (TPY) [8,760 hr/yr]
CO	0.3	1.6
PM	0.2	0.8
PM-10	0.2	0.8
PM-2.5	0.2	0.8
VOC	3.1	16.0
HAPs	0.05	0.25

HMA Truck Load-Out Operation		
Pollutant	Emissions (TPY) [500,000 TPY]	Emissions (TPY) [8,760 hr/yr]
CO	0.3	1.8
PM	0.1	0.7
PM-10	0.1	0.7
PM-2.5	0.1	0.7
VOC	1.0	5.1
HAPs	0.02	0.11

Hot Oil Heater

The hot oil heater is fired on fuel oil no. 2 or biodiesel with a maximum sulfur content of 0.05% by weight. Emissions were based on emission factors from AP-42 Section 1.3 (5/10) – Fuel Oil Combustion. NO_x emissions from biodiesel was increased by 10% over fuel oil no. 2.

Hot Oil Heater		
Pollutant	Emissions (lb/hr)	Emissions (TPY) [8,760 hr/yr]
CO	0.08	0.34
NO _x	0.35	1.51
SO ₂	0.11	0.49
PM	0.03	0.14
PM-10	0.02	0.07
PM-2.5	0.01	0.06
VOC	0.01	0.04
HAPs	0.001	0.005

Fugitive Emissions

Emissions due to aggregate processing, storage piles, and truck travelling on unpaved roads are summarized in the tables below. Aggregate processing emissions include the scalping screen and conveyors. A 70% control efficiency was assumed for water suppression for storage piles and trucks travelling on unpaved roads. Emissions were based on emission factors from AP-42 Section 11.19.2 (8/04) – Crushed Stone Processing and Pulverized Mineral Processing, Section 13.2.4 (11/06) – Aggregate Handling and Storage Piles, and Section 13.2.2 (11/06) – Unpaved Roads.

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Aggregate Processing		
Pollutant	Emissions (TPY) [500,000 TPY]	Emissions (TPY) [8,760 hr/yr]
PM	0.8	3.9
PM-10	0.3	1.4
PM-2.5	0.1	0.2

Storage Piles		
Pollutant	Emissions (TPY) [500,000 TPY]	Emissions (TPY) [8,760 hr/yr]
PM	1.2	6.5
PM-10	0.6	3.14
PM-2.5	0.1	0.5

Vehicle Travel on Unpaved Roads		
Pollutant	Emissions (TPY) [500,000 TPY]	Emissions (TPY) [8,760 hr/yr]
PM	9.8	51.4
PM-10	2.4	12.6
PM-2.5	0.2	1.3

818 kW Cummins Diesel Engine Generator

The diesel engine generator is fired on fuel oil no. 2 or biodiesel with a maximum sulfur content of 0.0015% by weight. The engine is a Tier 2 engine that was customized with an add-on emissions package that brings it to Tier 4 final. Since Cummins does not have actual test data for the Tier 4 engine, NO_x and PM emissions were based on Tier 4 emission standards. CO and TOC emissions were based on Cummins tests data for the Tier 2 engine, which are lower than the Tier 4 standards. NO_x emissions from biodiesel was increased by 10% over fuel oil no. 2. SO₂ and HAP emissions were based on emission factors from AP-42 Section 3.4 (10/96) – Large Stationary Diesel and All Stationary Dual-fuel Engines.

818 kW Cummins Diesel Engine Generator		
Pollutant	Emissions (lb/hr)	Emissions (TPY) [8,760 hr/yr]
CO	1.40	6.15
NO _x	1.46	6.38
SO ₂	0.01	0.05
PM	0.06	0.26
PM-10	0.06	0.25
PM-2.5	0.05	0.23
VOC	0.21	0.93
HAPs	0.012	0.053

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Total Emissions

Total facility emissions are summarized in the table below.

Total Facility Emissions and Trigger Levels (TPY)					
Pollutant	Emissions (With Limits)	Emissions (No Limits)	BACT Significant Level	CERR Threshold	DOH Level
CO	39.6	180.6	100	1000	250
NO _x	23.0	87.4	40	100	25
SO ₂	2.1	8.9	40	100	25
PM	20.7	107.0	25	-	25
PM-10	9.6	49.0	15	100	25
PM-2.5	6.7	33.9	-	100	-
VOC	13.0	64.2	40	100	25
HAPs	2.33	11.99	-	-	5

AIR QUALITY ASSESSMENT

An ambient air quality impact analysis (AAQIA) was conducted for the proposed drum mixer/dryer, 818 kW diesel engine generator, and hot oil heater to demonstrate compliance with State and National ambient air quality standards. The AERMOD modeling system using Lakes Environmental AERMOD View, Version 8.0.7, was used for the modeling analysis.

Terrain

Terrain data from the USGS National Elevation Dataset. Resolution is 1/3 arc-second (about ten (10) meters).

Meteorological data

Meteorological data from Kona International Airport at Keahole (2005 – 2009) was used for the analysis.

Receptor Grid

Receptor grid spacing was set at thirty (30) meters.

Dispersion Coefficient

Rural dispersion coefficient was selected.

Building Downwash

EPA's Building Profile Input Program (BPIP-PRIME) was used to evaluate downwash effects of nearby structures.

Ozone Limiting Method

The ozone limiting method was used for the one-hr (1-hr) and annual NO_x to NO₂ conversion. An in-stack NO₂/NO_x ratio of 20% for the drum/dryer, diesel engine generator, and hot oil heater was used for the model. The hourly ozone background concentrations obtained from the Sand Island, Oahu, air monitoring station for the years 2005 through 2009.

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Emission Rates and Stack Parameters

The short term emission rates and stack parameters used in the analysis are shown in the table below. The emissions rates for the annual averaging periods assume an annual production limit of 500,000 tons/year for the drum mixer/dryer.

Source	Emission Rates (g/s)					Stack Parameters			
	CO	NO _x	PM-10	PM-2.5	SO ₂	Height (m)	Diameter (m)	Flow Rate (m ³ /s)	Temp (°K)
Drum mixer/dryer	4.9140	2.2869	0.8694	0.8694	0.2393	8.24	1.28	27.5	394
818 kW DEG	0.1770	0.1836	0.0071	0.0066	0.0015	2.74	0.457	3.12	720
Hot oil heater	0.0099	0.0435	0.0021	0.0016	0.0140	4.38	0.375	0.43	589

Results

The table below shows the predicted ambient air quality impacts from the drum mixer/dryer, diesel engine generator, and hot oil heater should comply with State and National ambient air quality standards.

Predicted Ambient Air Quality Impacts							
Air Pollutant	Averaging Period	Impact (µg/m ³)	Background ¹ (µg/m ³)	Total Impact (µg/m ³)	SAAQS (µg/m ³)	NAAQS (µg/m ³)	Compared to SAAQS
CO	1-hr	290.3	1374	1664.3	10000	40000	16.6%
	8-hr	158.2	1145	1303.2	5000	10000	26.1%
NO ₂	1-hr	94.1	45	149.1	-	188	74.0%
	Annual	13.4	5.6	19.0	70	100	27.2%
PM-10	24-hr	15.8	51	66.8	150	150	44.5%
	Annual	0.8	16.3	17.1	50	-	34.2%
PM-2.5	24-hr	10.2	12	22.2	-	35	63.3%
	Annual	0.7	5	5.7	-	15	37.9%
SO ₂	1-hr	38.2	49.6	87.8	-	196	44.8%
	3-hr	32.3	33.9	66.2	1300	1300	5.1%
	24-hr	20.8	7.8	28.6	365	365	7.8%
	Annual	3.9	5.2	9.1	80	80	11.4%

1. Background concentrations (2011 Hawaii Air Quality Data) from Kapolei. NO₂ (1-hr) and PM-2.5 (24-hr) are the 98th percentile averaged over 3 years. PM-2.5 (annual) is the annual mean averaged over 3 years.

SIGNIFICANT PERMIT CONDITIONS

- The total hot mix asphalt production for the drum mix asphalt plant shall not exceed 500,000 tons in any rolling twelve-month (12-month) period.

Reason: Limit CO and NO_x emissions below the BACT and major source thresholds.

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2. Fuel Limits

- a. The drum mixer/dryer shall be fired only on the following fuels with a maximum sulfur content not to exceed 0.05% by weight for each fuel:
 - i. Fuel oil no. 2;
 - ii. Unitek Ecodiesel;
 - iii. Grease trap oil;
 - iv. Biodiesel; or
 - v. Any combination thereof.
- b. The hot oil heater shall be fired only fuel oil no.2 or biodiesel with a maximum sulfur content not to exceed 0.05% by weight for each fuel.
- c. The diesel engine generator shall be fired only on fuel oil no. 2 or biodiesel with the following specifications:
 - i. Maximum sulfur content not to exceed 0.0015% by weight; and
 - ii. Minimum cetane index of forty (40) or maximum aromatic content of thirty-five (35) volume percent.

Reason: Fuel types proposed by the applicant, and 40 CFR 60, Subpart IIII, fuel requirements for the diesel engine generator.

3. Incorporate 40 CFR 60, Subpart I, provisions for the drum mix asphalt plant:

The permittee shall not discharge or cause the discharge into the atmosphere from the baghouse servicing the drum mixer/dryer, particulate matter in excess of ninety (90) mg/dscm (0.04 gr/dscf).

Reason: The drum mix asphalt plant is subject to Subpart I.

CONCLUSION

Grace Pacific Corporation has submitted an application for an initial permit to operate a 300 TPH portable drum mix asphalt plant. The drum mixer/dryer is equipped with a baghouse to control particulate matter emissions. Potential emissions were based on the maximum rated capacities of the equipment. The ambient air quality impact assessment demonstrates compliance with State and National Ambient Air Quality Standards. Recommend issuance of the covered source permit subject to the incorporation of the significant permit conditions, thirty-day (30-day) public comment period, and forty-five-day (45-day) Environmental Protection Agency review period.

Mark Saewong
February 5, 2013