

PROPOSED

PERMIT APPLICATION REVIEW TEMPORARY COVERED SOURCE PERMIT (CSP) NO. 0355-02-CT Permit Application Renewal No. 0355-06

Applicant: West Hawaii Concrete

Facility: Crushing and Screening Plants

Locations: 1) Waikoloa Quarry, Waimea Quarry (Kamuela Quarry), Kona Quarry, and West Hawaii Sanitary Landfill
2) Other Temporary Sites, State of Hawaii

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Equipment:

1. The 800 TPH processing plant (615 plant) encompasses the following equipment and associated appurtenances:
 - a. Grizzly feeder;
 - b. 800 TPH Cedarapids jaw crusher, model no. 3042, serial no. 43383;
 - c. 460 TPH JCI cone crusher, model no. K300, serial no. J-16897 (54");
 - d. 5' x 16' JCI screen, serial no. 102443;
 - e. Various conveyors;
 - f. Water spray system; and
 - g. 545 kW/810 hp Caterpillar diesel engine generator, model no. 3412, serial no. 81Z10333.
2. The 1,130 TPH processing plant (618 and 620 plants) encompasses the following equipment and associated appurtenances:
 - a. Grizzly feeder;
 - b. 1,130 TPH Cedarapids jaw crusher, model no. 4248, serial no. 52073;
 - c. 400 TPH Canica vertical shaft impactor, model no. 100, serial no. 100368-03;
 - d. 645 Cedarapids cone crusher, model no. MVP 450, serial no. 52074;
 - e. 8' x 20' Cedarapids triple-deck screen, serial no. 52075;
 - f. 8' x 20' Cedarapids triple-deck screen, serial no. 52076;
 - g. Various conveyors;
 - h. Water spray system; and
 - i. 1,000 kW/1,350 hp Cummins diesel engine generator, model no. QST30-G5, serial no. 2177-03.
3. Additional pieces of equipment (613 and 618 plants) are listed as follows:
 - a. 400 TPH Canica vertical shaft impactor, model no. 100, serial no. 10012590;
 - b. 6' x 18' Vari-Vibe triple-deck screen, serial no. 961224;
 - c. 8' x 20' Diester triple-deck screen, serial no. 1030566; and
 - d. 635 kW/976 hp Caterpillar diesel engine generator, model no. C-27, serial no. MJE00634; and

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e. 545 kW/810 hp Caterpillar diesel engine generator, model no. 3412, serial no. 81Z09675.

Responsible

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1. Background

- 1.1 West Hawaii Concrete requests a permit modification for its facility to add one 545 kW/810 hp diesel engine generator, replace its 5' x 16' El-Jay screen with a 5' x 16' JCI screen, and remove a 160 kW/245 hp diesel engine generator. Various fuel and operating limits are specified in the existing permit for diesel engine generators operating at all locations and any one location. Also, a 2,000,000 ton per year production limit is specified in the permit to prevent the facility from exceeding the major source threshold for particulate matter at any one location. Each crushing and screening plant requires a water spray system to control fugitive dust emissions. A water truck is used for additional dust control for processing aggregate at each location. The standard industrial classification code (SICC) for this facility is 1429 (Crushed and Broken Stone, Not Elsewhere Classified).
- 1.2 For the modification to add a 545 kW/810 diesel engine generator, the applicant proposes various limits to allow processing of the permit as a minor modification. The facility owns two 545 kW/810 hp diesel engine generators with the same make, model number, and emissions. One 545 kW/810 hp diesel engine generator is already permitted and the other unit is being added to the permit. The following limits prevent an increase in emissions above permitted emission limits:
 - a. Limit total combined fuel consumption for both 545 kW/810 hp diesel engine generators to 225,000 gallons per year at all locations. The existing permit specifies a 225,000 gallon per year fuel consumption limit for operating the existing 545 kW/810 hp unit at all locations.
 - b. Limit the total combined fuel consumption for both 545 kW/810 hp diesel engine generators to 118,800 gallons per year at any one (1) location. The existing permit specifies a 118,800 gallon per year fuel consumption limit for operating the existing 545 kW/810 hp unit at any one.
 - c. Limit operation of the 545 kW/810 hp diesel engine generators to operation of only one (1) unit at any one (1) location.
- 1.3 Kathleen Brooks from West Hawaii Concrete disclosed the following:
 - a. The 635 kW/976 hp diesel engine generator, serial no. MJE00634, services the 618 plant; and
 - b. The 545 kW/810 hp diesel engine generator, serial no. 81Z10333, services the 615 plant.

2. Applicable Requirements

- 2.1 Hawaii Administrative Rules (HAR)
 - Chapter 59, Ambient Air Quality Standards
 - 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
 - 11-60.1-38, Sulfur Oxides From Fuel Combustion
 - Subchapter 4 - Noncovered Sources
 - Subchapter 6 - Fees for Covered Sources, Noncovered Sources, and Agricultural Burning
 - 11-60.1-111, Definitions
 - 11-60.1-117, General Fee Provisions for Noncovered Sources
 - 11-60.1-118, Application Fees for Noncovered Sources
 - 11-60.1-119, Annual Fees for Noncovered Sources
 - Subchapter 10 – Field Citations
- 2.2 40 Code of Federal Regulations (CFR) Part 60 – New Source Performance Standards (NSPS), Subpart OOO, Standards of Performance for Non-Metallic Mineral Processing Plants is applicable to the crushing and screening plants because the capacity of the crushers are greater than 150 TPH and crushing and screening equipment was manufactured after 1983. Existing equipment at this facility was fabricated prior to April 22, 2008. Also, the manufacturing date for the JCI screen being added to the facility is 2010. Pursuant to Table 3 in 40 CFR Part 60, Subpart OOO, fugitive dust opacity limits are more stringent for equipment fabricated after April 22, 2008.
- 2.3 40 CFR Part 60 – NSPS, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines does not apply to the portable diesel engine generators because the units will be operated as nonroad engines. Nonroad engines are exempt from 40 CFR Part 60, Subpart IIII.
- 2.4 40 CFR Part 63 – NSPS, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines is not applicable to the diesel engine generators because the units are nonroad engines. Nonroad engines are exempt from 40 CFR Part 63, Subpart ZZZZ.
- 2.5 The purpose of Compliance Assurance Monitoring (CAM) is to provide reasonable assurance that compliance is being achieved with large emission units that rely on air pollution control device equipment to meet an emissions limit or standard. Pursuant to 40 CFR 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 greater than the major source level; and (5) not otherwise be exempt from CAM. CAM is not applicable because this facility is not a major source.
- 2.6 Prevention of Significant Deterioration (PSD) review applies to new major stationary

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sources and major modifications to these types of sources. The facility is not a major source for any single air pollutant. As such, PSD review is not required.

- 2.7 Annual emissions reporting will be required because the facility is a covered source.
- 2.8 The consolidated emissions reporting rule (CERR) is not applicable because emissions from the facility do not exceed reporting levels pursuant to 40 CFR 51, Subpart A. See table below.

CERR APPLICABILITY			
Pollutant	Facility Emissions (proposed limits with water sprays and water truck) ^a	CERR Triggering Levels (TPY)	
		1 year cycle (type A sources)	3 year cycle (type B sources)
PM ₁₀	25.4	≥ 250	≥ 100
SO ₂	23.6	≥ 2,500	≥ 100
NO _x	93.6	≥ 2,500	≥ 100
VOC	1.3	≥ 250	≥ 100
CO	6.2	≥ 2,500	≥ 1,000

a: Based on maximum potential emissions from operating equipment at all locations.

- 2.9 A best available control technology (BACT) analysis is not required because potential emissions from the modification do not exceed the significant emission levels as defined in HAR, Section 11- 60.1.
- 2.10 Operation limits for the equipment restrict emissions to levels that are below major source thresholds. Therefore, this facility is a synthetic minor source.

3. Insignificant Activities

- 3.1 Fuel tanks servicing the diesel engine generators are considered an insignificant activity in accordance with HAR §11-60.1-82(f)(1).

4. Alternate Operating Scenarios

- 4.1 As an alternate operating scenario, the applicant will be allowed to replace each diesel engine generator with another diesel engine generator of similar or smaller size if replacement is required for the primary diesel engine generator.

5. Air Pollution Controls

- 5.1 The permit requires water spray systems and water trucks to control fugitive dust from processing aggregate at each temporary work site.

6. Project Emissions

- 6.1 Emissions of NO_x, CO, VOC, PM, PM₁₀, and PM_{2.5} were based on emissions data from manufacturer's specifications for the 1,000 kW, 635 kW, and 545 kW diesel engine generators. The hazardous air pollutant (HAP) emissions were estimated using emission factors from AP-42, Section 3.3 (10/96) for equipment under 600 hp. The HAP emissions

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were estimated using AP-42, Section 3.4 (10/96), Large Stationary Diesel and all Stationary Dual-fuel Engines for equipment above 600 hp. A mass balance calculation was used to determine SO₂ emissions based on the maximum fuel sulfur content of 0.5% by weight and the gallon per hour fuel consumption at 100% load. It was assumed that 96% of the total particulate was PM₁₀ and 90% of the total particulate was PM_{2.5} based on AP-42, Appendix B.2, Table B.2-2 for gasoline and diesel fired internal combustion engines. The applicable operating limits were used to determine emissions for each diesel engine generator. Emission estimates are shown in Enclosure (1) and summarized below.

1,000 kW DIESEL ENGINE GENERATOR					
Pollutant	Engine Emission Rate		Engine Emissions (TPY)		
	lb/hr	g/s	189,900 gal/yr (each site)	305,000 gal/yr (all sites)	8,760 hours
SO ₂	4.46	0.563	6.7	10.7	19.5
NO _x	16.04	2.025	24.1	38.7	70.2
CO	1.63	0.206	2.5	3.9	7.2
VOC	-----	-----	0.5	0.8	1.5
PM	-----	-----	0.3	0.5	0.9
PM ₁₀	0.21	0.027	0.3	0.5	0.9
PM _{2.5}	0.19	0.024	0.3	0.5	0.8
HAPs	-----	-----	0.057	0.091	0.166

635 kW DIESEL ENGINE GENERATOR					
Pollutant	Engine Emission Rate		Engine Emissions (TPY)		
	lb/hr	g/s	138,000 gal/yr (each site)	138,000 gal/yr (all sites)	8,760 hours
SO ₂	3.24	0.409	4.9	4.9	14.2
NO _x	10.89	1.375	16.3	16.3	47.7
CO	0.65	0.082	1.0	1.0	2.8
VOC	-----	-----	0.1	0.1	0.2
PM	-----	-----	0.1	0.1	0.2
PM ₁₀	0.048	0.006	0.1	0.1	0.2
PM _{2.5}	0.045	0.006	0.1	0.1	0.2
HAPs	-----	-----	0.041	0.041	0.121

545 kW DIESEL ENGINE GENERATORS					
Pollutant	Engine Emission Rate		Engine Emissions (TPY)		
	lb/hr	g/s	118,800 gal/yr (each site) ^a	225,000 gal/yr (all sites) ^a	8,760 hours
SO ₂	2.79	0.352	4.2	7.9	12.2
NO _x	13.61	1.718	20.4	38.7	59.6
CO	0.48	0.061	0.7	1.4	2.1
VOC	-----	-----	0.2	0.4	0.6
PM	-----	-----	1.2	2.4	3.6

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PM ₁₀	0.80	0.101	1.2	2.3	3.5
PM _{2.5}	0.75	0.094	1.1	2.1	3.3
HAPs	-----	-----	0.036	0.067	0.104

a: Based on the total combined fuel consumption limit for two 545 kW/810 hp diesel engine generators.

6.2 Particulate emissions from the crushing and screening plants were based on emission factors from AP-42, Section 11.19.2 (8/04), Crushed Stone Processing and Pulverized Mineral Processing. The controlled emission factors were used for crushing and conveyor transfer points. It was assumed that 51% PM was PM₁₀ and 15% PM was PM_{2.5} based on information from AP-42, Appendix B.2.2. Uncontrolled emission factors were used for truck loading and unloading operations and a 70% control efficiency for water sprays was applied to determine emissions. A 2,000,000 ton per year aggregate processing limit was assumed for the emission estimates. Emissions from the crushing and screening plants are shown in Enclosure (2) and summarized below.

CRUSHING AND SCREENING PLANTS		
Pollutant	Emissions (TPY)	Plant Emissions (TPY)
		2,000,000 ton/yr with water sprays
PM	10.1	17.7
PM ₁₀	3.7	6.5
PM _{2.5}	0.7	1.2

a: Based on 400 TPH average primary jaw crusher capacity for the plants and 8,760 hr/yr operation.

6.3 Particulate emissions from stockpiles were determined using emission factors from AP-42, Section 13.2.4 (11/06), Aggregate Handling and Storage Piles. Emissions were based on a production limit of 2,000,000 tons per year. Emissions were also based on a 10.9 mile per hour wind speed, K value for PM₁₀ of 0.35, K value for PM of 0.74, K value for PM_{2.5} of 0.053, and a mean 0.7% material moisture content. A 70% control efficiency was applied to account for use of a water truck to control fugitive dust. Emissions are shown in Enclosure (3) and summarized in the table below.

STORAGE PILES			
Pollutant	Emission Factor (lb/ton)	Emission Rate (TPY)	
		2,000,000 ton/yr with water truck	8,760 hr/yr with water truck (3,504,000 ton/yr, see note a)
PM	7.13×10^{-3}	2.1	3.7
PM ₁₀	3.37×10^{-3}	1.0	1.8
PM _{2.5}	5.10×10^{-4}	0.2	0.4

a: Based on 400 TPH average primary jaw crusher capacity for the plants and 8,760 hr/yr operation.

6.4 Emissions from vehicle travel on unpaved roads were calculated using the emission factor equation for vehicles traveling on unpaved surfaces at industrial sites. The equation was obtained from AP-42, Section 13.2.2 (12/03) Unpaved Roads. Equation (1a) emission factor was extrapolated to annual average uncontrolled conditions using Equation (2). Emission rates were based on the following assumptions:

- a. A distance of 22,096 vehicle miles traveled per year based the maximum plant capacity, 2,000,000 tons per year production, an average truck capacity of 24 tons,

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- and a 700 feet one way mile travel distance for the trucks;
- b. A k value for PM, PM₁₀, and PM_{2.5} of 4.9, 1.5, and 0.23, respectively based on data for industrial roads;
 - c. An a value for PM, PM₁₀, and PM_{2.5} of 0.7, 0.9, and 0.9, respectively based on data for industrial roads;
 - d. A b value for PM, PM₁₀, and PM_{2.5} of 0.45 based on data for industrial roads;
 - e. An s (silt content of road) value of 10%
 - f. A W (mean vehicle weight) value of 27 tons;
 - g. A p (# of days with 0.01" of rain/year) value of 105 based on available data from Kona Airport;
 - h. A 70% control efficiency was applied to account for use of a water truck;
 - i. Vehicle travel emissions are listed as follows:

VEHICLE TRAVEL			
Pollutant	Emission Factor (lb/VMT)	Emissions (TPY)	
		2,000,000 ton/yr with water truck	8,760 hr/yr with water truck (3,504,000 ton/yr, see note a)
PM	8.253	27.4	48.0
PM ₁₀	2.436	8.1	14.2
PM _{2.5}	0.374	1.2	2.1

a: Based on 400 TPH average primary jaw crusher capacity for the plants and 8,760 hr/yr operation.

6.5 Total yearly emissions for operating equipment are listed below as follows:

TON PER YEAR EQUIPMENT EMISSIONS						
Pollutant	Diesel Engine Generators			Crushing and Screening Plants		
	Each site	All Sites	8,760 hr/yr	Each Site	All Sites	8,760 hr/yr
SO ₂	15.8	23.5	45.9			
NO _x	60.8	93.7	177.5			
CO	4.2	6.3	12.1			
VOC	0.8	1.3	2.3			
PM	1.6	3.0	4.7	39.6	69.4	69.4
PM ₁₀	1.6	2.9	4.3	12.8	22.5	22.5
PM _{2.5}	1.5	2.7	4.3	2.1	3.7	3.7
Total HAPS	0.110	0.164	0.320			

TON PER YEAR FACILITY EMISSIONS			
	Each site	All Sites	8,760 hr/yr
SO ₂	15.8	23.6	45.9
NO _x	60.8	93.6	177.5
CO	4.2	6.2	12.1
VOC	0.8	1.3	2.3
PM	41.2	72.4	74.1
PM ₁₀	14.4	25.4	26.8
PM _{2.5}	3.6	6.4	8.0
Total HAPS	0.110	0.164	0.320

7. Air Quality Assessment

- 7.1 An ambient air quality impact analysis is not required for adding the 545 kW/810 hp diesel engine generator to the permit due to the following:
- a. The 545 kW/810 hp diesel engine generators (one unit being added to the permit and another existing unit) are the same make and model number with the same emissions.
 - b. Operation of the 545 kW/810 hp diesel engine generators is limited to only one unit at any one location.
 - c. The total combined fuel consumption for the 545 kW/810 hp diesel engine generators is limited to 118,800 gallons per year at any one location.
 - d. The total combined fuel consumption for the 545 kW/810 hp diesel engine generators is limited to 225,000 gallons per year at all locations.
 - e. The stack height of the 545kW/810 hp diesel engine generators must be at least seventeen (17) feet above base elevation.

8. Significant Permit Conditions

- 8.1 The total production shall not exceed 2,000,000 tons in any rolling twelve-month (12-month) period at any one location.

Reason for 8.1: This limit was carried over from the previous permit. The condition prevents the facility from exceeding the major source threshold for particulate. The major source threshold is site specific.

- 8.2. The maximum number of diesel engine generators operating at any one location shall be limited to three (3). At no time shall more than three (3) diesel engine generators operate simultaneously at any one site.
- 8.3 Operation of both 545 kW/810 hp diesel engine generators shall be limited to operating only one unit at any one location. At no time shall the 545 kW/810 hp diesel engine generators operate simultaneously at any one site.

Reason for 8.2 and 8.3: The conditions ensure compliance with the air standards for operating the diesel engine generators.

- 8.4 The total fuel consumption of the 1,000 kW/1,350 hp diesel engine generator shall not exceed 189,900 gallons at any one location in any rolling twelve-month (12-month) period.
- 8.5 The total combined fuel consumption of the 1,000 kW/1,350 hp diesel engine generator shall not exceed 305,000 gallons at all locations in any rolling twelve-month (12-month) period.
- 8.6 The total combined fuel consumption of both 545 kW/810 hp diesel engine generators shall not exceed 118,800 gallons at any one (1) location in any rolling twelve-month (12-month) period.
- 8.7 The total combined fuel consumption of both 545 kW/810 hp diesel engine generators shall not exceed 225,000 gallons at all locations in any rolling twelve-month (12-month) period.

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8.8 The total combined fuel consumption of the 635 kW/976 hp diesel engine generator shall not exceed 138,000 gallons at all locations in any rolling twelve-month (12-month) period.

Reason for 8.4 to 8.8: These conditions ensure that BACT thresholds are not exceeded. BACT thresholds are not site specific. The conditions also ensure compliance with the ambient air quality standards.

8.9 Incorporate minimum stack height requirements for the diesel engine generators.

Reason for 8.9: The modeling assessment was based on the stack heights reported by the applicant.

8.10 Incorporate 40 CFR, Part 60, Subpart OOO provisions for the crushing and screening equipment.

Reason for 8.10: Incorporate into the permit based on applicability to federal standards as indicated in Paragraph 2.2.

8.11 The total operation of each diesel engine generator shall not exceed 12 hours per day at the Kona, Waikoloa, and Waimea quarry locations.

Reason for 8.11: This condition is necessary to demonstrate compliance with the ambient air quality standard for PM_{2.5} over the 24-hour averaging period as a worst-case scenario for operating the diesel engine generators at all quarry locations.

9. Conclusion and Recommendation:

9.1 Potential emissions from the facility are reduced with fuel and production limits specified in the permit. The permit requires the use of a water spray systems for the crushing and screening equipment. The permit also requires the use of a water truck to control fugitive dust at sites where the crushing and screening equipment is operated. Previous air modeling assessments of the diesel engine generators demonstrated compliance with the ambient air quality standards. Recommend issuance of the temporary covered source permit subject to the significant permit conditions and 45 day review by the Environmental Protection Agency.

Mike Madsen

September 27, 2010