

**PERMIT APPLICATION REVIEW
COVERED/TEMPORARY COVERED SOURCE PERMIT (CSP) NO. 0703 -01-C/CT
Initial Permit Application No. 0703-01**

Applicant: Sphere, LLC dba Pacific Aggregate

Location: 1) 87-601 Paakea Road, Waianae, Oahu (sand plant)
2) Temporary Sites, State of Hawaii (various equipment)

Mailing Address: 87-601 Paakea Road
Waianae, Hawaii 96792

Equipment: The crushing and screening plants consist of the following equipment and associated appurtenances:

- a. 200 TPH Pettibone hammermill crusher, model no. 3640;
- b. 504 TPH Kolberg two-deck screen (6' x 12');
- c. 60 TPH Stedman cagemill crusher, model no. 50 (F50D4-47), serial no. D-3553;
- d. 240 TPH Eljay screen (6' x 16'), serial no. 993;
- e. 500 TPH CEC two-deck screen, serial no. 89328;
- f. 500 TPH CEC two-deck screen, serial no. 89329;
- g. 1,385 hp/1,033 kW Cummins diesel engine generator, model no. KTA-3067-G-2, serial no. 33112241;
- h. 775 hp/500 kW Caterpillar diesel engine generator, model no. D348 36 J, serial no. 36J-555;
- i. Various conveyors; and
- j. Various water spray systems.

Responsible

Official: Mr. Lawrence E. Wilderman
Title: President
Company: Sphere, LLC dba Pacific Aggregate
Address: 87-601 Paakea Road
Waianae, Hawaii 96792
Phone: (808) 668-9582
(808) 330-1552

Contact: Mr. Fred Peyer
Title: Consultant
Company: EMET Services, Inc.
Address: 94-520 Uke'e Street, Suite A
Waipahu, Hawaii 96797
Phone: (808) 671-8383
(808) 479-4945

1. Background

1.1 Sphere, LLC dba Pacific Aggregate has applied for a covered/temporary covered source permit to operate crushing and screening equipment to process aggregate. The facility's primary operation is to mine coral and process the coral into sand. The sand plant, located at 87-601 Paakea Road in Waianae, is not anticipated to be moved during the five year permit term. As indicated by the applicant, there is enough coral at the quarry to operate the sand plant for another 20 or more years. For the covered source permit, the applicant requests the option to move equipment to various temporary sites. The applicant indicated that the two 500 TPH portable screening plants may be moved to other locations. A 2,500 hour per year operating limit was proposed by the applicant for plant equipment. The source industrial classification (SIC) code for this facility is 1429 (Crushed and Broken Stone, Not Elsewhere Classified).

- 1.2 Pictures of the crushing and screening plants are shown in Enclosure (1). The pictures were taken during an August 7, 2008 site inspection of the sand plant.

2. Applicable Requirements

- 2.1 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 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 It was determined that equipment at the facility is subject to 40 Code of Federal Regulations (CFR) Part 60, Subpart OOO based on manufacturer’s information that indicated the capacity of the hammermill crusher to be greater than 150 tons per hour. As indicated in 40 CFR Part 60, Subpart OOO, affected units are those manufactured after August 31, 1983. Although the primary hammermill crusher is exempt from the federal standard based on its manufacturing date that is prior to 1983, 40 CFR Part 60, Subpart OOO is applicable to other equipment because; (1) the equipment was manufactured after 1983, (2) the units operate at the same site as the primary crusher, and (3) the primary crusher’s rated capacity is greater than 150 tons per hour. The applicant agreed to obtain a covered source permit rather than physically restrict the operating capacity of the primary crusher to below 150 TPH for operating equipment as a noncovered source.
- 2.3 The facility is not a major source for hazardous air pollutants (HAPs) and is not subject to National Emissions Standards for Hazardous Air Pollutants (NESHAPS) or Maximum Achievable Control Technology (MACT) requirements under 40 CFR, Parts 61 and 63.
- 2.4 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. Because emissions from this facility do not exceed major source thresholds, CAM is not applicable.
- 2.5 Prevention of Significant Deterioration (PSD) review applies to new major stationary 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.

- 2.6 Annual emissions reporting will be required because the facility is a covered source.
- 2.7 The consolidate 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 (2,500 hr/yr with water sprays and water truck)	CERR Triggering Levels (TPY)	
		1 year cycle (type A sources)	3 year cycle (type B sources)
PM ₁₀	11.1	≥ 250	≥ 100
SO ₂	6.0	≥ 2,500	≥ 100
NO _x	37.4	≥ 2,500	≥ 100
VOC	1.1	≥ 250	≥ 100
CO	9.9	≥ 2,500	≥ 1,000

- 2.8 A best available control technology (BACT) analysis is not required because potential emissions from adding the a larger diesel engine generator and two portable screening plants to the existing sand plant are below significant levels as defined in HAR, Section 11- 60.1.
- 2.9 The facility is a synthetic minor source because operation of the plant at 8,760 hr/yr with controls to abate fugitive dust exceeds major source thresholds.

3. Insignificant Activities

- 3.1 Insignificant activities identified by the application are listed as follows:
 - a. Two 66 hp Deutz diesel engines servicing the 500 TPH portable screening plants are insignificant activities in accordance with HAR §11-60.1-62(d)(4).
 - b. One 200 gallon above ground diesel storage tank is an insignificant activity pursuant to HAR §11-60.1-62(d)(2).

4. Alternate Operating Scenarios

- 4.1 The permit will allow replacement of the primary diesel engine with another unit of same size or smaller than the primary unit with equal or lower emissions.

5. Air Pollution Controls

- 5.1 Equipped with a water spray systems to abate fugitive dust from crushing and screening operations.
- 5.2 A water truck is used to control fugitive dust emissions for each work site.
- 5.3 A shroud and enclosures were observed for controlling fugitive dust at hoppers and conveyor discharge point.

6. Project Emissions

- 6.1 Emissions of NO_x, CO, VOC, PM, PM₁₀, PM_{2.5}, and HAPs from the diesel engine

PROPOSED

generators were based on emission factors from AP-42, Section 3.4 (10/96), Large Stationary Diesel and All Stationary Dual-fuel Engines. A mass balance calculation was used to determine SO₂ emissions based on the maximum allowable fuel sulfur content of 0.5% by weight and maximum fuel consumption for the unit 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 engine generators. An operation limit of 2,500 hours per year was assumed for the diesel engines. Emission estimates are shown in Enclosure (2) and summarized below.

DIESEL ENGINE GENERATORS						
Pollutant	Engine Emission Rate				Engine Generator Emissions (TPY)	
	1,033 kW/1,385 hp		500 kW/775 hp		1,033 kW/1,385 hp Diesel Engine Generator (worst-case)	
	lb/hr	g/s	lb/hr	g/s	2,500 hours	8,760 hours
SO ₂	4.81	0.607	4.49	0.567	6.0	21.0
NO _x	29.95	3.781	27.93	3.527	37.4	131.0
CO	7.96	1.004	7.42	0.937	9.9	34.7
VOC	-----	-----	0.79	0.099	1.1	3.9
PM	0.94	0.118	0.87	0.110	1.2	4.2
PM ₁₀	0.90	0.113	0.84	0.106	1.1	3.9
PM _{2.5}	0.84	0.106	0.79	0.099	1.1	3.9
HAPs	-----	-----	-----	-----	0.018	0.063

6.2 Particulate emissions from the crushing and screening equipment were based on emission factors from AP-42, Section 11.19.1 (8/04), Crushed Stone Processing and Pulverized Mineral Processing. The controlled emission factors were used for crushing, screening, 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 because there are no emission factors for these operations with controls. The uncontrolled emission factor was used for truck loading and unloading operations and a 70% control efficiency for water sprays was applied to determine emissions. A 2,500 hr/yr operation limit was applied to determine emissions from the equipment. A total combined 2,500 hr/yr operating limit was used for the two 500 TPH portable screening plants. The rated capacity of the equipment was used to determine maximum potential emissions. Emissions are shown in Enclosure (3) and summarized below.

CRUSHING AND SCREENING EQUIPMENT		
Pollutant	Emissions (TPY) ^a	
	2,500 hr/yr	8,760 hr/yr
PM	5.5	31.2
PM ₁₀	3.2	17.8
PM _{2.5}	0.6	3.9

- a: Emissions based on using controls to abate fugitive dust emissions.
- 6.3 Particulate emissions from stockpiles were determined based on emission factors from AP-42, Section 13.2.4 (11/06), Aggregate Handling and Storage Piles. Emissions were based on a total aggregate production from the production rate of the crushing, screening, and concrete batch plants and the total hour per year operation time allowed for each plant. Emission factors were determined from the following data: 10.9 mph average wind speed (data from Hilo, Honolulu, Kahului, and Lihue), 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% moisture content for stone quarrying and processing. A 70% control efficiency was assumed for using a wet suppression methods to control fugitive dust. Emissions are shown in Enclosure (5) and summarized in the table below.

STORAGE PILES			
Pollutant	Emission Factor (lb/ton)	Emission Rate (TPY)	
		2,500 hr/yr	8,760 hr/yr
PM	0.028	7.4	25.9
PM ₁₀	0.013	3.4	11.9
PM _{2.5}	0.004	0.5	1.8

- 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 (11/06) 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 distance of 20,833 vehicle miles traveled per year based the maximum plant capacities, 2,500 hr/yr operation, an average truck capacity of 21 tons, and a 0.25 mile two way travel distance for the trucks;
- A k value for PM, PM₁₀, and PM_{2.5} of 4.9, 1.5, and 0.15, respectively based on data for industrial roads;
- 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;
- A b value for PM, PM₁₀, and PM_{2.5} of 0.45 based on data for industrial roads;
- An s (silt content of road) value of 3.9% based on information from AP-42, Section 13.2.2 – Unpaved Roads Related Information
www.epa.gov/ttn/chief/ap42/ch13/related/c13s02-2.html;
- A W (mean vehicle weight) value of 26.5 tons;
- A p (# of days with 0.01" of rain/year) value of 94 based on available data between years 1949 and 1976 from the LUALUALEI 804 station recording climate parameters;
- A 70% control efficiency was applied to account for use of a water truck;
- Vehicle travel emissions are listed as follows:

VEHICLE TRAVEL			
Pollutant	Emission Factor (lb/VMT)	Emissions (TPY)	
		2,500 hr/yr with water truck	8,760 hr/yr with water truck
PM	4.408	13.8	48.4
PM ₁₀	1.080	3.4	11.9
PM _{2.5}	0.108	0.4	1.4

6.5 Total yearly emissions from the facility are listed below as follows:

TOTAL EMISSIONS		
Pollutant	Potential Emissions (TPY) 2,500 hr/yr	Potential Emissions (TPY) (8,760 hr/yr)
SO ₂	6.0	21.0
NO _x	37.4	131.0
CO	9.9	34.7
VOC	1.1	3.9
PM	27.9	109.7
PM ₁₀	11.1	45.5
PM _{2.5}	2.6	11.0
Total HAPS	0.018	0.063

7. Air Quality Assessment

7.1 An ambient air quality impact analysis (AAQIA) was performed for the 1,033 kW diesel engine generator. An air modeling assessment was performed for the 500 kW diesel engine generator from previous permit application review. A SCREEN3 program was used to determine air impacts. Assumptions for the AAQIA included:

- a. Simple terrain;
- b. Rural dispersion parameters;
- c. Default receptor placement;
- d. Wake affects from a building for the 1,033 kW diesel engine (16.1' high x 18' wide x 29.9' long);
- e. Default meteorology;
- f. EPA scaling factors of 0.9, 0.7, and 0.4 for the 3-hour, 8-hour, and 24-hour concentrations, respectively; and
- g. State of Hawaii scaling factor of 0.2 for the annual concentrations.

7.2 The following background concentrations were used for the assessment:

- a. PM₁₀ and PM_{2.5} – collected in 2006 from the Kapolei air quality monitoring station (air monitoring station that is closest to the coral quarry with PM₁₀ data).
- b. NO_x - collected in 2006 from the Kapolei air quality monitoring station (air monitoring station with NO_x data that is closest to the coral quarry with NO_x data).
- c. 1-hour and 8-hour CO – collected in 2006 from the Kapolei air quality monitoring station (air monitoring station that is closest to the coral quarry with CO data).
- d. SO₂ – collected in 2006 from the Kapolei air quality monitoring station (air monitoring station that is closest to the coral quarry with CO data).

PROPOSED

7.3 The table below lists the emission rates and stack parameters used for the AAQIA. Stack parameters for light duty operation were used instead of continuous operation because maximum potential emissions were based on light duty operation and the diesel engine generator does not operate continuously.

SOURCE	STAC K	EMISSION RATES (g/s)				STACK PARAMETERS			
		NO _x	SO ₂	CO	PM ₁₀ PM _{2.5}	Height (ft)	Temp. °K (°F)	Dia. (in)	Flow Rate (ft ³ /min)
1,033 kW Engine	1	3.781	0.607	1.004	0.113 0.106	23.8	702 (804)	12	6,510

7.4 Maximum 1-hour model output for the 1,033 kW diesel engine generator was **63.11 ug/m³ per g/s**. Based on the model output assuming simple terrain characteristics, the diesel engine generator complies with the ambient air quality standards as shown in the table below.

PREDICTED AMBIENT AIR QUALITY IMPACTS						
AIR POLLUTAN T	AVERAGING TIME	IMPACT (ug/m ³)	BACKGROUND (ug/m ³)	TOTAL IMPACT (ug/m ³)	AIR STANDARD	PERCENT STANDARD
		1,033 kW Engine				
SO ₂	3 – Hour	34	12	47	1,300	4
	24 – Hour	15	8	23	365	6
	Annual ^a	4	5	9	80	11
NO ₂	Annual ^a	14	9	23	70	33
CO	1 – Hour	63	1,596	1,659	10,000	17
	8 – Hour	44	1,183	1,227	5,000	25
PM ₁₀	24 – Hour	3	59	62	150	41
	Annual ^a	4	16	20	50	40
PM _{2.5}	24 – Hour	3	9	12	35	34
	Annual ^a	1	4	5	15	33

a: Annual concentration reduced by a factor of 2,500/8,760 to account for diesel engine hour limitation.

8. Significant Permit Conditions

8.1 The total operating hours of the sand plant, as represented by the total combined operating hours of the diesel engine generators powering the plant, shall not exceed 2,500 hours in any rolling twelve-month (12-month) period.

8.2 The total combined operating hours of the 500 TPH portable screening plants shall not exceed 2,500 hours in any rolling twelve-month (12-month) period.

8.3 The total combined operating hours of the diesel engine generators shall not exceed 2,500 hours in any rolling twelve-month (12-month) period.

Reason for 8.1 and 8.2: These conditions were incorporated into the permit based on what the applicant proposed for the facility. The limits are required for compliance with the air standards. The limits are also required to keep the facility from exceeding the major source thresholds for the applicable pollutants. An hour meter will be required for each plant to monitor the operating hours.

8.4 Incorporate minimum stack height requirements for the diesel engines.

Reason 8.4: The AAQIA was based on the stack heights reported by the applicant.

8.5: 40 CFR, Part 60, Subpart OOO provisions are applicable to crushing and screening equipment built after 1983.

Reason for 8.5: Incorporated into the permit based on applicability to federal standards as indicated in Paragraph 2.2.

9. Conclusion and Recommendation:

Actual emissions from this facility should be lower than estimated. Maximum potential emissions were based on worst-case conditions assuming maximum rated capacity of the diesel engines and processing plant equipment. Calculations were also based on 2,500 hr/yr operation of the crushing and screening plants. However, processing by the plants will be on a temporary basis with intermittent periods of operation, contingent upon jobs performed. The permit requires the use of a water spray systems for compliance with state and federal fugitive emissions limits. Recommend issuance of the temporary noncovered source permit subject to the incorporation of the significant permit conditions.

October 7, 2008
Mike Madsen