

**PERMIT APPLICATION REVIEW  
TEMPORARY COVERED SOURCE PERMIT (CSP) NO. 0738-03-CT  
Application for Initial Permit No. 0738-03**

**Applicant:** Arrow of Oregon/Hawaii, LLC

**Location:** 92-8457 Liliana Lane, Ocean View, Hawaii

**\*Mailing Address:** 92-1329 Prince Kuhio Boulevard, #4  
PMB 288  
Captain Cook, Hawaii 96704

**Equipment:** The facility encompasses the following equipment and associated appurtenances:

- a. 300 TPH Phoenix horizontal shaft impact plant, model no. HIS-4048 RDVG-12, serial no. 00371035R;
- b. 400 ton per hour (TPH) Cedarapids vertical shaft impact plant, model no. VSI 2100, serial no. 28F0785;
- c. 500 TPH Powerscreen Turbo Chieftain screening plant, model no. 1400, serial no. 6603808, with double deck screen, vibrating grid, hopper, shredder, and 109 hp diesel engine;
- d. 200 kW/345 hp Cummins diesel engine generator, model no. 200 DVF, serial no. A940531047 (generator set), serial no. 34715316 (engine), servicing the Cedarapids vertical shaft impact plant;
- e. 300 hp John Deere diesel engine, model no. 60881AF001, serial no. RG6081a093674, servicing the Phoenix horizontal shaft impact plant;
- f. Water spray systems; and
- g. Various conveyors.

**Responsible**

**Official:** Colton Wilson  
**Title:** General Manager  
**Company:** Arrow Hawaiian  
**Address:** see above\*  
**Phone:** (808) 333-0229

**1. Background**

1.1 Arrow Hawaiian has applied for an initial covered source permit to operate crushing and screening plants to process cinder and soil. The applicant proposes to operate two (2) crushing plants with an existing screening plant. The screening plant operates under Noncovered Source Permit (NSP) No. 0731-01-N. The addition of two crushing plants subjects the facility to Title V permitting requirements. As such, a covered source permit is necessary to incorporate federal requirements for the crushing and screening equipment. Each crushing plant is powered by diesel engines that burn fuel oil No. 2 with a maximum sulfur content not to exceed 0.5% by weight. The screening plant is powered by a 109 hp diesel engine which is exempt from permitting due to the engine's small size. The 109 hp unit will be listed in the permit because the engine's hour meter will be used to track operating hours for the screening plant. The source industrial classification (SIC) code for this facility is 1442 (Construction Sand and Gravel).

- 1.2 Anticipated operation for the facility is forty (40) hours per week, fifty-two (52) weeks per year, 2,080 hours per year. The applicant requested that the 2,080 hour per year anticipated operating hours be doubled for flexibility, if a yearly operating limit is required for the facility.
- 1.3 The screening plant was obtained from Big Island Concrete and Aggregate that previously operated the screening plant with a crusher and concrete batch plant under NSP No. 0643-01-NT. There was no permit transfer requested when changing the screening plant owner from Big Island Concrete and Aggregate to Arrow Hawaiian. Big Island Concrete and Aggregate had abandoned its business and its permit was closed on January 27, 2011.

**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 40 Code of Federal Regulations (CFR) Part 60 – New Source Performance Standards (NSPS), Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines is not applicable to the portable diesel engines servicing the crushing plants because the plants will be moved to more than one site at the facility within a twelve month period. Therefore, the diesel engines servicing the portable plants are designated nonroad engines. Nonroad engines are exempt from 40 CFR Part 60, Subpart IIII.
- 2.3 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 equipment. Subpart OOO applies because the crushing plants have a capacity greater than 150 tons per hour.
- 2.4 40 CFR Part 63 – National Emission Standards for Hazardous Air Pollutants (NESHAP), Subpart ZZZZ, NESHAP for Stationary Reciprocating Engines is not applicable to the diesel engines servicing the crushing plants because the engines will operate as nonroad engines. Nonroad engines are exempt from 40 CFR Part 63, Subpart ZZZZ.

- 2.5 The Compliance Assurance Monitoring (CAM) regulation is not applicable because this facility is not a major source. The CAM regulation is only applicable to major covered sources 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.
- 2.6 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.
- 2.7 Annual emissions reporting is required because the facility is a covered source.
- 2.8 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.
- 2.9.1 A Best Available Control Technology (BACT) analysis not is required because potential emissions from the crushing and screening equipment are below significant levels as defined in HAR, Section 11- 60.1.

<b>BACT APPLICABILITY</b>		
Pollutant	Emissions (TPY)	Significant Emission Level (TPY)
PM	24.1	25
PM <sub>10</sub>	8.9	15
PM <sub>2.5</sub>	1.4	10

- 2.9.2 A BACT analysis is not required for the two (2) portable diesel engines servicing the crushing plants because the units are nonroad engines.
- 2.10 The facility is not a synthetic minor source because the facility will not exceed major source thresholds if operated 8,760 hours per year.
- 2.11 Title V and PSD permitting for greenhouse gas (GHG) emissions is not applicable to this facility because the potential to emit of CO<sub>2</sub> equivalent (CO<sub>2</sub>e) emissions is less than 50,000 tons per year. Under the Tailoring Rule, in no event are sources with the potential to emit less than 50,000 tons per year CO<sub>2</sub>e subject to PSD or Title V permitting for GHG emissions before 2016. See Paragraph 6.5 of this permit application review for GHG emission estimates.

**3. Insignificant Activities**

- 3.1 The 109 hp diesel engine powering the 500 TPH screening plant is an insignificant activity in accordance with HAR §11-60.1-62(d)(4) because the engine’s maximum heat rate input of 0.685 MMBtu/hr is less than the applicability threshold of 1 MMBtu/hr.

**4. Alternate Operating Scenarios**

- 4.1 No alternate operating scenarios were proposed by the applicant.

**5. Air Pollution Controls**

5.1 The permit will require that the crushing and screening plants to be equipped with a water spray system to control fugitive dust emissions.

**6. Project Emissions**

6.1 Particulate emissions from the crushing and screening plants 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 conveyor transfer points and screening of fines (soil as worst-case). Uncontrolled emission factors were used for truck loading and unloading operations because there are no emission factors for these operations with controls. A 70% control efficiency for wet suppression measures was applied to determine emissions using the uncontrolled emission factors. It was assumed that 51% of the PM was PM<sub>10</sub> and 15% of the PM was PM<sub>2.5</sub> based on information from AP-42, Appendix B.2.2. Emissions were based on the rated capacity of the crushing and screening equipment. Emissions from truck loading and unloading operations were based on the total combined capacity of the crushing plants (300 TPH + 400 TPH = 700 TPH). An average capacity of 400 TPH was used to calculate emissions from conveyors. All calculations were based on operating 4,160 hours per year. Emissions are shown in Enclosure (1) and summarized below.

<b>CRUSHING AND SCREENING</b>		
Pollutant	TPY Emissions	
	4,160 hr/yr	8,760 hr/yr
PM	5.0	12.4
PM <sub>10</sub>	2.7	6.3
PM <sub>2.5</sub>	0.7	1.5

6.2 Particulate emissions from stockpiles were determined using emission factors from AP-42, Section 13.2.4 (11/06), Aggregate Handling and Storage Piles. Worst-case emissions will be from the operating 8,760 hours per year at the total combined 700 TPH capacity of the crushing plants. Emissions were also based on a 15 mile per hour wind speed, K value for PM<sub>10</sub> of 0.35, K value for PM of 0.74, K value for PM<sub>2.5</sub> of 0.053, and a mean 2.525% 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 (2) and summarized in the table below.

<b>AGGREGATE STORAGE PILES</b>			
Pollutant	Emission Factor (lb/ton)	TPY Emissions	
		4,160 hr/yr	8,760 hr/yr
PM	5.10 X 10 <sup>-4</sup>	3.1	6.5
PM <sub>10</sub>	3.37 X 10 <sup>-3</sup>	1.5	3.1
PM <sub>2.5</sub>	7.13 X 10 <sup>-3</sup>	0.2	4.2

6.3 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 (12/06) Unpaved Roads. Equation (1a) emission factor was extrapolated to annual average uncontrolled conditions using Equation (2). Emission rates were based on the following assumptions:

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- a. A distance of 13,347 vehicle miles traveled per year for fixed plant based on a 700 TPH plant capacity, 4,160 hour per year operation, twenty-four (24) ton load capacity for haul trucks, and 0.11 mile two-way travel distance (applicant indicated 600 feet two-way distance for haul road);
- b. A k value for PM, PM<sub>10</sub>, and PM<sub>2.5</sub> of 4.9, 1.5, and 0.15, respectively, based on data for industrial roads;
- c. An a value for PM, PM<sub>10</sub>, and PM<sub>2.5</sub> of 0.7, 0.9, and 0.9, respectively, based on data for industrial roads;
- d. A b value for PM, PM<sub>10</sub>, and PM<sub>2.5</sub> of 0.45 based on data for industrial roads;
- e. An s (surface material silt content) value of 10%;
- f. A W (mean vehicle weight) value of 27 tons;
- g. An average p (# of days with 0.01" of rain/year) value for South Kona of 113 based on available data from the Hawaii State Climate Office between 1977 and 1989;
- h. A 70% control efficiency was applied to account for use of a water truck; and
- i. Emissions are summarized below as follows:

<b>VEHICLE TRAVEL ON UNPAVED ROADS</b>			
Pollutant	Emission Factor (lb/VMT)	Emissions (TPY)	
		4,160 hr/yr	8,760 hr/yr
PM	7.998	16.0	33.6
PM <sub>10</sub>	2.365	4.7	9.9
PM <sub>2.5</sub>	0.236	0.5	1.1

6.4 Emissions were estimated for the diesel engine based on 8,760 hours per year operation. The NO<sub>x</sub>, CO, VOC, and PM were based on emissions data from the manufacturer and the maximum rated capacity of each engine. The HAP emissions were based on emission factors from AP-42, Section 3.3 (10/96), Gasoline and Diesel Industrial Engines. A mass balance calculation was used to determine SO<sub>2</sub> emissions based on the maximum fuel sulfur content of 0.5% by weight and the maximum gallon per hour fuel consumption for each engine. It was assumed that 96% of the total particulate is PM<sub>10</sub> based on AP-42, Appendix B.2, Table B.2-2 for gasoline and diesel fired internal combustion engines. It was assumed that 90% of the total particulate is PM<sub>2.5</sub> based on AP-42, Appendix B.2, Table B.2-2 for gasoline and diesel fired internal combustion engines. Emissions are estimated in Enclosure (3) and summarized below.

<b>300 hp Diesel Engine</b>				
Pollutant	Engine Emission Rate		Engine Emissions (TPY)	
	g/s	lb/hr	4,160 hr/yr	8,760 hr/yr
SO <sub>2</sub>	0.136	1.08	2.2	4.6
NO <sub>x</sub>	0.575	4.55	9.5	20.0
CO	0.708	5.61	11.7	24.6
VOC	-----	-----	1.4	2.9
PM	0.033	0.26	0.5	1.1
PM <sub>10</sub>	0.032	0.25	0.5	1.1
PM <sub>2.5</sub>	0.036	0.24	0.5	1.1
HAPs	-----	-----	0.028	0.059

200 kW/345 hp Diesel Engine Generator				
Pollutant	Engine Emission Rate		Engine Emissions (TPY)	
	g/s	lb/hr	4,160 hr/yr	8,760 hr/yr
SO <sub>2</sub>	0.113	0.89	1.9	3.9
NO <sub>x</sub>	0.805	6.38	13.3	28.0
CO	0.111	0.88	1.8	3.8
VOC	-----	-----	0.7	1.5
PM	0.048	0.38	0.8	1.7
PM <sub>10</sub>	0.046	0.36	0.8	1.7
PM <sub>2.5</sub>	0.043	0.34	0.7	1.5
HAPs	-----	-----	0.029	0.061

6.4 Maximum potential emissions at any one site are listed below as follows:

TOTAL TPY EMISSIONS		
Pollutant	4,160 hr/yr	8,760 hr/yr
SO <sub>2</sub>	4.1	8.5
NO <sub>x</sub>	22.8	48.0
CO	13.5	28.4
VOC	2.1	4.4
PM	26.3	55.3
PM <sub>10</sub>	10.5	22.1
PM <sub>2.5</sub>	2.3	9.4
HAPs	0.057	0.120

6.5 Greenhouse gas (GHG) emissions were estimated for operating the diesel engines servicing the two crushing plants. Greenhouse gases are a single air pollutant defined as an aggregate group of the following six gases: carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). Maximum potential GHG emissions were estimated on a mass basis using AP-42 emission factors from Section 3.3 (10/96), Gasoline and Diesel Industrial Engines. The GHG emissions on a CO<sub>2</sub> equivalent basis were determined with global warming potential (GWP) values listed in PSD and Title V permitting guidance for GHGs prepared by the Office of Air Quality Planning and Standards. The GHG emissions are calculated in Enclosure (3) and summarized in the following table.

GHG	Potential Emissions (TPY)	Global Warming Potential	CO <sub>2e</sub> Emissions (TPY)
CO <sub>2</sub>	1,316.8	1	3,076.3

a: Greenhouse gas emissions were based on 4,160 hours per year operation.

## 7. Air Quality Assessment

7.1 An ambient air quality impact analysis is not required for the portable diesel engines due to the nature of the emissions from this equipment. The diesel engines are non-road engines and will operate not more than 12 months at each temporary site.

**8. Significant Permit Conditions**

8.1: Incorporate 40 CFR Part 60, Subpart OOO provisions for crushing and screening plants which include opacity limits on fugitive dust for various emission points (e.g., crushers, screen, and belt conveyors).

Reason for 8.1: Incorporate pursuant to Paragraph 2.3 of this permit application review.

8.2 Specify requirements for fugitive dust control that includes use of a water spray systems for the crushing and screening plants.

Reason for 8.2: Incorporate to ensure compliance with the emissions limit on fugitive dust. As indicated by the applicant, water spray systems are installed for the crushing and screening plants.

8.3 The total operating hours of the 200 kW/345 hp Cummins diesel engine generator, representing the operating hours of the vertical shaft impact plant, shall not exceed 4,160 hours in any rolling twelve-month (12-month) period.

8.4 The total operating hours of the 300 hp John Deere diesel engine, representing the operating hours of the horizontal shaft impact plant, shall not exceed 4,160 hours in any rolling twelve-month (12-month) period.

8.5 The total operating hours of the 109 hp diesel engine, representing the operating hours of the screening plant, shall not exceed 4,160 hours in any rolling twelve-month (12-month) period.

Reason for 8.3 through 8.5: The applicant proposed 4,160 hours per year as the maximum duration for operating plant equipment.

8.6 For any six (6) minute averaging period, the diesel engines shall not exhibit visible emissions of twenty (20) percent or greater, except as follows: during start-up, shutdown, or equipment breakdown, the diesel engines may exhibit visible emissions greater than twenty (20) but not exceeding sixty (60) percent opacity for a period aggregating not more than six (6) minutes in any sixty (60) minute period.

Reason for 8.6: Incorporate pursuant to HAR §11-60.1-32 (a) for sources after 1972.

**9. Conclusion and Recommendation:**

Actual emissions from the facility should be lower than estimated. Maximum potential emissions were based on worst-case conditions assuming continuous operation of the plants at maximum rated capacity. Actual operation for the crushing and screening plants, however, will be on a temporary basis with intermittent periods of operation, contingent upon jobs performed. Water spray systems are used for operating the plants to control fugitive dust emissions. Recommend issuance of the temporary covered source permit subject to the incorporation of the significant permit conditions.

October 12, 2012  
Mike Madsen