PERMIT APPLICATION REVIEW
TEMPORARY COVERED SOURCE PERMIT (CSP) NO. 0622-01-CT
Initial CSP Application No. 0622-01

Applicant: Hawaiian Dredging Construction Company

Facility: 400 TPH mobile crushing and screening plant

Location: Various Temporary Sites, State of Hawaii
Initial Location: UTM – 813,050 Meters East and 2,177,800 Meters North, Zone 4

Mailing Address: P.O. Box 4088
Honolulu, Hawaii 96812-4088

Equipment: 400 TPH Pioneer model no. RT425, serial no.4066430 impact plant consists of the following equipment:

a. 6 cubic yard hopper (7'-8" x 15') with fixed walls and bypass chute;
b. Vibrating grizzly feeder (50" x 15', 5' step grizzly);
c. 400 TPH horizontal shaft impactor, model no. 4250;
d. Single deck screen (5' x 12') with side and under-screen conveyors;
e. End delivery conveyor (48" x 40'), serial no. 406647;
f. Side delivery conveyor (24" x 12');
g. Recirculating conveyor system with 18" inclined conveyor and 24" x 9' side delivery conveyor;
h. 400 hp Cummins diesel engine, model no. QSM11-C, serial no.; and
i. Water spray system.

Responsible Official:	Mr. Mel Miyamoto	**Contact:**	Mr. Ross Richards
Title:	Vice President	**Title:**	Plant Manager
Company:	Hawaiian Dredging	**Company:**	Hawaiian Dredging
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Contact:	Ms. Kristen Lee	**Consultant**:	Mr. Fred Peyer
Title	Project Engineer	**Company:**	EMET Services, Inc.
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1. Background

1.1 Hawaiian Dredging Construction Company has applied for a temporary covered source permit to operate a 400 TPH mobile crushing plant on tracks. For the initial project, the plant will crush rock for the Queen Ka'ahumanu Highway widening project. Queen Ka'ahumanu Highway will be widened on both sides between Kealakehe Parkway and Henry Street. Rock excavated from the widening project will be crushed to provide aggregate for highway embankments. The plant is powered by a 400 hp diesel engine that will be fired on fuel oil No. 2 with a maximum sulfur content of 0.5% by weight. An

allowance to replace the diesel engine with an engine of equal or smaller size was requested by the applicant to give added operating flexibility. The applicant proposes a 2,500 hour per year operation limit for the plant. The standard industrial classification code (SICC) for this facility is 1429 (Crushed and Broken Stone, Not Elsewhere Classified).

1.2 Ms. Kristen Lee from Hawaiian Dredging Construction Company disclosed the following information:

a. A water truck will be used to control fugitive dust at sites where the mobile crushing plant will be located.

b. The serial number for the model RT4250 mobile crushing plant is 406643.

c. The serial number for the end delivery conveyor is 406647.

d. For the highway widening project, water for the water spray system servicing the mobile crushing and screening plant will be supplied from fire hydrants. If water from a hydrant is not available, a water truck will be used to supply water for the spray system.

e. Currently, a 1,500 TPH rock crushing plant is supporting operations to widen Queen Ka'ahumanu Highway. Water for the water spray system servicing this plant is supplied by a fire hydrant.

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 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
- Subchapter 8 - Standards of Performance for Stationary Sources
  - 11-60.1-161(25) Standards of Performance for Non-metallic Mineral Processing Plants
- Subchapter 10 – Field Citations

2.2 40 Code of Federal Regulations (CFR) Part 60 – New Source Performance Standards (NSPS), Subpart OOO, Standards of Performance Standards of Performance for Non-metallic Mineral Processing Plants is applicable because the horizontal shaft impactor for the plant is greater than 150 TPH capacity (maximum capacity reported in manufacturer's literature is 400 TPH). The plant is also new (manufactured after 1983).

2.3 The facility is not a major source for hazardous air pollutants 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. CAM is not applicable because this facility is not a major source.

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 this plant is a covered source.

2.7 The consolidate emissions reporting rule (CERR) is not applicable because emissions from the facility (for CERR applicability, the facility is the point source) 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)	
		3 year cycle (type A sources)	1 year cycle (type B sources)
PM_{10}	4.6	≥ 100	≥ 250
SO_2	1.9	≥ 100	≥ 2,500
NO_X	3.0	≥ 100	≥ 2,500
VOC	0.16	≥ 100	≥ 250
CO	0.7	≥ 1,000	≥ 2,500

2.8 A best available control technology (BACT) analysis is required for new sources or modifications to existing sources that would result in a net significant emission increase as defined in HAR, Section 11.60.1-1. The crushing plant's emissions, when operated at 2,500 hrs/yr, do not exceed significant levels for any regulated air pollutant. As such, BACT is not required for this facility.

2.9 The facility is not a synthetic minor source because operation of the plant at 8,760 hr/yr with operational controls does not exceed major source thresholds.

2.10 Annual emissions reporting is required because this facility is a covered source.

3. Insignificant Activities

3.1 Diesel No. 2 fuel will be stored in a 180 gallon fuel storage tank servicing the 400 hp diesel engine. This storage tank is exempt from the air permit requirements per HAR, Section 11-60.1-82(f)(1) because it has a capacity of less than 40,000 gallons and is not subject to any standard or other requirement pursuant to Section 111 or 112 of the CAA.

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 The mobile plant will be equipped with a water spray system with water spray bars/nozzles at:

1) Crusher inlet;
2) Crusher outlet;
3) Discharge conveyor; and
4) Fines conveyor.

5.2 A water spray truck will be used to control fugitive dust at each work site for the mobile crushing and screening plant.

6. Project Emissions

6.1 Emissions of NO_X, CO, VOC, PM, PM_{10}, and $PM_{2.5}$ from the diesel engine generator were based on the worst-case gram per kilowatt – hour emission rates from manufacturer's specifications. For NO_X, the non-methane hydrocarbon was subtracted to evaluate this pollutant specifically. A mass balance calculation was used to determine SO_2 emissions based on the maximum allowable fuel sulfur content of 0.5% and a 0.377 lb/hp-hr maximum fuel consumption. It was assumed that 96% of the total particulate was PM_{10} 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 was $PM_{2.5}$ based on AP-42, Appendix B.2, Table B.2-2 for gasoline and diesel fired internal combustion engines. Emission factors from AP-42, Section 3.3 (10/96), Gasoline and Diesel Industrial Engines were used to determine HAP emissions from the diesel engine generator. The g/s and lb/hr emissions were based on a worst-case firing rate of 2.92 MMBtu/hr. An operation limit of 2,500 hours per year was assumed for the diesel engine.
Emission estimates are shown in Enclosure (1) and summarized below.

DIESEL ENGINE GENERATORS				
Pollutant	Emission Rate		Emissions (TPY)	
	lb/hr	g/s	Limited	No Limits
			2,500 hr/yr	8,760 hr/yr
SO_2	1.507	0.190	1.9	6.7
NO_X	2.360	0.298	3.0	10.5
CO	0.590	0.075	0.7	2.5
VOC	0.131	0.017	0.16	0.56
PM	0.066	0.008	0.08	0.28
PM_{10}	0.063	0.008	0.08	0.28
$PM_{2.5}$	0.059	0.007	0.07	0.24

Total HAPS	---------	----------	0.014	0.049

6.2 Particulate emissions from the mobile crushing and screening plant were based on emission factors from AP-42 (8/04), Crushed Stone Processing. The controlled emission factors were used for crushing, screening, and conveyor transfer points. It was assumed that 51% PM was PM_{10} 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. A 70% control efficiency for water sprays was applied to determine emission using the uncontrolled emission factors. A 2,500 hr/yr operation limit was also applied to determine emissions. Emissions from the mobile plant are shown in Enclosure (2) and summarized below.

400 TPH MOBILE CRUSHING AND SCREENING PLANT		
Pollutant	Emission Rate (TPY)	
	2,500 hr/yr with water sprays	8,760 hr/yr with water sprays
PM	2.3	8.1
PM_{10}	3.0	2.4
$PM_{2.5}$	0.7	0.5

6.3 Particulate emissions from stock piles were determined based on emission factors from AP-42, Section 13.2.4 (1/95), Aggregate Handling and Storage Piles. Emissions were based on a total aggregate production from the 400 TPH plant of 1,000,000 TPY for 2,500 hr/yr operation. Emission factors were determined from the following data: 10.9 mph average wind speed (data from Hilo, Honolulu, Kahului, and Lihue), K value for PM_{10} of 0.35, K value for PM of 0.74, K value for $PM_{2.5}$ of 0.11, and a mean 0.7% moisture content for stone quarrying and processing. A 70% control efficiency was used for using a water truck to control dust. Emissions are shown in Enclosure (3) and summarized in the table below.

STORAGE PILES			
Pollutant	Emission Factor (lb/ton)	Emission Rate (TPY)	
		2,500 hr/yr with water truck	8,760 hr/yr with water truck
PM	0.028	4.2	14.7
PM_{10}	0.013	2.0	7.0
$PM_{2.5}$	0.004	0.6	2.1

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 raters were based on the following assumptions:

a. A distance of 9,524 vehicle miles traveled per year for the 400 TPH plant based on 2,500 hr/yr operation, an average truck capacity of 21 tons, and a 0.2 mile two way travel distance for the trucks;
b. A k value for PM, PM_{10}, 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, PM_{10}, 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, PM_{10}, and $PM_{2.5}$ of 0.45 based on data for industrial roads;
e. 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;

f. A W (mean vehicle weight) value of 26.5 tons;
g. A p (# of days with 0.01" of rain/year) value of 46 based on available data between years 1991 and 2005 from the Honokohau Harbor station recording climate parameters;
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)	Emission Rate (TPY)	
		2,500 hr/yr with water truck	8,760 hr/yr with water truck
PM	5.197	7.4	25.9
PM_{10}	1.271	1.8	6.3
$PM_{2.5}$	0.195	0.3	1.0

6.5 Total yearly emissions from operating the mobile crushing plant are listed below as follows:

TOTAL EMISSIONS		
Pollutant	Potential Emissions (TPY) (2,500 hr/yr with water sprays and water truck)	Potential Emissions (TPY) (8,760 hr/yr with water sprays and water truck)
SO_2	1.9	6.7
NO_X	3.0	10.5
CO	0.7	2.5
VOC	0.16	0.56
PM	14.0	49.0
PM_{10}	4.6	16.1
$PM_{2.5}$	1.1	3.8
Total HAPS	0.014	0.049

7. Air Quality Assessment

7.1 An ambient air quality impact analysis (AAQIA) was performed for the 400 hp diesel engine generator using a SCREEN3 model version dated 96043. Assumptions for the SCREEN3 model included:

a. Simple elevated terrain;
b. Complex terrain;
c. Rural dispersion parameters;
d. Wake affects from the mobile crushing plant (11' high x 12' wide x 39' 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 Simple terrain receptors were located at horizontal distances associated with vertical distances in 1 meter height levels up to 3 meters.

7.3 Complex terrain receptors were placed at the following heights and distances (meters) from the 400 hp diesel engine to determine complex terrain impact 6.8/312, 19/438, 31.2/650, 43.4/875, and 55.6/1150.

7.4 The following background concentrations were used for the assessment:

a. PM_{10} – collected in 2004 from the Hilo air quality monitoring station (air monitoring station that is closest to Kona with PM_{10} data).

b. NO_X - collected in 2004 from the Kapolei air quality monitoring station (air monitoring station with NO_X data that is most conservative of current data from another island).

c. CO – collected in 2004 from the University air quality monitoring station (air monitoring station that is most conservative of current data from another island).

d. SO_2 – collected in 2004 from the Kona air quality monitoring station.

7.5 The table below lists the emission rates and stack parameters used in the analysis.

SOURCE	STACK	EMISSION RATES (g/s)				STACK PARAMETERS			
		NO_X	SO_2	CO	PM_{10}	Height (ft)	Temp. ^{O}K (^{O}F)	Dia. (in)	Flow Rate (ft^3/min)
400 hp Engine	1	0.298	0.190	0.075	0.008	12	764 (915)	5	2,579

7.6 Results from the AAQIA show the following maximum model outputs:

Concentration (ug/m^3 per g/s)	Averaging Period	Terrain	Distance From Stack feet
1,518	1-hour	Simple	151
28.12	24-hour	Complex Valley	1,437
80.74	24-hour	Complex Simple	1,024

7.7 The table below shows the normalized modeling and conversion factors. The bold entries are the model outputs.

Simple Terrain			Complex Terrain Valley		Complex Terrain Simple	
Averaging Period	Conversion Factor	Normalized Output (ug/m^3 per g/s)	Conversion Factor	Normalized Output (ug/m^3 per g/s)	Conversion Factor	Normalized Output (ug/m^3 per g/s)
1-hour	N/A	**1,518**	0.25	112	0.4	202
3-hour	0.9	1,366	0.9	101	0.9	182
8-hour	0.7	1,063	0.7	78	0.7	141
24-hour	0.4	607	N/A	**28.12**	N/A	**80.74**
Annual	0.2	304	0.2	22	0.2	40

7.8 Results from the AAQIA of the 400 hp diesel engine generator, shown in the table below, indicate compliance with the ambient air quality standards.

PREDICTED AMBIENT AIR QUALITY IMPACTS						
AIR POLLUTANT	AVERAGING TIME	IMPACT (ug/m^3)	BACKGROUND (ug/m^3)	TOTAL IMPACT (ug/m^3)	AIR STANDARD	PERCENT STANDARD
SO_2	3 –Hour 24 – Hour Annual	260 115 16	55 21 8	315 136 24	1,300 365 80	24 37 30
NO_2	Annual	26	9	35	70	50
CO	1 – Hour 8 – Hour	114 80	3,762 2,323	3,876 2,403	10,000 5,000	39 48
PM_{10}	24 – Hour Annual	5 1	29 13	34 14	150 50	23 28

8. Significant Permit Conditions

8.1 Diesel engine operating hours shall not exceed 2,500 hours in any rolling twelve (12) month period.

Reason for 8.1: The applicant has proposed a maximum 2,500 hours per year operation for the plant . The mobile crushing and screening plant's operating hours are controlled by operating hours of the diesel engine. The diesel engine will be equipped with an hour meter for monitoring the operating hours.

8.2: 40 CFR, Part 60, Subpart OOO provisions are applicable to the impactor, screen, and associated conveyors.

Reason for 8.2: 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 (maximum rated capacity, 400 hp and 400 TPH) for the mobile crushing plant. Actual crushing capacity will vary depending on product size and the type of material but will likely be much lower than the maximum. Calculations were also based on 2,500 hours per year operation. However, aggregate processing by the plant will be on a temporary basis with intermittent periods of operation, contingent upon jobs performed. The permit requires the use of a water spray system for compliance with state and federal fugitive emission regulations. The permit also requires the use of a water truck to control fugitive dust at sites where the mobile crushing plant is located. Recommend issuance of the temporary covered source permit subject to the incorporation of the significant permit conditions, 30-day public comment period, and 45-day review by EPA.

May 11, 2006
Mike Madsen