PROPOSED

PERMIT APPLICATION REVIEW
Temporary Covered Source Permit (CSP) No. 0562-01-CT
Permit Application No. 0562-01

Applicant: CTS Earthmoving, Inc.
Facility: 1,500 TPH Portable Crushing and Screening Plant
Located at: Various Temporary Sites, State of Hawaii
Initial Location: UTM - 813,480 Meters East and 2,181,800 Meters North (NAD 83)
Kohanaiki, Kona, Hawaii

***Mailing Address:** P.O. Box 470
Holualoa, Hawaii 96725

Equipment: 1,500 TPH Thunderbird II jaw plant (serial no. 2217-03) and 560 TPH cone crusher plant (serial no. 51000) with the following equipment:

a. Cedarapids vibrating grizzly feeder, serial no. 050813 (52" x 20');
b. 700-1,500 TPH Cedarapids jaw crusher, model no. 3054 JVDH-D 3962, serial no. 52169 (30" x 54" jaw size);
c. 560 TPH Cedarapids cone crusher, model no. MVP 380, serial no. R 10172;
d. Thunderbird II three-deck screen, model no. 6163.7-SH-O, serial no. 50393 (6' x 16');
e. Various conveyors;
f. Water spray system;
g. 300 hp Caterpillar diesel engine, model no. C-9, serial no. CLJ04382; and
h. 890 hp Caterpillar diesel engine, model no. 3412, serial no. 81Z23751.

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1. Background.

1.1 CTS Earthmoving, Inc. has applied for an initial temporary covered source permit to operate a 1,500 TPH portable crushing and screening plant to process aggregate for construction (e.g., 6" minus or 3/4" fill material). For the permit, the applicant's consultant requested that CTS Earth moving, Inc. be allowed to replace any of the two diesel engines with a temporary unit of equal or smaller size. A 2,080 hr/yr limit was proposed for the plant to prevent an exceedance of the major source threshold for particulate (worst-case) and ensure compliance with ambient air standards for operating the diesel engines. The Standard Industrial Classification Code for this facility is 1429 (Crushed and Broken Stone, Not Elsewhere Classified).

1.2 As indicated by the applicant's consultant, the 300 hp diesel engine is mounted directly to the 1,500 TPH jaw plant. The 890 hp diesel engine is secured inside a truck trailer for transport from site to site and is not directly mounted to a plant

2. Applicable Requirements.

2.1 Hawaii Administrative Rules (HAR)

- Chapter 11-59, Ambient Air Quality Standards
- Chapter 11-60.1, Subchapter 1, General Requirements
- Chapter 11-60.1, 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
- Chapter 11-60.1, Subchapter 5, Covered Sources
- Chapter 11-60.1, 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
- Chapter 11-60.1, Subchapter 8, Standards of Performance for Stationary Sources
  - 11-60.1-161, New Source Performance Standards
- Chapter 11-60.1, 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 Nonmetallic Mineral Processing Plants, is applicable to the primary crusher, cone crusher, screen, and conveyors because equipment was manufactured after 1983 and the primary crusher has a capacity greater than 150 TPH.

2.3 The facility is not a major stationary 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 precontrol emissions that are greater than the major source level; and (5) not otherwise be exempt from CAM. CAM is not applicable to equipment at this facility because the plant 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, a PSD review is not required.

2.6 The facility will be placed into the Compliance Data System (CDS) and annual emissions reporting will be required because this plant is a covered source.

2.7 The facility is a synthetic minor source because operational limits and wet suppression methods to control particulate restrict air pollutants below major source thresholds for NO_X and particulate.

2.8 The Consolidated Emissions Reporting Rule (CERR) is not applicable because emissions from the facility (For CERR applicability, the facility is a point source) do not exceed reporting levels pursuant to 40 CFR 51, Subpart A (see table below).

CERR APPLICABILITY

Pollutant	[a]Facility Emissions (TPY)	CERR Triggering Levels (TPY)	
		3 year cycle (type A sources)	1 year cycle (type B sources)
PM-10	32.9	≥ 100	≥ 250
SO_2	4.4	≥ 100	≥ 2,500
NO_x	19.4	≥ 100	≥ 2,500
VOC	1.4	≥ 100	≥ 250
CO	1.3	≥ 1,000	≥ 2,500

a: Based on emissions for plant operating 2,080 hr/yr.

2.9 A Best Available Control Technology (BACT) analysis is required for the fugitive emissions of particulate (PM and PM-10) from this facility because these emissions exceed significant levels as defined in HAR §11-60.1-1 (see table below). For BACT to control dust from the portable crushing and screening plant, the applicant proposes to use a water spray system with

water bars/nozzles at the feeder, primary jaw crusher, conveyor transfer below cone crusher, and all screen to conveyor transfer sites. For BACT to control dust over the work area, the applicant proposes to use a water truck and spray water whenever necessary to keep dust from becoming airborne. It was also indicated that the water spray system for the plant will be checked daily for proper operation.

BACT APPLICABILITY		
Pollutant	Emissions (TPY)	Significant Level (TPY)
CO	1.3	100
NO_x	19.4	40
SO_2	4.4	40
PM	82.2	25
PM-10	32.9	15
VOC	1.4	40

a: Based on operating 2,080 hr/yr and a 70% control efficiency for fugitive dust from wet suppression measures used.

3. Insignificant Activities and Exemptions.

3.1 A 235 gallon fuel oil No. 2 storage tank for the 300 hp Caterpillar diesel engine is an insignificant activity in accordance with HAR, §11-60.1-82(f)(1).

3.2 A 500 gallon fuel oil No. 2 storage tank for the 890 hp Caterpillar diesel engine is an insignificant activity in accordance with HAR, §11-60.1-82(f)(1).

4. Alternate Operating Scenarios.

4.1 The permit will allow replacement of the diesel engines with a temporary engine if the temporary engine is the same size or smaller and has equal or lower emissions.

5. Air Pollution Controls.

5.1 For the water spray system, water sprays bars/nozzles will be located at the feeder, primary jaw crusher, conveyor transfer below cone crusher, and all screen to conveyor transfer sites. The water spray system will be checked daily.

5.2 A water spray truck will be used to control fugitive dust along facility grounds and used as necessary to prevent dust from becoming airborne.

6. Project Emissions.

6.1 The applicant's consultant used emission factors taken from AP-42, Section 3.4 (10/96), "Large Stationary Diesel and all Stationary Duel-fuel Engines" and manufacturer's information to determine emissions from the 890 hp diesel engine. Emission rates were based on 44.2 gal/hr maximum fuel consumption rating for the engine, 2,080 hr/yr operation, a 19,300 Btu/lb fuel heating value, and a 7.1 lb/gal fuel density. Emissions of PM were assumed to equal PM-10 emission. Emissions, adjusted as applicable, are summarized below as follows:

890 hp Diesel Engine Emissions

Pollutant	Emission Factor (lb/MMBtu)	Emission Rate (lb/hr)/(g/s)	Emission Rate (TPY) Controlled 2,080 hr/yr	Emission Rate (TPY) Uncontrolled 8,760 hr/yr
NO_X	based on manufacturer's specifications	14.72/1.859	15.3	64.5
CO	based on manufacturer's specifications	0.56/0.071	0.6	2.5
SO_2	[a]Based on mass balance	3.135/0.396	3.3	13.7
PM	based on manufacturer's specifications	1.07/0.135	1.1	4.7
PM-10	based on manufacturer's specifications	1.07/0.135	1.1	4.7
TOC	0.09	----------	0.6	2.4
HAPs	Various (0.004)	----------	0.025	0.106

a: Based on mass balance as follows:

$S/SO_2 = 32.06/64.06$

(44.2 gal/hr)(7.1 lb diesel/gal)(0.005 sulfur) = 1.569 lb sulfur/hr

$SO_2 = (1.569)(64.06/32.06) = 3.135$ lb/hr

6.2 The applicant's consultant used emission factors taken from AP-42, Section 3.3 (10/96), "Gasoline and Industrial Engines" and manufacturer's information to determine emissions from the 300 hp diesel engine. It was assumed for this review that PM-10 equals total particulate emissions. Emission rates were based on a 15 gal/hr maximum fuel consumption rating for the engine, 2,080 hr/yr operation, at 19,300 Btu/lb fuel heating value, and a 7.1 lb/gal fuel density. Emissions, adjusted as applicable, are summarized below as follows:

300 hp Diesel Engine Emissions

Pollutant	Emission Factor (lb/MMBtu)	Emission Rate (lb/hr)/(g/s)	Emission Rate (TPY) Controlled 2,080 hr/yr	Emission Rate (TPY) Uncontrolled 8,760 hr/yr
NO_X	based on manufacturer's specifications	3.95/0.500	4.1	17.3
CO	based on manufacturer's specifications	0.63/0.080	0.7	2.8
SO_2	[a]based on mass balance	1.065/0.134	1.1	4.7
PM	based on manufacturer's specifications	0.06/0.008	0.06	0.3
PM-10	0.31	0.06/0.008	0.06	0.3
VOC	0.36	----------	0.8	3.2
HAPs	Various (0.006)	----------	0.012	0.054

a: Based on mass balance as follows:

S/SO_2 = 32.06/64.06

(15 gal/hr)(7.1 lb diesel/gal)(0.005 sulfur) = 0.533 lb sulfur/hr

SO_2 = (0.533)(64.06/32.06) = 1.065 lb/hr

6.3 The applicant's consultant used emission factors taken from AP-42, Section 11.19.2 (1/95), "Crushed Stone Processing" to predict fugitive dust emissions for various rock crushing operations. The Clean Air Branch (CAB) calculated emissions for equipment using the same emission factors. A 70% control efficiency was used to account for water sprays. Emissions, shown in Enclosure (1), were based on the maximum rated capacity of the equipment and 2,080 hr/yr operation. Emissions are summarized below as follows:

1,500 TPH Crushing and Screening Plant Emissions		
Pollutant	[a]Emission Rate (TPY) Controlled 2,080 hr/yr	[b]PM Emission Rate (TPY) Uncontrolled 8,760 hr/yr
PM	32.6	457.6
PM-10	15.5	217.6

a: Assumed 2,080 hr/yr operation with 70% control of particulate from wet suppression methods.

b: Assumed 8,760 hr/yr operation with no controls.

6.4 Emissions from active stockpiles were determined by the applicant's consultant using AP-42, Section 13.2.4 (1/95), "Aggregate Handling and Storage Piles". Emissions were based on a total aggregate production from the 1,500 TPH plant of 3,120,000 TPY for 2,080 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, and 0.7% moisture content for aggregate. A 70% control efficiency was assumed for the storage piles for using a water truck. Emissions, adjusted as applicable, are summarized below.

Stockpile Emissions			
Pollutant	Emission Factor (lb/ton)	Emission Rate (TPY) [with controls at 2,080 hr/yr]	Emission Rate (TPY) [with controls at 8,760 hr/yr]
PM	0.0284	13.3	186.7
PM-10	0.0134	6.3	88.4

6.5 Emissions from vehicle travel on unpaved roads were calculated by the applicant's consultant 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". The 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 74,286 vehicle miles traveled per year for the 1,500 TPH plant based on 2,080 hr/yr operation, an average truck capacity of 21 tons, and a 0.5 mile two-way travel distance;
b. A k (constant) for PM and PM-10 of 4.9 and 1.5, respectively based on data for industrial roads;
c. An a (constant) for PM and PM-10 of 0.7 and 0.9, respectively based on data for industrial roads;

d. A b (constant) for PM and PM-10 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 171 based on available data between years 1956 and 2003 from Opihihale 2, Hawaii (www.wrcc.dri.edu/cgi-bin/cliGCStP.pl?hiopih);
h. A 70% control efficiency was applied to account for dust control from water trucks; and
i. Vehicle travel emissions are listed as follows:

Vehicle Travel Emissions			
Pollutant	Emission Factor (lb/VMT)	Emission Rate (TPY) [with controls at 2,080 hr/yr]	Emission Rate (TPY) [with controls at 8,760 hr/yr]
PM	3.160	35.2	494.2
PM-10	0.885	9.9	139.0

6.6 Worst-case yearly emissions of criteria pollutants and HAPs from operation of the diesel engine generators and portable crushing and screening plant are shown below.

FACILITY-WIDE EMISSIONS		
Pollutant	Potential Emissions (TPY) [Facility-Wide, Controlled at 2,080 hr/yr]	Potential Emissions (TPY) [Facility-Wide, Uncontrolled 8,760 hr/yr]
NO_x	19.4	81.8
CO	1.3	5.3
SO_2	4.4	18.4
PM	82.2	1,144
PM-10	32.9	450
VOC	1.4	5.6
HAPs	0.037	0.160

a: Based on emissions from Paragraphs 6.1 through 6.5 for plant and diesel engines operating 2,080 hr/yr and 70% control for fugitive particulate emissions from the applicant's wet suppression methods.

b: Based on 8,760 hr/yr operation with no controls.

7. Air Quality Assessment.

7.1 The applicant's consultant performed an ambient air quality impact analysis (AAQIA) for the 300 and 890 hp diesel engines. A BEE-Line Version dated 96043 of the EPA SCREEN 3 model was used for the analysis. Assumptions for the SCREEN3 model included:

a. Simple elevated terrain impacts;
b. Complex terrain impacts;
c. Rural dispersion parameters;
d. Wake effects from the portable crushing plant;
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;
g. State of Hawaii scaling factor of 0.2 for the annual concentrations; and
h. Annual operational limit of 2,080 hr/yr (2,080/8,760=0.237).

7.2 A Good Engineering Practice (GEP) stack height analysis was performed by the consultant. The analysis indicates that the stack heights of the 300 and 890 hp diesel engines are less than the GEP formula stack height based on the dimensions of the 4.3 meter high x 12.2 meter long x 2.4 meter wide structure of the truck trailer for the 890 hp diesel engine .

7.3 The following background concentrations were used for the assessment:

a. SO_2 - collected in 2002 from the Kona monitoring station;

b. PM_{10} - collected in 2002 from the Hilo monitoring station; and

c. NO_2 and CO - collected in 2002 from the new Kapolei monitoring station.

7.4 The table below presents the emission rates and stack parameters used in the AAQIA for burning fuel oil No. 2.

SOURCE		EMISSION RATES				STACK PARAMETERS			
Equipment	Stack No.	NO_x (g/s)	SO_2 (g/s)	CO (g/s)	PM_{10} (g/s)	Height (m)	Temp. (K)	Vel. (m/s)	Dia. (m)
890 hp Diesel Engine	1	1.859	0.396	0.071	0.135	6.5	758.6	32.2	0.305
300 hp Diesel Engine	2	0.500	0.134	0.080	0.008	6.0	695.8	26.9	0.203

7.5 For a model run using simple elevated terrain, receptors were placed at the following heights and distances in meters respectively: 1/60, 2/70, 3/80, 4/90, 5/100, and 6/110.

7.6 For a model run using complex terrain, receptors were placed at the following heights and distances in meters respectively: 7/120, 12.2/175, 24.4/300, 36.6/500, and 48.8/780.

7.7 Results from the air quality modeling assessments show the following maximum concentrations:

Concentration (ug/m^3 per g/s)	**Averaging Period**	**Terrain**	**Distance From Stack**		**Diesel Engine**
			meters	**feet**	
1,201.0	1-hour	Simple	110	360	300 hp
327.6	1-hour	Simple	100	328	890 hp
39.4	24-hour	Complex Valley	300	984	300 hp
31.2	24-hour	Complex Valley	300	985	890 hp
84.1	24-hour	Complex Simple	175	574	300 hp
185.4	24-hour	Complex Simple	175	574	890 hp

7.8 The table below shows the normalized concentrations and conversion factors. The bold entries are the model results.

	Simple Terrain			**Complex Terrain Valley**			**Complex Terrain Simple**		
Averaging Period	Conversion Factor	Normalized Concentration (ug/m^3 per g/sec)		Conversion Factor	Normalized Concentration (ug/m^3 per g/sec)		Conversion Factor	Normalized Concentration (ug/m^3 per g/sec)	
		300 hp engine	890 hp engine		300 hp engine	890 hp engine		300 hp engine	890 hp engine
1-hour	N/A	**1,201.0**	**327.6**	0.25	157.6	124.8	0.4	210.2	463.5
3-hour	0.9	1,080.9	294.8	0.9	141.8	112.3	0.9	189.2	417.1
8-hour	0.7	840.7	229.3	0.7	110.3	87.4	0.7	147.1	324.5
24-hour	0.4	480.4	131.0	N/A	**39.4**	**31.2**	N/A	**84.1**	**185.4**
Annual	0.2	240.2	65.5	0.2	31.5	25.0	0.2	42.0	92.7

7.9 The predicted concentrations in the table below were based on full capacity operation of each diesel engine at 2,080 hr/yr firing fuel oil No. 2.

PREDICTED AMBIENT AIR QUALITY IMPACTS

AIR POLLUTANT	AVERAGING TIME	IMPACT 300 hp engine (ug/m^3)	IMPACT 890 hp engine (ug/m^3)	BACKGROUND (ug/m^3)	TOTAL IMPACT (ug/m^3)	AIR STANDARD (ug/m^3)	PERCENT STANDARD
SO_2	3-Hour	145	165	50	360	1,300	28
	24-Hour	64	73	19	156	365	43
	Annual[a]	8	9	8	25	80	31
NO_2	Annual[a,b]	21	31	9	61	70	87
CO	1-Hour	96	33	4,374	4,503	10,000	45
	8-Hour	67	23	3,448	3,538	5,000	71
PM_{10}	24-Hour	4	25	23	52	150	35
	Annual[a]	1	3	10	14	50	28

a: Annual impact reduced by 2,080/8,760 to account for the hr/yr operation restriction.

b. Total impact reduced by 25% to account for partial conversion of NO to NO_2.

8. <u>Significant Permit Condition Changes</u>.

8.1 The total operating hours of the 890 hp diesel engine shall not exceed 2,080 hours per any rolling twelve-month (12-month) period.

8.2 The total operating hours of the 300 hp diesel engine shall not exceed 2,080 hours per any rolling twelve-month (12-month) period.

Reason for 8.1 and 8.2: These conditions were incorporated, as proposed by the applicant, to meet ambient air quality standards and prevent the facility from triggering major source thresholds for particulate worst-case.

8.3 The plant will be subject to NSPS, Subpart OOO.

Reason for 8.3: Because the initial crusher is over 150 TPH and the associated equipment was fabricated after 1983, NSPS, Subpart OOO is triggered.

8.4 Change permit to allow provisions for the permittee to replace existing diesel engines with diesel engines of the same or smaller size.

Reason for 8.4: Change per applicant's request.

PROPOSED

9. Conclusion and Recommendation.

9.1 Actual emissions from the plant should be lower than predicted since calculations were base on operation at maximum capacity. The diesel engines, crushers, and three-deck screens are not expected to reach maximum capacity for extended periods during actual service. Furthermore, the maximum potential emissions from the plant were based on 2,080 hr/yr operation during regular operation which is 5 days per week and 8 hours per day. The applicant anticipated the plant to be inoperative at times during location changes and between jobs. The hourly limits on the diesel engines should ensure compliance with state and federal ambient air quality standards for the combustion of fuel oil No. 2. Recommend issuance of the permit subject to the incorporation of the significant permit conditions. The 30-day public comment period, and 45-day EPA review period will be initiated simultaneously.

Mike Madsen 6-21-2004