PROPOSED

PERMIT APPLICATION REVIEW
TEMPORARY COVERED SOURCE PERMIT (CSP) NO. 0595-01-CT
Application for Modification No. 0595-02

Applicant: CTS Earthmoving, Inc.

Facility: 357 TPH crushing and screening plant

Location: Various Temporary Sites, State of Hawaii

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

Equipment: 357 TPH crushing and screening plant consists of the following:

a. 357 TPH Aggregate Machinery, Inc., Thunderbird II jaw crusher, model no. 3042 (J2DH), serial no. 10090-01;
b. 350 TPH EL-JAY secondary cone crusher (54" cone), model no. 1140, serial no. 42B0580;
c. 400 TPH EL-JAY 5"x16"x 3-deck screen, model no. FSG5163-25, serial no. 34B0880;
d. 362 hp Caterpillar diesel engine, model no. 3306, serial no. 64Z27461;
e. 300 hp Caterpillar diesel engine, model no. D353, serial no. 46B152;
f. AMI Thunderbird II radial stacker, model no. 36100PRS30, serial no. 2348-05, EQU-01417;
g. Various conveyors; and
h. Water spray system.

Responsible Official:	Mr. Christian Twigg-Smith	**Contact:**	Mr. Sam Buda
Title:	President	**Title:**	Safety Administrator
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Consultant: Mr. Fred Peyer
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1. Background

1.1 CTS Earthmoving, Inc. has applied for a modification to its temporary covered source permit for operating a 357 TPH crushing and processing plant. The existing plant has a jaw crusher and 362 hp diesel engine and is limited to 2,500 hours per year operation. Proposed modification is to add a secondary cone crusher with 300 hp diesel engine and built-in three-deck screen. The 2,500 hour per year operational limit will remain the same for all equipment. A stacking conveyor will also be added to the plant. Equipment for the modification is stored at the CTS Earthmoving Inc. equipment yard adjacent to Honokohau Quarry at 74-5039R Queen Kaahumanu Street, Kailua-Kona, Hawaii 96740.

1.2 The standard industrial classification code (SICC) for this facility is 1429 (Crushed and Broken Stone, Not Elsewhere Classified).

1.3 Per telephone conversation with Fred Peyer, the stack diameter for the 300 hp diesel engine is 6.5 inches instead of 8 inches. The stack diameter was measured by CTS Earthmoving, Inc. personnel. It was also indicated that the stack for the 300 hp diesel engine could be raised to 19 feet.

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(27) 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 not applicable to the cone crusher and screen for the secondary plant because this equipment was manufactured prior to 1983. Manufacturing date for the cone crushing plant is 1980. Subpart OOO only applies to the jaw crusher and conveyors manufactured after 1983.

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. 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 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}	6.4	≥ 100	≥ 250
SO_2	2.6	≥ 100	≥ 2,500
NO_X	22	≥ 100	≥ 2,500
VOC	1.8	≥ 100	≥ 250
CO	4.7	≥ 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 emissions increase as defined in HAR, Section 11.60.1-1. Additional emissions from the modification to add a cone plant with diesel engine do not exceed significant levels for any regulated air pollutant as shown in table below. As such, BACT is not required for this facility.

BACT APPLICABILITY				
Pollutant	**Emission (TPY)**			**Significant Levels (TPY)**
	Modification			
	Cone Plant	300 hp Diesel Engine	Total	
PM	2.1	0.8	2.9	25
PM_{10}	0.7	0.8	1.5	15
SO_2	-----	1.4	1.4	40
NO_X	-----	11.6	11.6	40
VOC	-----	1.0	1.0	40
CO	-----	2.5	2.5	100

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

3. Insignificant Activities

3.1 Insignificant activities identified by the application are listed as follows:

a. Two 235 gallon fuel tanks servicing the diesel engines are insignificant activities in accordance with HAR §11-60.1-82(f)(1).

b. A 112 kW John Deere diesel engine is an insignificant activity pursuant to HAR §11-60.1-82(f)(2). It was indicated that the heat input capacity of the equipment is 999,740 Btu/hr.

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 plant will be equipped with a water spray system with water spray bars at:

a) Feeder to the jaw crusher;
b) Cone crusher;
c) Screen;
d) Transfer point to the under-conveyor servicing jaw plant; and
e) Conveyor belt servicing cone crushing and screening.

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

6. Project Emissions

6.1 Emissions of NO_X, CO, VOC, PM, PM_{10}, $PM_{2.5}$, and HAPs from the diesel engines 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_2 emissions based on the maximum allowable fuel sulfur content of 0.5% by weight and maximum consumption at 100% load. The capacity for the 362 hp diesel engine was based on manufacturer's specifications. The capacity for the 300 hp diesel engine was based on the horse power rating of the engine and a 7,000 Btu/hp-hr conversion per AP-42. 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. An operation limit of 2,500 hours per year was assumed for the diesel engines. Lower emissions from the 362 hp diesel engine than those for the 300 hp diesel engine can be attributed to use of manufacturer's rated fuel consumption for the 362 hp diesel engine. No manufacturer's specifications are available for the 300 hp diesel engine; therefore, data from AP-42 was used to determine maximum fuel consumption. Emissions estimates based on AP-42 data tends to be more conservative than those based on manufacturing data. Emission estimates are shown in Enclosure (1) and summarized below.

DIESEL ENGINE GENERATORS								
Pollutant	Engine Emission Rate				Engine Emissions (TPY)			
	362 hp		300 hp		2,500 hours		8,760 hours	
					362 hp	300 hp	362 hp	300 hp
	lb/hr	g/s	lb/hr	g/s	Existing	Modification	Existing	Modification
SO_2	0.979	0.124	1.085	0.137	1.2	1.4	4.2	4.9
NO_X	8.339	1.053	9.261	1.169	10.4	11.6	36.4	40.6
CO	1.796	0.227	1.995	0.252	2.2	2.5	7.7	8.8
VOC	-------	-------	-------	-------	0.85	0.95	3.0	3.3
PM	0.605	0.076	0.672	0.085	0.76	0.84	2.7	2.9
PM_{10}	0.586	0.074	0.651	0.082	0.73	0.81	2.6	2.8
$PM_{2.5}$	0.548	0.069	0.609	0.077	0.69	0.76	2.6	2.7
HAPs	--------	-------	--------	-------	0.00896	0.00995	0.031	0.035
Total HAPS----------→					0.019		0.066	

6.2 Particulate emissions from the mobile crushing and screening plant 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 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 emissions using the uncontrolled emission factors. A 2,500 hr/yr operation limit was also applied to determine emissions. The rated capacity of the equipment was used to determine maximum potential emissions. Emissions from the crushing and screening plant are shown in Enclosure (2) and summarized below.

357 TPH CRUSHING AND SCREENING PLANT				
Pollutant	Emissions (TPY)		Total Plant Emissions (TPY)	
	Cone Plant Modification	Jaw Plant Existing	2,500 hr/yr with water sprays	8,760 hr/yr with water sprays
PM	2.119	0.639	2.8	9.8
PM_{10}	0.676	0.270	0.9	3.1
$PM_{2.5}$	0.066	0.053	0.1	0.4

6.3 Particulate emissions from stockpiles 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 357 TPH plant of 892,500 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 assumed for using 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)	
		2,500 hr/yr with water truck	8,760 hr/yr with water truck
PM	0.028	3.8	13.3
PM_{10}	0.013	1.8	6.3
$PM_{2.5}$	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 (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 21,250 vehicle miles traveled per year for the 357 TPH plant based on 2,500 hr/yr operation, an average truck capacity of 21 tons, and a 0.5 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 190 based on available data between years 1949 and 2005 from the Kainaliu 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)	Emissions (TPY)	
		2,500 hr/yr with water truck	8,760 hr/yr with water truck
PM	2.849	9.1	31.9
PM_{10}	0.697	2.2	7.7
$PM_{2.5}$	0.107	0.3	1.1

6.5 Total yearly emissions from operating the crushing and screening 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	2.6	91
NO_X	22	77
CO	4.7	16.5
VOC	1.8	6.3
PM	17.3	60.6
PM_{10}	6.4	22.5
$PM_{2.5}$	2.4	8.6
Total HAPS	0.019	0.066

7. Air Quality Assessment

7.1 An ambient air quality impact analysis (AAQIA) was performed for the modification to add a 300 hp diesel engine using a SCREEN3 model version dated 96043. Emissions from the existing 362 hp diesel engine were considered to be part of the background concentrations. As such, the 362 hp diesel engine was not modeled. Because this is a portable source, the Department re-ran the model assuming the plant is adjacent to the fence line and terrain incline as worst-case. A SCREEN3 Version 5.0 program was used to re-run the model. Assumptions for the AAQIA included:

a. Simple terrain;
b. Simple elevated terrain;
c. Complex terrain;
d. Rural dispersion parameters;
e. Wake affects from the crushing jaw plant (13' high x 8' wide x 20' long);
f. Default meteorology;
g. EPA scaling factors of 0.9, 0.7, and 0.4 for the 3-hour, 8-hour, and 24-hour concentrations, respectively; and
h. State of Hawaii scaling factor of 0.2 for the annual concentrations.

7.2 The consultant used simple terrain receptors located at stack base starting at 122 meters from the plant. The next receptor was placed at 200 meters. Thereafter, receptors were placed at 100 meter increments up to 2,000 meters from the plant.

7.3 The consultant placed complex terrain receptors at the following heights and distances (meters) from the 300 hp diesel engine to determine impacts: 20/200, 22/225, 24/250, 26/275, 28/300, 30/325, 32/350, 34/375, and 37/400.

7.4 The Department placed simple elevated and complex terrain receptors at the following heights and distances (meters) from the 300 hp diesel engine to determine impacts: 0.47/5, 0.94/10, 1.87/20, 2.8/30, 4.2/45, 6.10/65, 7.5/80, 9.3/100, 12.19/130, 118.29/195, 24.38/260.

7.5 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.

7.6 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)	[a]Dia. (in)	Flow Rate (ft^3/min)
300 hp Engine	1	1.169	0.137	0.252	0.082	19	723 (842)	6.5	1,716

a: See Paragraph 1.3.

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

Concentration (ug/m^3 per g/s)	Averaging Period	Terrain	Distance From Stack feet
2,739	1-hour	Simple	148
55	24-hour	Complex Valley	640
476	24-hour	Complex Simple	213

7.8 The table below shows the normalized modeling results 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	**2,739**	0.25	220	0.4	1,190
3-hour	0.9	2,465	0.9	198	0.9	1,071
8-hour	0.7	1,917	0.7	154	0.7	833
24-hour	0.4	1,096	N/A	**55**	N/A	**476**
Annual	0.2	548	0.2	44	0.2	238

7.8 Results from the AAQIA of the 300 hp diesel engine, 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	338	55	393	1,300	30
	24 – Hour	150	21	171	365	47
	Annual[a]	21	8	29	80	36
NO_2	Annual[a,b]	51	9	60	70	86
CO	1 – Hour	690	3,762	4,452	10,000	45
	8 – Hour	483	2,323	2,806	5,000	56
PM_{10}	24 – Hour	90	29	119	150	79
	Annual[a]	13	13	26	50	52

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

b: The ozone limiting method was utilized to determine the nitrogen dioxide concentration as follows:
Annual concentration of NO_X for the equipment is (548 ug/m^3s/g)(2,500/8,760)(1.169) = 183 ug/m^3.

300 ug/m^3 > 34 ug/m^3 (background ozone concentration from Sand Island in 2004). Therefore, the equipment is O_3 limited since there is insufficient ozone to convert all the NO to NO_2.

It was assumed that 90% of the nitrogen oxides discharged from the stacks form NO and 10% of the nitrogen oxides discharged from the stacks form NO_2; therefore, the concentration of NO_2 emitted from the stacks is as follows:

$$183(0.1) = 18.3\ ug/m^3$$

It was additionally assumed that the NO_2 produced from the reaction between NO from the stacks and background ozone is as follows:

$$(\text{background } O_3)\ (NO_2/O_3) = 34(46/48) = 32.6\ ug/m^3$$

$$\text{Total } NO_2 = 18.3\ ug/m^3 + 32.6\ ug/m^3 = \underline{50.9\ ug/m^3}$$

8. Significant Permit Conditions

8.1 Plant 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 engines. The diesel engines 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 jaw crusher and conveyors built after 1983.

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 assuming maximum rated capacity of the diesel engines and stone processing plant equipment. 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 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.

June 12, 2006
Mike Madsen