PROPOSED

PERMIT APPLICATION REVIEW
TEMPORARY COVERED SOURCE PERMIT (CSP) NO. 0562-01-CT
Application for Modification No. 0562-02

Applicant: CTS Earthmoving, Inc.

Facility: Various crushing and screening plants

Location: Various Temporary Sites, State of Hawaii

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

Equipment: The crushing and screening plants consist of the following:

a. 1,500 TPH Aggregate Machinery, Inc. Thunderbird II jaw crushing plant, serial no. 2217-03, with 215 - 1,500 TPH Cedarapids jaw crusher, model no. 3054, serial no. 52169 (30" x 54" jaw size);
b. 1,500 TPH Aggregate Machinery, Inc. Thunderbird II jaw crushing plant, serial no. 2495-06, with 215 - 1,500 TPH Cedarapids jaw crusher, model no. 3054, serial no. 54169 (30" x 54" jaw size);
c. 560 TPH Cedarapids cone crushing plant, model no. MVP 380, serial no. 10172 with Thunderbird II three-deck screen, model no. 6163.7-SH-O, serial no. 50393 (6' x 16');
d. Various conveyors servicing the crushing and screening plants;
e. Water spray systems servicing the crushing and screening plants;
f. 300 hp Caterpillar diesel engine, model no. C-9, serial no. CLJ04382 driving the1500 TPH jaw crushing plant, serial no. 2217-03;
g. 425 hp Caterpillar diesel engine, model no. C-12, serial no. BDL 01886 driving the 1,500 TPH jaw crushing plant, serial no. 2495-06; and
h. 890 hp Caterpillar diesel engine generator, model no. 3412, serial no. 81Z23751 providing power to various crushing and screening operations.

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1. Background

1.1 CTS Earthmoving, Inc. has applied for a permit modification to add a 1,500 TPH jaw crushing plant with 425 hp diesel engine to its facility. Existing equipment for the permit includes a 1,500 TPH jaw crushing plant with 300 hp diesel engine, a 560 TPH

cone crushing plant with built-in screen, and an 890 hp diesel engine generator that provides power to various crushing and screening operations. Existing plants have a 2,080 hour per year operating limit. For the modification, both the existing plants and new 1,500 TPH jaw crushing plant being added to the facility will be subject to a 1,850 hour per year operating limit. The standard industrial classification code (SICC) for this facility is 1429 (Crushed and Broken Stone, Not Elsewhere Classified).

1.2 Pursuant to a telephone conversation on May 4, 2007 with CTS Earthmoving, Inc. personnel, the diesel engine servicing the new jaw crushing plant is 425 hp, the stack for the engine is 7-3/4 inches, and the fuel tank for the engine is 235 gallons in capacity. It was later discovered by the applicant that the stack exit diameter is 6 inches.

1.3 Pictures of a 560 TPH cone crusher with three-deck screen and the 890 hp diesel engine generator from this permit operating with a 357 TPH jaw crushing plant from another CTS Earthmoving, Inc. permit are shone in Enclosure (1). The pictures were taken by Wendell Sano during a May 1, 2007 site inspection of CTS Earthmoving, Inc. at Paul Legg Subdivision.

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 applicable to the this facility because the plant equipment was manufactured after to1983 and the primary crushers for the facility all have capacities above 150 TPH.

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 (2,080 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}	32.1	≥ 250	≥ 100
SO_2	5.2	≥ 2,500	≥ 100
NO_X	21.9	≥ 2,500	≥ 100
VOC	1.3	≥ 250	≥ 100
CO	2.3	≥ 2,500	≥ 1,000

2.8 A best available control technology (BACT) analysis is required for the permit modification to add a 1,500 TPH crushing plant with 425 hp diesel engine because potential emissions from the plant are above significant levels as defined in HAR, Section 11- 60.1 for particulate matter (see table below). As per discussion with the applicant's consultant on April 27, 2007, the wet suppression methods proposed in the application to control fugitive dust are proposed as BACT for particulate for the crushing plant being added to the permit.

BACT APPLICABILITY		
Pollutant	Emissions (TPY)	Significant Level (TPY)
SO_2	1.3	40
NO_X	4.6	40
CO	1.1	100
VOC	0.1	40
PM	46.1	25
PM_{10}	14.4	15

a: Based on emissions from equipment added to the permit operated at 1,850 hr/yr with water a spray system to control fugitive dust.

2.9 The facility is a synthetic minor source because operational limits and controls for the

plant restrict air pollutants below major source thresholds.

3. Insignificant Activities

3.1 Insignificant activities identified by the application are listed below:

a. 235 gallon fuel storage tank servicing the 300 hp diesel engine is an insignificant activity in accordance with HAR §11-60.1-82(f)(1).

b. 235 gallon fuel storage tank servicing the 425 hp diesel engine generator is an insignificant activity in accordance with HAR §11-60.1-82(f)(1).

c. 500 gallon fuel storage tank servicing the 890 hp diesel engine is an insignificant activity in accordance with HAR §11-60.1-82(f)(1).

4. Alternate Operating Scenarios

4.1 The permit allows 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 crushing and screening plants are equipped with a water spray system with water spray bars at:

a. Each feeder for the primary jaw crushers;
b. Each primary jaw crusher;
c. Conveyor transfer below cone crusher; and
d. All screen to conveyor transfer sites.

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

6. Project Emissions

6.1 Emissions of NO_X, CO, VOC, PM, PM_{10}, and $PM_{2.5}$ were based on emissions data from manufacturer's specifications. 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_2 emissions based on the maximum allowable fuel sulfur content of 0.5% by weight and a 20.5 gallon per hour maximum fuel consumption at 100% load. It was assumed that 96% of the total particulate was PM_{10} 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 engines. An operation limit of 1,850 hours per year was assumed for the diesel engine. Emission estimates are shown in Enclosure (2) and summarized below.

DIESEL ENGINE				
Pollutant	Engine Emission Rate		Engine Emissions (TPY)	
	425 hp engine		425 hp engine	425 hp engine
	lb/hr	g/s	1,850 hours	8,760 hours
SO_2	1.454	0.184	1.3	6.2
NO_X	5.01	0.633	4.6	21.8
CO	1.3	0.153	1.1	6.4
VOC	-------	--------	0.1	0.5
PM	-------	-------	0.1	0.5
PM_{10}	0.106	0.013	0.1	0.5
$PM_{2.5}$			0.1	0.5
HAPs			0.012	0.06

6.3 Particulate emissions from the crushing plant were based on emission factors from AP-42, Section 11.19.2 (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 1,850 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 1,500 TPH crushing plant are shown in Enclosure (3) and summarized below.

1,500 TPH CRUSHING AND SCREENING PLANT		
Pollutant	Emissions (TPY)	Total Plant Emissions (TPY)
	1,850 hr/yr with water sprays	8,760 hr/yr with water sprays
PM	1.7	8.0
PM_{10}	0.9	4.3
$PM_{2.5}$	0.2	0.9

6.4 Particulate emissions from stockpiles were determined by using emission factors from AP-42, Section 13.2.4 (11/06), Aggregate Handling and Storage Piles. Emissions were based on the 1,500 TPH plant capacity and 1,850 hr/yr operation. Emissions were also based on a 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 applied to account for use of a water truck to control fugitive dust. Emissions are shown in Enclosure (4) and summarized in the table below.

STORAGE PILES			
Pollutant	Emission Factor (lb/ton)	Emission Rate (TPY)	
		2,080 hr/yr with water truck	8,760 hr/yr with water truck
PM	0.028	13.1	55.2
PM_{10}	0.013	6.1	25.7
$PM_{2.5}$	0.004	1.9	8.0

6.5 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 46,250 vehicle miles traveled per year for the 1,500 TPH plant based on 1,850 hr/yr operation, an average truck capacity of 21 tons, and a 0.35 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 43 based on available data between years 1950 and 1963 from the Puu Anahulu 93A 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)	
		1,850 hr/yr with water truck	8,760 hr/yr with water truck
PM	4.703	32.6	154.6
PM_{10}	1.150	8.0	37.9
$PM_{2.5}$	0.176	1.2	5.7

6.6 Total yearly emissions from operating the crushing and screening plant are listed below as follows:

TOTAL EMISSIONS				
Pollutant	Potential Emissions (TPY) (1,850 hr/yr with water sprays and water truck)			Potential Emissions (TPY) (8,760 hr/yr with water sprays and water truck)
	New Equipment	Existing Equipment[a]	Entire Facility	
SO_2	1.3	3.9	5.2	24.8
NO_X	4.6	17.3	21.5	103.6
CO	1.1	1.2	2.3	11.0
VOC	0.1	1.2	1.3	6.2
PM	46.1	52.8	98.9	468.3
PM_{10}	14.4	17.7	32.1	160.5
Total HAPs	0.012	0.033	0.045	0.213

a: Based on updated emissions determined from 11.19.2 (8/04), Crushed Stone Processing and Pulverized Mineral Processing (see Enclosure (5)). Stockpile and vehicle travel emissions are the same as those from Paragraphs 6.3 and 6.4 because existing plant and new 1,500 TPH jaw crushing plant have the same capacity. Diesel engine emissions for existing equipment under permit file number 0562-01 reduced by a factor of 1,850/2,080 to determine potential emissions from existing equipment.

7. Air Quality Assessment

7.1 The applicant's consultant performed an ambient air quality impact analysis (AAQIA) for the 425 hp diesel engine. The existing 300 hp diesel engine for the other jaw crushing plant and 890 hp diesel engine generator were considered to be part of the background concentrations and were not modeled. An EPA SCREEN3 model was used for the analysis. Assumptions for the model included:

a. Application of flat terrain in an approximate 50 meter (164 ft) radius around the source;
b. Simple elevated terrain parameters at the following heights/distances in meters 1/41, 2/81, 3/123, 4/164;
c. Complex terrain parameters at the following heights/distances in meters 12/500, 24/1000, 37/1400, 48/1900, 61/2300, 73/2700, 85/3000;
d. Rural dispersion parameters;
e. Wake affects from a structure that is 14' x 9.8' x 36' in dimension;
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;
h. State of Hawaii scaling factor of 0.2 for the annual concentrations; and
i. Annual operating limit of 1,850 hours per year.

7.2 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). No particulate data was collect on the island of Hawaii in 2005.

b. NO_X - collected in 2005 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. 1-hour CO – collected in 2005 from the Honolulu air quality monitoring station (air monitoring station that is most conservative of current data from another island).

d. 8-hour CO – collected in 2005 from the University air quality monitoring station (air monitoring station that is most conservative of current data from another island).

e. SO_2 – collected in 2004 from the Kona air quality monitoring station. No SO_2 data was collected on the island of Hawaii in 2005.

7.4 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. ^oK (^oF)	Dia. (in)	Flow Rate (ft^3/min)
425 hp Engine	1	0.633	0.184	0.153	0.013	14	763 (914)	6	2535.6

7.5 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	Factor	Normalized Output (ug/m^3 per g/s)	Factor	Normalized Output (ug/m^3 per g/s)	Factor	Normalized Output (ug/m^3 per g/s)
		425 hp engine		425 hp engine		425 hp engine
1-hour	N/A	**2,543**	0.25	48	0.4	133
3-hour	0.9	2,289	0.9	43	0.9	120
8-hour	0.7	1,780	0.7	34	0.7	93
24-hour	0.4	1,017	N/A	**12**	N/A	**53**
Annual	0.2	509	0.2	10	0.2	19

7.6 Results from the AAQIA of the 425 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
		425 hp engine				
SO_2	3 –Hour 24 – Hour Annual[a]	421 187 20	55 21 8	476 208 28	1,300 365 80	37 57 35
NO_2	Annual[a,b]	51	9	60	70	86
CO	1 – Hour 8 – Hour	389 272	3,876 1,895	4,265 2,167	10,000 5,000	43 43
PM_{10}	24 – Hour Annual[a]	13 2	29 13	42 15	150 50	28 30

a: Annual concentration reduced by a factor of 1,850/8,760 to account for diesel engine hour limitation.
b: Total impact reduced by 25% to account for partial conversion of NO_X to NO_2. Reduced impact = impact (0.75)

8. Significant Permit Conditions

8.1 The 1,500 TPH jaw crushing plant with 425 hp diesel engine shall not exceed 1,850 hours in any rolling twelve (12) month period.

8.2 The 1,500 TPH jaw crushing plant with 300 hp diesel engine shall not exceed 1,850 hours in any rolling twelve (12) month period.

8.3 The 890 hp diesel engine generator servicing the crushing and screening plants shall not exceed 1,850 hours in any rolling twelve (12) month period.

Reason for 8.1: The applicant has proposed a maximum 1,850 hours per year operation limit for equipment at this facility. Equipment operating hours are dependant on operation of the diesel engines and diesel engine generator powering the various crushing and screening units. The hour limits enable the facility to operate below major source thresholds when all equipment is located at one site. The limits are also necessary for compliance with the ambient air quality standards for operating the various diesel engines providing power for the facility.

8.2 Incorporate minimum stack height requirements for the diesel engines and diesel engine generator.

Reason for 8.2: The AAQIA was based on stack heights reported by applicant.

8.3: 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 rated capacity. Calculations were based on 1,850 hours per year operation. The permit requires the use of water spray systems 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 each plant is located. Recommend issuance of the temporary covered source permit modification subject to the significant permit conditions, 30-day public comment period, and 45-day review by EPA.

May 7, 2007
Mike Madsen