

**PERMIT APPLICATION REVIEW  
TEMPORARY NONCOVERED SOURCE PERMIT (NSP) NO. 0672-01-CT  
Initial Permit Application No. 0672-01**

**Applicant:** CTS Earthmoving, Inc.

**Facility:** 452 TPH mobile jaw crushing plant

**Initial Location:** UTM: 191,540 meters East and 2,170,710 meters North,  
Blue Sky Coffee Farm, Holualoa, Hawaii

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

**Equipment:** The Cobratrack 1100 mobile crushing plant, serial no. 53556, consists of the following equipment:

- a. 452 TPH Jaques/Cedarapids 3042 overhead jaw crusher;
- b. Vibrating grizzly feeder (4214-9 VGF);
- c. Discharge conveyor;
- d. Side discharge conveyor;
- e. Water spray system; and
- f. 285 hp Cummins diesel engine, model no. QSL9, serial no. 46510658.

**Responsible**

**Official:** Mr. Christian Twigg-Smith  
**Title:** President  
**Company:** CTS Earthmoving, Inc.  
**Phone:** (808) 324-1829

**Contact:** Mr. Sam Buda  
**Title:** Plant Manager  
**Company:** CTS Earthmoving, Inc.  
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**Consultant:** Mr. Fred Peyer  
**Company:** EMET Services, Inc.  
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Waipahu, Hawaii 96797  
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**1. Background**

1.1 CTS Earthmoving, Inc. has submitted an initial temporary covered source permit application to operate a 452 TPH mobile jaw crushing plant with 285 hp diesel engine. The applicant proposes a 2,080 hour per year operating limit for the plant. The mobile jaw crushing plant will be equipped with a water spray system to control fugitive dust from crushing aggregate. A water truck will also be used to control fugitive dust at each temporary work site. The standard industrial classification code (SICC) for this facility is 1429 (Crushed and Broken Stone, Not Elsewhere Classified).

**2. Applicable Requirements**

2.1 Hawaii Administrative Rules (HAR)  
Chapter 59, Ambient Air Quality Standards

- 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
    - 11-60.1-38, 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 OOO, Standards of Performance Standards of Performance for Non-Metallic Mineral Processing Plants is applicable to the crushing plant because the jaw crusher capacity is greater than 150 TPH and the crushing plant is new.
- 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 the plant is subject to covered source permitting requirements.
- 2.7 The consolidated 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.

<b>CERR APPLICABILITY</b>			
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 <sub>10</sub>	3.4	≥ 250	≥ 100
SO <sub>2</sub>	1.1	≥ 2,500	≥ 100
NO <sub>x</sub>	3.1	≥ 2,500	≥ 100

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VOC	1.2	≥ 250	≥ 100
CO	0.3	≥ 2,500	≥ 1,000

2.8 A best available control technology (BACT) analysis is not required because potential emissions from this facility do not exceed significant levels as defined in HAR, Section 11-60.1. See table below.

<b>BACT APPLICABILITY</b>		
Pollutant	Emissions (TPY)	Significant Level (TPY)
	2,080 hr/yr with water sprays and water truck	
SO <sub>2</sub>	1.1	40
NO <sub>x</sub>	3.1	40
CO	0.3	100
VOC	1.2	40
PM	9.5	25
PM <sub>10</sub>	3.4	15

2.9 Operational limits and controls for the plant do not restrict air pollutants below major source thresholds. Therefore, this facility is not a synthetic minor source.

**3. Insignificant Activities**

3.1 A 200 gallon fuel tank servicing the 285 hp diesel engine for the mobile crushing plant is an insignificant activity in accordance with HAR §11-60.1-82(f)(1).

**4. Alternate Operating Scenarios**

4.1 As an alternate operating scenario, the applicant wants the option to replace the 285 hp diesel engine for the mobile jaw crushing plant with another diesel engine of the same or smaller size if equipment malfunction or overhaul is required for the permitted diesel engine.

**5. Air Pollution Controls**

5.1 The jaw crushing plant is equipped with a water spray system with water spray bars located:

- a. At jaw crusher; and
- b. Along conveyor belt.

5.2 A water spray truck will be used by the applicant to control dust at each work site.

**6. Project Emissions**

6.1 Emissions of NO<sub>x</sub>, CO, PM, PM<sub>10</sub>, and PM<sub>2.5</sub> were based on emissions data from manufacturer's specifications. The VOC and HAP emissions were estimated using 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 allowable fuel sulfur content of 0.5% by weight and maximum 14.4 gallon per hour fuel consumption at 100% load. It was assumed that 96% of the total

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particulate was PM<sub>10</sub> and 90% of the total particulate was PM<sub>2.5</sub> based on AP-42, Appendix B.2, Table B.2-2 for gasoline and diesel fired internal combustion engines. An operation limit of 2,080 hours per year was applied to determine emissions. Emission estimates are shown in Enclosure (1) and summarized below.

<b>DIESEL ENGINE</b>				
Pollutant	Engine Emission Rate		Engine Emissions (TPY)	
	285 hp engine		285 hp engine	
	lb/hr	g/s	2,080 hours	8,760 hours
SO <sub>2</sub>	1.014	0.128	1.1	4.6
NO <sub>x</sub>	2.974	0.376	3.1	13.1
CO	0.308	0.039	0.3	1.3
VOC	-----	-----	1.2	5.1
PM	-----	-----	0.1	0.2
PM <sub>10</sub>	0.043	0.005	0.1	0.2
PM <sub>2.5</sub>			0.1	0.2
HAPs			0.021	0.088

6.2 Particulate emissions from the jaw crushing plant were based on emission factors from AP-42, Section 11.19.2 (8/04), Crushed Stone Processing and Pulverized Mineral. The controlled emission factors were used for crushing and conveyor transfer points. It was assumed that 51% PM was PM<sub>10</sub> and 15% PM was PM<sub>2.5</sub> based on information from AP-42, Appendix B.2.2. Uncontrolled emission factors were used for truck loading and unloading operations and a 70% control efficiency for water sprays was applied to determine emissions. An operating time of 2,080 hr/yr was assumed. The rated capacity of the equipment was used to determine maximum potential emissions. Emissions from the crushing plant are shown in Enclosure (2) and summarized below.

<b>CRUSHING PLANT</b>		
Pollutant	Emissions (TPY)	Total Plant Emissions (TPY)
	2,080 hr/yr with water sprays	8,760 hr/yr with water sprays
PM	0.6	2.5
PM <sub>10</sub>	0.3	1.3
PM <sub>2.5</sub>	0.06	0.3

6.3 Particulate emissions from stockpiles were determined using emission factors from AP-42, Section 13.2.4 (11/06), Aggregate Handling and Storage Piles. Emissions were based on the jaw crushing plant's capacity and 2,080 hr/yr operation. Emissions were also based on a 10.9 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 0.7% 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 (3) and summarized in the table below.

<b>STORAGE PILES</b>			
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	3.9	16.6

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PM <sub>10</sub>	0.013	1.8	7.7
PM <sub>2.5</sub>	2.03 x 10 <sup>-3</sup>	0.3	1.2

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 (11/06) Unpaved Roads. Equation (1a) emission factor was extrapolated to annual average uncontrolled conditions using Equation (2). Emission rates were based on the following assumptions:

- a. A distance of 11,192 vehicle miles traveled per year based the maximum plant capacity, 2,080 hr/yr operation, an average truck capacity of 21 tons, and a 0.25 mile two way travel distance for the trucks;
- 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 (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](http://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 186 based on available data between years 1975 and 1986 from the KALAOA 69.22 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:

<b>VEHICLE TRAVEL</b>			
Pollutant	Emission Factor (lb/VMT)	Emissions (TPY)	
		2,080 hr/yr with water truck	8,760 hr/yr with water truck
PM	2.913	4.9	20.6
PM <sub>10</sub>	0.714	1.2	5.1
PM <sub>2.5</sub>	0.071	0.1	0.4

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

<b>TOTAL EMISSIONS</b>		
Pollutant	Potential Emissions (TPY) (2,080 hr/yr with water sprays and water truck)	Potential Emissions (TPY) (8,760 hr/yr with water sprays and water truck)
SO <sub>2</sub>	1.1	4.6
NO <sub>x</sub>	3.1	13.1
CO	0.3	1.3
VOC	1.2	5.1
PM	9.5	39.9
PM <sub>10</sub>	3.4	14.3
PM <sub>2.5</sub>	0.6	2.1
Total HAPS	0.021	0.088

**7. Air Quality Assessment**

7.1 An ambient air quality impact analysis (AAQIA) was performed for the 285 hp diesel engine using an EPA SCREEN 3 model. Assumptions for the model included:

- a. Simple terrain;
- b. Rural dispersion parameters;
- c. Wake affects from the jaw crushing plant;
- d. Default meteorology;
- e. EPA scaling factors of 0.9, 0.7, and 0.4 for the 3-hour, 8-hour, and 24-hour concentrations, respectively; and
- f. State of Hawaii scaling factor of 0.2 for the annual concentrations.

7.2 The following background concentrations were used for the assessment:

- a. PM<sub>10</sub> – collected in 2004 from the Hilo air quality monitoring station (air monitoring station that is closest to Kona with PM<sub>10</sub> data). No particulate data was collect on the island of Hawaii in 2005 or 2006.
- b. NO<sub>x</sub> - collected in 2006 from the Kapolei air quality monitoring station (air monitoring station with NO<sub>x</sub> data that is most conservative of current data from another island).
- c. 1-hour CO – collected in 2006 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 2006 from the University air quality monitoring station (air monitoring station that is most conservative of current data from another island).
- e. SO<sub>2</sub> – collected in 2004 from the Kona air quality monitoring station. No SO<sub>2</sub> data was collected on the island of Hawaii in 2005 or 2006.

7.3 The table below lists the emission rates and stack parameters used in the AAQIA.

SOURCE	STACK	EMISSION RATES (g/s)				STACK PARAMETERS			
		NO <sub>x</sub>	SO <sub>2</sub>	CO	PM <sub>10</sub>	Height (ft)	Temp. °K (°F)	Dia. (in)	Flow Rate (ft <sup>3</sup> /min)
285 hp engine	1	0.376	0.128	0.039	0.005	13	651 (712)	6"	1,208

7.4 Results from the AAQIA of the 285 hp diesel engine, shown in the table below, indicate compliance with the ambient air quality standards. Maximum 1-hour model output was determined to be **708.4 ug/m<sup>3</sup> per g/s** at a 150 meters (492 feet).

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PREDICTED AMBIENT AIR QUALITY IMPACTS						
AIR POLLUTANT	AVERAGING TIME	IMPACT (ug/m <sup>3</sup> )	BACKGROUND (ug/m <sup>3</sup> )	TOTAL IMPACT (ug/m <sup>3</sup> )	AIR STANDARD	PERCENT STANDARD
SO <sub>2</sub>	3 –Hour	82	55	137	1,300	11
	24 – Hour	36	21	57	365	16
	Annual <sup>a</sup>	4	8	12	80	15
NO <sub>2</sub>	Annual <sup>a</sup>	13	9	22	70	31
CO	1 – Hour	27	2,850	2,877	10,000	29
	8 – Hour	19	1,967	1,986	5,000	40
PM <sub>10</sub>	24 – Hour	1	29	30	150	20
	Annual <sup>a</sup>	1	13	14	50	28

a: Annual concentration reduced by a factor of 2,080/8,760 to account for the mobile crushing plant hour limitation.

## **8. Significant Permit Conditions**

8.1 The operating hours of the jaw crushing plant with diesel engine shall not exceed 2,080 hours in any rolling twelve (12) month period.

Reason for 8.1: The applicant has proposed a maximum 2,080 hours per year operation for the jaw crushing plant.

8.2 Incorporate minimum stack height requirements for the diesel engine that drives the mobile crushing plant.

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

## **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 plant. 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 also based on 2,080 hours per year operation. The permit requires the use of a water spray system for compliance with fugitive dust regulations. The permit also requires the use of a water truck to control fugitive dust at sites where the jaw crushing plant is located. Recommend issuance of the temporary covered source permit subject to the significant permit conditions, the 30 day public comment period, and 45 day review by the Environmental Protection Agency.

January 29, 2008  
Mike Madsen