

**PERMIT APPLICATION REVIEW
TEMPORARY COVERED SOURCE PERMIT (CSP) NO. 0669-01-CT
Initial Application No. 0669-01**

Applicant: R.H.S. Lee, Inc.

Facility: 250 TPH Mobile Crushing Plant
280 TPH Mobile Screening Plant

Location: Various Temporary Sites, State of Hawaii

Mailing Address: 96-1414 Waihona Place
Pearl City, Hawaii 96782

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

- a. 250 TPH Extec impact crushing plant, model no. I-C13, serial no. 10515, with Krupp Hazemag impact crusher, model no. APP 1013EX;
- b. 280 TPH Extec screening plant, model no. S-5, serial no. 10622, with 5' x 8' two-deck screen;
- c. Various conveyors;
- d. Water spray systems; and
- e. 440 hp Caterpillar diesel engine, model no. C-13, serial no. LGK0253, driving mobile crushing plant.

Responsible

Official: Mr. Richard H.S. Lee
Title: President
Company: R.H.S. Lee, Inc.
Phone: (808) 455-9026

Contact: Mr. Jim Morrow
Title: Env. Management Consultant
Phone: (808) 942-9096

1. Background

1.1 R.H.S. Lee, Inc. has submitted a initial temporary covered source permit application to increase the capacity of the mobile crushing plant with 440 hp diesel engine from 135 TPH to 250 TPH. A 280 TPH mobile screening plant is also permitted with this facility. A temporary noncovered source permit (No. 0644-01-NT) was previously issued for operating the equipment based on information from the applicant that the crushing plant could be restricted to 135 TPH production rate by installing a restriction kit. An August 8, 2007 site inspection found that the restriction kit had not been installed because impactor blow bar settings could not be adjusted if a restriction kit was welded in place. The applicant proposes a 3,000 hour per year operating limit for the plant equipment to prevent the facility from exceeding major source thresholds. The limit also ensures compliance with the ambient air quality standards for operating the 440 hp diesel engine powering the mobile crushing plant. The diesel engine for the screening plant is exempt from permitting. The standard industrial classification code (SICC) for this facility is 1429 (Crushed and Broken Stone, Not Elsewhere Classified).

1.2 Available literature for the impact crusher for the mobile crushing plant indicates the impactor to be a model APP 1013 with 120 -200 ton per hour capacity that is manufactured

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by Krupp Hazemag. Krupp Hazemag is a crusher manufacturing plant in France.

- 1.3 Information provided by EXTEC, the manufacturer for the mobile crushing plant, indicates the impactor to be 250 TPH at a maximum open setting of 2 1/2”.
- 1.4 Pictures from a site inspection of R.H.S. Lee, Inc. on May 2, 2007 at Red Hill on the Coast Guard Reservation are shown in Enclosure (1).
- 1.5 Pictures of the crushing and screening plants after issuing the temporary noncovered source permit are shown in Enclosure (2). The pictures were taken during an August 8, 2007 site inspection of the plant at Schofield Barracks.

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 and screening plants because the impact crusher capacity is greater than 150 TPH and the crushing and screening plants are new equipment.
- 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 particulate emissions are greater than 25 TPY.
- 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).

CERR APPLICABILITY			
Pollutant	Facility Emissions (3,000 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	22.3	≥ 250	≥ 100
SO ₂	2.4	≥ 2,500	≥ 100
NO _x	4.6	≥ 2,500	≥ 100
VOC	0.2	≥ 250	≥ 100
CO	3.7	≥ 2,500	≥ 1,000

- 2.8 A best available control technology analysis is not required because potential facility emissions from this permit application proposal compared to those from the initial noncovered source permit application (File No. 0644-01) are below significant emission levels as defined in HAR, Section 11- 60.1 .
- 2.9 The facility is a synthetic minor source because operational limits and controls for the plant restrict air pollutants below major source thresholds for particulate.

3. Insignificant Activities

- 3.1 Insignificant activities identified by the applicant are listed below.
 - a. A 99 hp Deutz diesel engine powering the 280 TPH mobile screening plant is an insignificant activity in accordance with HAR §11-60.1-82(f)(2).
 - b. A 125 gallon fuel tank servicing the 440 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 No alternate operating scenarios were proposed by the applicant.

5. Air Pollution Controls

- 5.1 The I-C13 impact crushing plant is equipped with a water spray system with non-resetting water flow meter and water spray bars at:
 - a. Impact crusher; and
 - b. Discharge end of the main conveyor.
- 5.2 The S-5 screening plant is equipped with a water spray system with water spray bars at the end of the two side conveyors and main conveyor.

5.3 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_x, CO, VOC, PM, PM₁₀, and PM_{2.5} were based on emissions data from manufacturer's specifications. 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 SO₂ emissions based on the maximum allowable fuel sulfur content of 0.5% by weight and maximum 22.7 gallon per hour fuel consumption at 100% load. It was assumed that 96% of the total particulate was PM₁₀ 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 3,000 hours per year was assumed for the diesel engine. Emission estimates are shown in Enclosure (3) and summarized below.

DIESEL ENGINE				
Pollutant	Engine Emission Rate		Engine Emissions (TPY)	
	440 hp engine		440 hp engine	440 hp engine
	lb/hr	g/s	3,000 hours	8,760 hours
SO ₂	1.599	0.202	2.4	7.0
NO _x	3.040	0.384	4.6	13.4
CO	2.470	0.312	3.7	10.8
VOC	-----	-----	0.2	0.6
PM	-----	-----	0.2	0.6
PM ₁₀	0.134	0.017	0.2	0.6
PM _{2.5}			0.2	0.6
HAPs			0.030	0.088

6.3 Particulate emissions from the crushing and screening plants were based on emission factors from AP-42, Section 11.19.2 (8/04), Crushed Stone Processing and Pulverized Mineral Processing, except that for screening of fines, the uncontrolled emission factor was used, and a 35% control efficiency was assumed for wetting soil prior to screening. The controlled emission factors were used for crushing, screening, and conveyor transfer points. It was assumed that 51% PM was PM₁₀ 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 and a 70% control efficiency for water sprays was applied to determine emissions from the crushing and screening plants. An operating time of 3,000 hr/yr was used to determine emissions for the plants. The rated capacity of the equipment was assumed for estimating emissions. Emissions from the crushing and screening plants are shown in Enclosure (4) and summarized below.

CRUSHING AND SCREENING PLANTS		
Pollutant	Emissions (TPY)	Total Plant Emissions (TPY)
		3,000 hr/yr with water sprays
PM	84.1	245.6
PM ₁₀	20.5	59.9
PM _{2.5}	12.6	36.8

6.4 Particulate emissions from stockpiles were determined by using emission factors from AP-42, Section 13.2.4 (1/95), Aggregate Handling and Storage Piles. Emissions were based on each plant's capacity and 3,000 hr/yr operation. Emissions were also based on a 15 mile per hour wind speed, K value for PM₁₀ of 0.35, K value for PM of 0.74, K value for PM_{2.5} of 0.11, and a mean 2.525 % 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 (5) and summarized in the table below.

STORAGE PILES			
Pollutant	Emission Factor (lb/ton)	Emission Rate (TPY)	
		3,000 hr/yr with water truck	8,760 hr/yr with water truck
PM	0.007	1.7	5.0
PM ₁₀	0.003	0.7	2.0
PM _{2.5}	5 x 10 ⁻⁴	0.1	0.4

- 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 (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 distance of 2,509 vehicle miles traveled per year based the maximum plant capacity, 3,000 hr/yr operation, an average truck capacity of 24 tons, and a 100 feet one way travel distance for the trucks;
 - A k value for PM, PM₁₀, and PM_{2.5} of 4.9, 1.5, and 0.15, respectively based on data for industrial roads;
 - An a value for PM, PM₁₀, and PM_{2.5} of 0.7, 0.9, and 0.9, respectively based on data for industrial roads;
 - A b value for PM, PM₁₀, and PM_{2.5} of 0.45 based on data for industrial roads;
 - An s (silt content of road) value of 10%;
 - A W (mean vehicle weight) value of 27 tons;
 - A p (# of days with 0.01" of rain/year) value of 96 based on information for Honolulu;
 - A 70% control efficiency was applied to account for use of a water truck; and
 - Vehicle travel emissions are listed as follows:

VEHICLE TRAVEL			
Pollutant	Emission Factor (lb/VMT)	Emissions (TPY)	
		3,000 hr/yr with water truck	8,760 hr/yr with water truck

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PM	8.543	3.2	9.3
PM ₁₀	2.523	0.9	2.6
PM _{2.5}	0.252	0.1	0.3

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

TOTAL EMISSIONS		
Pollutant	Potential Emissions (TPY) (3,000 hr/yr with water sprays and water truck)	Potential Emissions (TPY) (8,760 hr/yr with water sprays and water truck)
SO ₂	2.4	7.0
NO _x	4.6	13.4
CO	3.7	10.8
VOC	0.2	0.6
PM	89.2	260.5
PM ₁₀	22.3	65.1
PM _{2.5}	13.0	38.1
Total HAPS	0.030	0.088

7. Air Quality Assessment

7.1 An ambient air quality impact analysis (AAQIA) was performed for the 440 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 screening 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. PM₁₀ – collected in 2006 from the Kapolei air quality monitoring station (air monitoring station with PM₁₀ data that is most conservative of current data from Oahu).
- b. NO_x - collected in 2006 from the Kapolei air quality monitoring station (air monitoring station with NO_x data that is most conservative of current data from Oahu).
- c. CO (1-hour) – collected in 2006 from the Honolulu air quality monitoring station (air monitoring station that is most conservative of current data from Oahu).
- d. CO (8-hour) – collected in 2006 from the University air quality monitoring station (air monitoring station that is most conservative of current data from Oahu).
- e. SO₂ (3 and 24 hour) – collected in 2006 from the Makaiwa air quality monitoring station (air monitoring station that is most conservative of current data from Oahu).

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- f. SO₂ (annual) – collected in 2006 from the Kapolei air quality monitoring station (air monitoring station that is most conservative of current data from Oahu).

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 _x	SO ₂	CO	PM ₁₀	Height (ft)	Temp. °K (°F)	Dia. (in)	Flow Rate (ft ³ /min)
440 hp engine	1	0.384	0.202	0.312	0.017	14	769 (925)	6"	2747.5

7.4 Results from the AAQIA of the 440 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 **2,485 ug/m³ per g/s** at a 15 meter (49 feet).

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	452	62	514	1,300	40
	24 – Hour	201	27	228	365	62
	Annual ^a	34	5	39	80	49
NO ₂	Annual ^{a,b}	49	9	58	70	83
CO	1 – Hour	775	2,850	3,625	10,000	36
	8 – Hour	543	1,967	2,510	5,000	50
PM ₁₀	24 – Hour	17	59	76	150	51
	Annual ^a	3	16	19	50	38

a: Annual concentration reduced by a factor of 3,000/8,760 to account for the mobile crushing plant hour limitation.

b: Total impact reduced by 25% to account for partial conversion of NO_x to NO₂. Reduced impact = impact (0.75)

8. Significant Permit Conditions

8.1 The operating hours of each plant shall not exceed 3,000 hours in any rolling twelve (12) month period.

Reason for 8.1: The applicant has proposed a maximum 3,000 hours per year operation for each plant. The hour limit is required to prevent the facility from exceeding the major source threshold for particulate. The limit is also necessary for compliance with the ambient air quality standards for operating the 440 hp diesel engine.

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. The stack was already raised and oriented in the vertical direction to comply with the air standards after the

initial noncovered source permit for the facility was issued.

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 equipment. Actual crushing and screening 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 3,000 hours per year operation. The permit requires the use of a water spray system for compliance with the fugitive dust limits. The permit also requires the use of a water truck to control fugitive dust at sites where each plant is located. A site investigation disclosed a water spray system installed for each plant to control fugitive dust and stack modification of the 440 hp diesel engine for compliance with air standards. Recommend issuance of the temporary covered source permit subject to the significant permit conditions, 30 day public comment period, and 45 day review by the Environmental Protection Agency.

January 31, 2008
Mike Madsen