

Permit Application Review
Temporary Covered Source Permit (CSP) No. 0603-01-CT

File No: 0603-01
Renewal Application No. 0603-01

Applicant: E. M. Rivera & Sons, Inc.

Facility Title: 505 TPH Portable Crushing Plant
with One (1) 300 HP Diesel Engine

Location: Various Temporary Sites, State of Hawaii
Initial Location: Facility's baseyard, Honokohau, Kailua-Kona, Hawaii
2,177,867 N, 813,045 E

Address: 73-4354 Mamalahoa Hwy, #204, Kailua-Kona, Hawaii 96740

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1. Equipment Description:

Table 1 - Rock Crushing Operation

| Unit | Type | Mfg | Model/ Ser. No. | Year | Description | Maximum Capacity | Fuel |
|-------------------------|--|----------------------|--|------|--|-------------------------|---|
| Portable Crushing Plant | Jaw Crusher | Terex/ Cedarapids | Cobra Track 1100; Serial # 53224 | 2005 | 30" X42" feed opening Crushing of basalt rock or concrete. | 505 TPH ^a | driven by Diesel Engine listed below |
| | Vibrating Grizzly Feeder | Terex/ Cedarapids | -- | 2005 | Double deck, variable speed vibrator | -- | driven by DE listed below |
| | Built-in Conveyor Belt & Radial Conveyor | -- | -- | 2005 | transports material exiting crusher to stockpile | -- | driven by Diesel Engine Gen. listed below |
| | Water spray system | -- | -- | -- | 3 sets of spray nozzles located at material transfer points | -- | N/A |
| | Diesel Engine | Cummins | QSL-9; Serial # 46426239 | 2005 | Drives mobile crusher and conveyors | 300 HP ^b | Diesel No. 2 max 14.75 gph |

^a Based on manufacturer's specifications.

^b Maximum advertised HP

Any changes to the proposed setup, operation, or materials processed in the plant may be a modification subject to an air quality assessment and permit amendment.

2. Air Pollution Controls:

The facility will control particulate emissions by employing water spray bars at the following material transfer points:

- a. transfer to side conveyor
- b. transfer crusher to conveyor
- c. transfer to stockpile

In addition, the material is dampened before and after crushing operations. An on-site water truck will be utilized for the spraying of the feed and finish stockpiles, as well as haul roads, and the crushing area during operation of the plant to minimize fugitive emissions.

Air pollution control is also achieved through the use of diesel No. 2 with a maximum sulfur content not to exceed 0.5% by weight.

3. Background:

E. M. Rivera & Sons, Inc. submitted an application for a temporary covered source permit on October 4, 2005, to operate a new portable crushing plant at various locations. The initial location is at the applicant's baseyard in Honokohau, Hawaii (Big Island), where the crusher will be stored between projects. The site and surrounding quarry has a fence surrounding the entire area. However, there are several other businesses located inside of the fenced area. The crusher location is east of Queen Kaahumanu Highway, NE of the end of Access Road "A". Located to the west of the crusher site are several businesses including Big Island Disposal and Kona Transport. To the north, south, and east of the crusher site are undeveloped lands (lava).

E. M. Rivera & Sons, Inc. proposes to use the portable crushing plant to crush basalt rock and concrete at various locations. The operation would consist of feeding the crusher by front end loader. The crusher is a self-contained and mobile crushing unit mounted on a heavy-duty track frame. The material is deposited on the vibrating grizzly feeder and travels through the jaw crusher. The material is crushed to size and discharged onto the built-in belt conveyor. The crushed material then travels over the radial conveyor and is delivered for stockpiling.

The 300 HP Cummins diesel engine (which is part of the crushing unit) provides the power for the self contained unit. There are no screens, additional conveyors, or any other optional equipment proposed.

The applicant proposes that operating hours of the portable crushing plant and diesel engine generator be limited to not more than 2,080 hours/yr. The length of operation at each project site would vary between a few weeks to several months with normal operating hours of 8 hours per day, 5 days per week. Operations will be irregular depending on job availability. Typically, there are times when the plant will sit idle.

The diesel engine will be run on Diesel No. 2, with sulfur content not to exceed 0.5% by weight. E. M. Rivera & Sons, Inc. utilizes a 500 gallon fuel tank for the storage of diesel fuel. This tank is an insignificant activity.

The application included a request for an "alternate operating scenario." This scenario involves the temporary replacement of the 300 HP diesel engine with another engine of equal or lesser size with equal or lesser emissions if any repair reasonably warrants the removal of the diesel engine from the site (i.e., equipment failure, engine overhaul, or any major equipment problems requiring maintenance for efficient operation.

4. Applicable Requirements:

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(25) Standards of Performance for Non-metallic
Mineral Processing Plants

Subchapter 10 – Field Citations

40 Code of Federal Regulations (CFR) Part 60 - Standards of Performance for New Stationary Sources. The following Subparts apply to the portable crusher:

Subpart A - General Provisions

Subpart OOO - Standards of Performance for Non-metallic Mineral Processing
Plants

40 CFR Part 60 Subpart OOO applies to portable crushed stone plants with capacities greater than 150 TPH that commence construction, reconstruction, or modification after August 31, 1983. The subject 505 TPH portable crushing plant was manufactured in 2005, and thus the crushing plant, including the conveying systems are subject to Subpart OOO. The dates of manufacture for the equipment are shown in Table 1.

This source is not subject to Prevention of Significant Deterioration (PSD) requirements because it is not a major stationary source, as defined in HAR Title 11, Chapter 60.1, Subchapter 7 and 40 CFR Part 52, Section 52.21.

This source is not subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAPS) as there are no standards in 40 CFR Part 61 applicable to this facility (stone processing plant operations).

40 CFR Part 63, Subpart ZZZ established national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major sources of HAP emissions. Since the applicant's DEG is not located at a major source of HAP emissions, it is not subject to this Subpart.

This source is not subject to Maximum Achievable Control Technology (MACT) requirements because the facility is not a major or area source of HAPS, covered under 40 CFR Part 63.

A Best Available Control Technology (BACT) analysis is required for new sources or modifications to existing sources that would result in a net significant emission increase as defined in HAR, Section 11.60.1-1. The crushing plant's emissions, when operated at 2,080 hrs/yr, do not exceed significant levels for any regulated air pollutant. As such, BACT is not required for this facility.

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.

Annual in-house emission reporting is required if the total combined facility's emissions of a particular pollutant exceed the "in-house" triggering levels. Total combined emissions from this facility do not exceed these levels. However, annual emissions reporting is required for all covered sources.

40 CFR Part 51, Subpart A - Emission Inventory Reporting Requirements, determines Consolidated Emissions Reporting (CER) based on facility wide emissions of each air pollutant at the CER triggering levels shown below. This facility does not have any emissions at the CER triggering levels. Therefore, CER requirements are not applicable.

The table below summarizes the facility's emissions at its operational limit of 2,080 hr/yr compared to the various threshold levels.

Maximum Emissions Compared to Significant Levels, CER, and "In-house" Thresholds (All Values in TPY)

| Pollutant | Facility-Wide Emissions ^a | Significant Levels | CERR Trigger Levels | | "In-house" Reporting Levels |
|--------------------|--------------------------------------|--------------------|-----------------------------|-----------------------------|-----------------------------|
| | | | 1-Yr Cycle (Type A Sources) | 3-yr Cycle (Type B Sources) | |
| NOx | 2.92 | 40 | ≥ 250 | ≥ 100 | ≥ 25 |
| CO | 0.97 | 100 | ≥ 2500 | ≥ 1000 | ≥ 250 |
| SO2 | 1.08 | 40 | ≥ 2500 | ≥ 100 | ≥ 25 |
| PM-10 ^b | 3.11 | 15 | ≥ 250 | ≥ 100 | ≥ 25 |
| PM ^b | 6.86 | 25 | ≥ 2500 | ≥ 1000 | ≥ 25 |
| VOC | 0.76 | 40 | ≥ 250 | ≥ 100 | ≥ 25 |
| HAPs | 0.01 | -- | -- | -- | ≥ 5 |

^a Based on 505 TPH Crusher and the 300 HP D.E. operating 2,080 hr/yr.

^b Does not include PM emissions from vehicle travel on unpaved roads.

5. Insignificant Activities/Exemptions:

Diesel No. 2 fuel will be stored on site in a 500 gallon fuel storage tank. This storage tank is exempt from the air permit requirements per HAR, Section 11-60.1-82(f)(1) because it has a capacity of less than 40,000 gallons and is not subject to any standard or other requirement pursuant to Section 111 or 112 of the CAA.

6. Project Emissions:

The data below summarizes the Department of Health's emission calculations, details of which are shown in Enclosures (1), (2), (3), and (4).

505 TPH Rock Crusher. Worst case emissions (using the maximum capacity of the crusher, 505 TPH) from the portable crusher were calculated and are summarized below and shown in Enclosure (1). Operations are based on 2,080 hrs/yr per the applicant's proposal.

Rock Crushing Emissions (TPY)

| Pollutant | 8,760 hr/yr | 2,080 hr/yr |
|-----------|-------------|-------------|
| PM-2.5 | 1.458 | 0.346 |
| PM-10 | 3.859 | 0.916 |
| PM | 9.717 | 2.307 |

Stockpiles. Worst case emissions from aggregate handling and storage piles were calculated and are summarized below and shown in Enclosure (2).

| Pollutant | Stockpile Emissions (TPY) | |
|-----------|---------------------------|-------------|
| | 8,760 hr/yr | 2,080 hr/yr |
| PM-2.5 | 2.80 | 0.66 |
| PM-10 | 8.90 | 2.11 |
| PM | 18.82 | 4.47 |

Vehicle Travel. Worst case emissions from unpaved road traffic (truck travel) are summarized below and are shown in Enclosure (3).

Vehicle Travel Emissions (TPY)

| Pollutant | (8,760 hr/yr) ^a | (2,080 hr/yr) ^b |
|-----------|----------------------------|----------------------------|
| PM-2.5 | 1.32 | 0.31 |
| PM-10 | 8.55 | 2.03 |
| PM | 34.93 | 8.29 |

^a Vehicle miles traveled per year = 73,730 miles

^b Vehicle miles traveled per year = 17,507 miles

300 HP Diesel Engine. Worst case emissions from the 300 HP diesel engine were calculated assuming 2,080 hours of operation a year firing diesel no. 2 per the applicant's proposal. Based on the maximum fuel feed rate for the DE of 14.75 gph, and 137,000 btu/gal for F.O. no. 2, the maximum heat input rate of the DE is 2.02 MMBtu/hr. Emissions are summarized below and detailed in enclosure (4).

| Pollutant | Emission Factor (lb/MMBtu) | Emission (lb/hr) | DE Emission (TPY) | |
|-----------------|----------------------------|------------------|-------------------|---------------|
| | | | (8,760 hr/yr) | (2,080 hr/yr) |
| NO _x | * | 2.811 | 12.312 | 2.923 |
| CO | * | 0.937 | 4.104 | 0.974 |
| SO ₂ | mass bal. | 1.039 | 4.550 | 1.080 |
| PM-2.5 | -- | 0.071 | 0.311 | 0.074 |
| PM-10 | -- | 0.079 | 0.346 | 0.082 |
| PM | * | 0.079 | 0.346 | 0.082 |
| Aldehydes | 0.07 | 0.141 | 0.620 | 0.147 |
| TOC | 0.36 | 0.727 | 3.186 | 0.757 |
| Total HAPs | | | 0.056 | 0.013 |

* Mfg. data

Emissions Summary. Calculations show that the majority of emissions are fugitive in nature and are generated by vehicle traffic on the unpaved roads. Please refer to the attached spreadsheets for details.

FACILITY WIDE EMISSIONS (TPY) - 8,760 hr/yr

| Pollutant | 300 hp Diesel Engine | Rock Crushing Process | Stock-pile | Unpaved Rds | Total Emissions |
|-----------------|----------------------|-----------------------|------------|-------------|-----------------|
| NO _x | 12.312 | -- | -- | -- | 12.31 |
| CO | 4.104 | -- | -- | -- | 4.10 |
| SO ₂ | 4.550 | -- | -- | -- | 4.55 |
| PM-2.5 | 0.311 | 1.46 | 2.80 | 1.32 | 5.88 |
| PM-10 | 0.346 | 3.86 | 8.90 | 8.55 | 21.65 |
| PM | 0.346 | 9.72 | 18.82 | 34.93 | 63.81 |
| VOC | 3.186 | -- | -- | -- | 3.19 |
| HAPs | 0.056 | -- | -- | -- | 0.06 |

FACILITY WIDE EMISSIONS (TPY) - 2,080 hr/yr

| Pollutant | 300 hp Diesel Engine | Rock Crushing Process | Stock-pile | Unpaved Rds | Total Emissions |
|-----------------|----------------------|-----------------------|------------|-------------|-----------------|
| NO _x | 2.923 | -- | -- | -- | 2.92 |
| CO | 0.974 | -- | -- | -- | 0.97 |
| SO ₂ | 1.080 | -- | -- | -- | 1.08 |
| PM-2.5 | 0.074 | 0.35 | 0.66 | 0.31 | 1.40 |
| PM-10 | 0.082 | 0.92 | 2.11 | 2.03 | 5.14 |
| PM | 0.082 | 2.31 | 4.47 | 8.29 | 15.15 |
| VOC | 0.757 | -- | -- | -- | 0.76 |
| HAPs | 0.013 | -- | -- | -- | 0.01 |

Major Source Applicability: A major source as defined in Section 11-60.1-1 of HAR Title 11, has the potential to emit any HAP of 10 TPY or more, or 25 TPY or more of any combination of HAPs, or 100 TPY or more of any air pollutant. Calculated emissions, as shown in the above table, do not meet these limits and thus, this facility is not classified as a major source.

Synthetic Minor Applicability: A synthetic minor source is a facility that is potentially major (as defined in HAR 11-60.1-1), but is made nonmajor through federally enforceable permit conditions (e.g., limiting the facility's hours of operation and limiting the facility's production rate). This facility is not a synthetic minor based on potential emissions of less than "major" levels (< 100 TPY) when the stone processing plant and diesel engine are operated at 8,760 hr/yr.

7. Air Quality Assessment:

The ambient air quality standards seek to protect public health and welfare and to prevent the significant deterioration of air quality.

For new facilities and facilities proposing modifications, an ambient air quality assessment is required to analyze the maximum potential pollutant concentrations generated by a source and its effect on the ambient air.

7.1 An ambient air quality impact analysis (AAQIA) for the 300 hp diesel engine that powers the 505 TPH jaw crusher was conducted using EPA's SCREEN 3 model, and assumptions used in the model included:

- a. Simple/complex terrain impacts;
- b. Rural dispersion parameters;
- c. Wake effects from the portable 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 A Good Engineering Practice (GEP) stack height analysis was performed. The analysis indicates that the stack height of the diesel engine is less than the GEP formula stack height based on the dimensions of the jaw crushing plant. Therefore, the crushing plant's dimensions were inputted into the SCREEN 3 modeling run to account for downwash effects.

| GOOD ENGINEERING PRACTICE STACK HEIGHT (All dimensions in meters) | | | | | | | |
|--|-----|--------|-------|------|-----|------|-----------|
| Structure | Hgt | Length | Width | PW | L | Hg * | Stack hgt |
| Crusher/D.E. | 3.6 | 7.2 | 2.8 | 7.73 | 3.6 | 9 | 3.66 |

* Hg (GEP stack height) = Height + 1.5 L, where L is smaller of PW or structure hgt.

7.3 CAB used background air quality data from Hawaii Electric Light Co.'s Kona, Hawaii monitoring station for SO₂, NO_x, CO and PM-10.

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

| Cummins 300 HP Diesel Engine Stack Parameters | | | | | |
|--|-----------------|---------------|-------------|-----------|----------|
| Stack no. | Hgt (m) | Diam (m) | Flow (m3/s) | Vel (m/s) | Temp (K) |
| 1 | 3.66 (12 ft) | 0.127 (5") | 0.698 | 55.11 | 776.9 |

Stack Emission Rate

| Pollutant | (g/s) |
|-------------------|--------|
| SO ₂ | 0.1309 |
| NO _x * | 0.3542 |
| CO * | 0.1181 |
| PM-10 * | 0.0100 |

* Manufacturer's data

7.6 Results from the air quality modeling assessment showed the following normalized concentrations. The highest concentration (1,065 ug/m³ per g/sec) from the model using complex terrain occurred at a distance of 30 meters from the stack. The highest concentration (2,620 ug/m³ per g/sec) from the model using simple terrain occurred at a distance of 11 meters from the stack. Based on these results, the following maximum pollutant concentrations were calculated for each averaging period which had the highest normalized concentrations.

Conversion Factors and Normalized Concentrations from Modeling Results

| Avg Period | Simple Terrain * | | Complex Terrain Valley | | Complex Terrain Simple | |
|------------|-------------------|----------------------------------|------------------------|----------------------------------|------------------------|----------------------------------|
| | Conversion Factor | Normalized Conc. (ug/m3 per g/s) | Conversion Factor | Normalized Conc. (ug/m3 per g/s) | Conversion Factor | Normalized Conc. (ug/m3 per g/s) |
| 1-hour | NA | 2620 | 0.25 | 258 | 0.4 | 2663 |
| 3-hour | 0.9 | 2358 | 0.9 | 232.2 | 0.9 | 2396 |
| 8-hour | 0.7 | 1834 | 0.7 | 180.6 | 0.7 | 1864 |
| 24-hour | 0.4 | 1048 | NA | 64.5 | NA | 1065 |
| Annual | 0.2 | 524 | 0.2 | 51.6 | 0.2 | 533 |

Bold entries are results of model

Complex terrain elevations provided by applicant

* Model assumed flat terrain in the westerly direction

The results of the analysis showed that the combined effect of 1) maximum concentrations generated by the 300 HP diesel engine generator and 2) ambient background concentrations, were in compliance with the State Ambient Air Quality Standards and Federal Ambient Air Quality Standards, as tabulated below:

| PREDICTED AMBIENT AIR QUALITY IMPACTS | | | | | | | | | | | | |
|---------------------------------------|-------------------|---------------------|--|--|--|-----------------------------------|------------------------------|----------|----|-----|-----|-----|
| AIR POLLUTANT | EMISS. RATE (g/s) | AVG. TIME | Normalized Conc. (ug/m ³ per g/s) | IMPACT ^b (ug/m ³) | BCKGRD ^c (ug/m ³) | TOTAL IMPACT (ug/m ³) | AIR STD (ug/m ³) | % OF STD | | | | |
| SO ₂ | 0.131 | 3-Hour | 2396 | 313.67 | 87 | 401 | 1,300 | 31% | | | | |
| | | 24-Hour | 1065 | 139.41 | | | | | 34 | 173 | 365 | 48% |
| | | Annual ^a | 533 | 16.55 | | | | | 4 | 21 | 80 | 26% |
| NO _x | 0.354 | Annual ^a | 533 | 44.78 | 2 | 47 | 70 | 67% | | | | |
| CO | 0.118 | 1-Hour | 2663 | 314.34 | 969 | 1283 | 10,000 | 13% | | | | |
| | | 8-Hour | 1864 | 220.04 | 736 | 956 | 5,000 | 19% | | | | |
| PM-10 | 0.010 | 24-Hour | 1065 | 10.60 | 27 | 38 | 150 | 25% | | | | |
| | | Annual ^a | 533 | 1.26 | 12 | 13 | 50 | 27% | | | | |

^a Annual hour limit of 2,080 hr/yr applied.

^b IMPACT = (Normalized conc.) X (Emission rate) (ug/m³)

^c Background data from Hawaii Electric Light Co. monitoring station located at Kona, Hawaii

8. Significant Permit Conditions:

Condition: The operating hours of the 505 TPH portable crushing plant including the 300 HP diesel engine shall not exceed two-thousand and eighty (2,080) hours in any rolling twelve (12) month period.

Purpose: The applicant has proposed 2,080 hours as the maximum hours of operation per year to ensure the facility complies with the ambient air quality standards for NO₂. Monitoring of the annual limitation will be achieved through the use of a non-resetting hour meter on the diesel engine.

Condition: 40 CFR Part 60 Subpart OOO provisions are applicable to the jaw crusher and conveyors. The permittee shall comply with all applicable provisions of these standards, including all emission limits and all notification, testing, monitoring, and reporting requirements.

Purpose: To specify equipment subject to 40 CFR 60, Subpart OOO, Standards of Performance for Nonmetallic Mineral Processing Plants.

Condition: The permittee shall not cause to be discharged into the atmosphere from any transfer point on the belt conveyors or from any other affected facility any fugitive emissions which exhibit greater than ten (10) percent opacity.

Purpose: This condition required by NSPS (40 CFR 60.672(b)).

Condition: The permittee shall not cause to be discharged into the atmosphere from the primary crusher, fugitive emissions which exhibit greater than fifteen (15) percent opacity.

Purpose: This condition required by NSPS (40 CFR 60.672(a)).

Condition: Initial and annual source performance tests shall be conducted pursuant to Special Condition, Section F. Test summaries and results shall be maintained in accordance with the requirements of this section.

Purpose: The facility is subject to 40 CFR 60, Subpart OOO, Standards of Performance for Nonmetallic Mineral Processing Plants. An initial and annual source performance test is required for the measurement of opacity. The annual source performance test is a State requirement to help ensure the facility is operating in compliance with the ambient air quality standards.

9. Conclusion and Recommendation:

Actual emissions from this facility should be lower than estimated based on the following reasons:

- a. The calculated project emissions were based on the potential worst possible conditions (maximum rated capacity, 505 TPH) of the crushing plant. Actual crushing capacity will vary depending on product size and the type of material but will likely be much lower than the maximum.
- b. Calculations were based on 2,080 hours a year of operations for the facility, and the 300 HP diesel engine. However, crushing operations will be on a temporary basis with intermittent periods of operation, contingent upon jobs performed. The applicant projected 8 hours operation a day with periods of time where the facility will sit idle in between jobs.

Based on the information submitted by E. M. Rivera & Sons, Inc., it is the determination of the Department of Health (DOH) that the proposed project will be in compliance with the Hawaii Administrative Rules (HAR), Chapter 11-60.1 and State and Federal ambient air quality standards. Therefore, recommend the issuance of the Temporary Covered Source Permit to E.M. Rivera & Sons, Inc. subject to the incorporation of the significant permit conditions, 30-day public comment period, and 45-day review by EPA.

WK, 11/3/05