

TEMPORARY COVERED SOURCE PERMIT REVIEW - NO. 0242-01-CT

Permit Renewal
Application No. 0242-05

Applicant: Goodfellow Brothers, Inc.

Facility: 780 TPH Stone Crushing and Screening Plant with 1 MW Diesel Engine Generator

Equipment Location: Various locations throughout the state

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Background:

Goodfellow Brothers, Inc. (GBI) owns and operates a variety of crushers, screens, and conveyors for rock crushing activities. The equipment is used to crush basalt for construction purposes. Materials are batch-dropped into a primary crusher, forwarded via conveyors to either a stockpile or to a secondary and possibly a tertiary crusher. The stockpiles either remain throughout the duration of the project or are moved by a front-end loader.

The equipment is deployed to various locations and may be erected in several different configurations depending on the project requirements. The application covers GBI's entire equipment inventory of crushers, screen trailers, and diesel engine generators. To allow flexibility, the permit will allow several plant configurations, however, no more than one of each type of crusher (primary, secondary, tertiary), one diesel engine generator, three screens, and four storage piles will be allowed at any one project location. Water sprays at the crushers, screens, conveyors, and stockpiles control fugitive dust. All other areas use manual watering to control fugitive dust. Due to the size and manufacture date of the crushers, the crushers are subject to 40 CFR Part 60, Subpart OOO - Standards of Performance for Nonmetallic Mineral Processing Plants.

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Proposed Project:

GBI is proposing to increase the operating hours of the diesel engines from 1,440 to 2,000 hours per rolling 12-month period at each site. In order to remain in compliance with the SAAQS, GBI is proposing to increase the stack heights of the 1 MW diesel engines.

Equipment Description:

The following is a list of the equipment covered under this temporary covered source permit:

- a. 780 TPH Primary Jaw Crusher, Nordberg, model C140B, serial no. C1403124: equipment no. K-129;
- b. 780 TPH Primary Jaw Crusher, Nordberg, model C140B, serial no. C1400153: equipment no. K-76;
- c. 500 TPH Secondary Cone Crusher, Omnicone, model 1560, serial no. 253: equipment no. K-26;
- d. 500 TPH Secondary Cone Crusher, Omnicone, model 1560, serial no. 304-300034: equipment no. K-130;
- e. 350 TPH Tertiary Crusher, Canica, model 90, serial no. 87074-A: equipment no. K-42;
- f. 440 TPH Screen Trailer, JCI, model FSG5162-26, serial no. 97H01F32: equipment no. K-27;
- g. 440 TPH Screen Trailer, JCI, model 620332, serial no. 96H01F32: equipment no. K-143;
- h. 264 TPH Screen, Cedar Rapids, 4'x12'x2, serial no. 1426: equipment no. K-23;
- i. 1 MW Diesel Engine Generator, Gen Set, model 3512, serial no. 24Z8717, with a minimum stack height of 17 feet: equipment no. LP-130;
- j. 1 MW Diesel Engine Generator, Gen Set, model 3512, serial no. 24Z01234, with a minimum stack height of 17 feet: equipment no. LP-84;
- k. 1 MW Diesel Engine Generator, Gen Set, model 3512, serial no. 24Z08458, with a minimum stack height of 17 feet: equipment no. LP-121;
- l. Various conveyors; and
- m. Various water sprays.

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Each temporary location is allowed to have any or all of the following equipment:

- a. One (1) primary crusher;
- b. One (1) secondary crusher;
- c. One (1) tertiary crusher;
- d. One (1) 1,000 kW diesel engine generator (LP-84, LP-121, LP-130);
- e. Three (3) screens;
- f. Four (4) storage piles; and
- g. Various conveyors.

Air Pollution Controls:

Water sprays are located at the crushers, screens, conveyors, and stockpiles to control fugitive dust from the crushing operations. Manual watering, including the use of water trucks, will control fugitive dust from the stockpiles and unpaved roads.

Applicable Requirements:

Hawaii Administrative Rules (HAR):

Chapter 11-59, Ambient Air Quality Standards

Chapter 11-60.1 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

11-60.1-37 Process Industries

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

11-60.1-115 Basis of Annual Fees for Covered Sources

Subchapter 8, Standards of Performance for Stationary Sources

11-60.1-161 New Source Performance Standards

Subchapter 10, Field Citations

NSPS:

40 CFR, Part 60, Subpart OOO - Standards of Performance for Nonmetallic Mineral Processing Plants - states that stone crushing plants with capacities greater than 25 TPH that commence construction, reconstruction, or modification after August 31, 1983 are subject to the requirements of the subpart. As such, all of the crushers are subject to Subpart OOO.

CDS:

CDS is a database of covered sources. This facility is a covered source and thus, CDS applies.

Synthetic minor:

A synthetic minor is a facility that without limiting conditions, physical or operational, emits above the major triggering levels as defined by HAR 11-60.1-1 for either criteria pollutant(s) or hazardous air pollutant(s). Without operational limits, the diesel engines would be a major source for NO_x. Thus, GBI is a synthetic minor.

BACT:

A Best Available Control Technology (BACT) analysis is required for each new or modified emissions unit located within a stationary source that has a net emissions increase equal to or greater than the significant levels defined in HAR §11-60.1-1. By definition, an emissions unit is part of a stationary source. A stationary source is a structure, facility, or installation located on one or more contiguous or adjacent properties that are under common ownership or control. Since a stationary source must have a location, each temporary location is a stationary source. Thus, for temporary sources, the net emissions increases for BACT applicability are determined by the future potential emissions minus the past actual two-year average per location.

GBI is proposing to increase the operating hours for each temporary location from 1,440 to 2,000 hours. Using the historical records of the most recent past two years, the past actual two-year average ranged from 88 hours to 579 hours of operation at the different locations. As such, for BACT applicability there is an increase of 1,912 hours (2,000 - 88). As shown in the tables below, the increase in operating hours triggers a BACT review for PM₁₀. All other pollutants are not subject to a BACT review.

Table 1
Comparison of Net Emissions to Significant Levels for BACT
Diesel Engine

Pollutant	Net Increase (TPY)	BACT Trigger (TPY)
SO ₂	5.5	40
NO _x	34.9	40
CO	9.3	100
VOC ¹	1.0	40
PM ₁₀	0.6	15

1 - total organic compounds (TOC) as volatile organic compounds (VOC)

Table 2
Comparison of PM₁₀ Net Emissions to Significant Levels for BACT
Crushing and Screening Plant

Equipment	Net Increase (TPY)	BACT Trigger (TPY)
Crushing	1.0	
Screening	20.7	
Loading	0.3	
Transfer	0.2	
Storage	3.3	
DEG	0.6	
Plant Total	46	15

BACT for PM₁₀ for the crushing and screening operations has been determined to be water sprays. GBI currently uses water sprays at the crushers, screens, conveyers, and stockpiles. For the diesel engine generators, BACT for PM₁₀ is proper operations and maintenance to ensure good combustion of the diesel fuel.

It should be noted that since GBI can operate at more than one location during a 12-month period, each emission unit has a potential to operate close to 8,760 hours per rolling 12-months. However, as discussed above, each temporary location is considered as a source. Thus, for BACT, major source, CERR, and other determinations that have trigger levels based on emission levels of a source, the operating hours of each temporary location are used in the analysis.

Non-Applicable Requirements:

PSD:

PSD does not apply since this facility is not a major source.

CAM:

The purpose of Compliance Assurance Monitoring (CAM) is to provide a reasonable assurance that compliance is being achieved with large emissions units that rely on air pollution control device equipment to meet an emissions limit or standard. Pursuant to 40 Code of Federal Regulations, 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 100% of the major source level; and (5) not otherwise be exempt from CAM. Since the facility is not a major source, CAM does

not apply.

CERR (Consolidated Emission Reporting Rule):

40 CFR part 51, Subpart A – Emission Inventory Reporting Requirements, determines the annual emissions reporting frequency based on the actual emissions of each pollutant from any individual emission point within the facility that emits at or above the triggering levels. Since the trigger levels are at or above the major source levels and by definition, a temporary source cannot be a major source, the facility is not subject to annual emission reporting under CERR. The Department does however, require facilities to report their annual emissions if the facility-wide emissions exceed the Department's trigger levels. The Department uses the data for in-house recordkeeping purposes. Table 3 below summarizes the Department's trigger levels and illustrates the facility's applicability.

Table 3
Comparison of Emissions to CAB Trigger Levels

pollutant	780 TPH plant 2,000 hrs (TPY)	1 MW DEG 2,000 hrs (TPY)	Unpaved Roads 15,000 VMT (TPY)	Facility-wide 2,000 hrs (TPY)	CAB trigger (TPY)
PM ₁₀	47.9	0.7	7.5	56.1	25
SO _x	--	5.8	--	5.8	25
NO _x	--	36.6	--	36.6	25
VOC ¹	--	1.0	--	1.0	25
CO	--	9.7	--	9.7	250

1 - total organic compounds (TOC) as volatile organic compounds (VOC)

NESHAP/MACT:

Stone processing is not a NESHAP source.

40 CFR 63, Subpart ZZZZ National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines is not applicable to the diesel engines because the facility is not a major source of HAPs.

Insignificant Activities/Exemptions:

No insignificant activities were identified.

Alternate Operating Scenarios:

The applicant requested provisions to allow temporary use of diesel engine generators when the permitted diesel engine generators are temporarily out-of-service.

Project Emissions:

The table below summarizes the emissions for a 780 TPH plant with the maximum amount of equipment allowed at any temporary location. Emissions for the diesel engine were estimated using AP-42 section 3.3, revised 10/96. Emissions for the crushing operation were estimated using AP-42 section 11.19.2, revised 1/95. The emission factor for the storage piles was derived using AP-42 section 13.2.4, revised 1/95.

Table 4
Facility-wide Emissions with Maximum Allowed Equipment

pollutant	780 TPH plant 2,000 hrs (TPY)	1 MW DEG 2,000 hrs (TPY)	Unpaved Roads 15,000 VMT (TPY)	Facility-wide 2,000 hrs (TPY)
PM ₁₀	47.9	0.7	7.5	56.1
SO _x	--	5.8	--	5.8
NO _x	--	36.6	--	36.6
VOC ¹	--	1.0	--	1.0
CO	--	9.7	--	9.7

1 - total organic compounds (TOC) as volatile organic compounds (VOC)

Air Quality Assessment:

An ambient air quality impact analysis using the USEPA SCREEN3 model was completed for the 1 MW diesel engine generator. The 1 MW diesel engine generators are the same make and model and are the only power source for all of the possible configurations. Assumptions used in the SCREEN3 modeling analysis are as follows:

- Rural dispersion parameters
- Default meteorology

Terrain:

- Flat terrain, no terrain elevations used. The base of the diesel engine and receptors are at the same elevation.

Potential downwash effect:

- The crusher was used as the downwash structure for the diesel engine generator to determine resulting emission concentrations. Should the terrain or near-by structure at a temporary location have a greater downwash influence than the crusher structure, the permittee is required to submit a revised model for that location.

Receptor locations:

- Receptors were located in areas considered ambient air. Since this is a temporary source where fence lines and/or boundary may or may not exist, ambient air is considered immediately adjacent to the stack.

Background air quality data:

- The background air quality data shown in Table 7 is from the Department's 2002 Annual Summary and are the highest concentrations from around the state. The highest background levels from around the state were used because this is a temporary source to be located anywhere in the state. Using the highest background levels insures that the source will meet the SAAQS at any temporary location within the state.

Stack parameters:

- Table 5 lists the emission rates and stack parameters used in the ambient air quality analysis of the 1 MW diesel engine generator.
- Note: The permittee is proposing to increase the exhaust stacks of the 1 MW Caterpillar diesel engine generators to 17 feet above ground-level.

Table 5
Stack Parameters - Caterpillar model 3512, 1 MW DEG

Emission Rates (g/s)				Stack Parameters			
SO ₂	NO ₂	CO	PM ₁₀	Height (m)	Temp (°K)	Exit Velocity (m/s)	Dia. (m)
0.72	4.57	1.21	0.08	5.18	756	54.53	0.305

The maximum concentration predicted by SCREEN3 was 274.4 µg/m³ at a distance of 52 meters from the stack.

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Table 6 below lists the USEPA scaling factors used in the ambient air quality analysis.

Table 6
USEPA Scaling Factors

Air Pollutant	Averaging Time	Scaling Factor
SO ₂	3-Hour	0.9
	24-Hour	0.4
	Annual	0.2
NO ₂	Annual	0.2
CO	1-Hour	--
	8-Hours	0.7
PM ₁₀	24-Hours	0.4
	Annual ^b	0.2

The maximum predicted concentrations for the diesel engine are shown in Table 7. The annual concentrations were adjusted for the annual operating hours per location – 2,000 hours.

Table 7
Comparison of Modeling Results to State Ambient Air Quality Standards

Pollutant	Averaging Period	Max (µg/m ³)	Adjusted ^a (µg/m ³)	Background (µg/m ³)	Total (µg/m ³)	SAAQS (µg/m ³)	% of SAAQS
SO ₂	3 hr	178	178	430	608	1,300	47
	24 hr	79	79	95	174	365	48
	annual	40	9	8	17	80	21
NO ₂	annual	251	57	10	67	70	96
PM ₁₀	24 hr	9	9	101	110	150	73
	annual	4	1	20	21	50	42
CO	1 hr	333	333	3,990	4,323	10,000	43
	8hr	233	233	1,810	2,043	5,000	41

a - Adjusted for 2,000 hours of operation = Max * (2,000/8,760)

Based on these assumptions, the air emissions impacts from the crushing operation and diesel engine are within State and Federal Ambient Air Quality Standards.

Conclusion and Recommendation:

The permittee is proposing to increase the operating hours of the 780 TPH stone processing plant from 1,440 hours per location to 2,000 hours per location. The emission estimates and modeling predict that the facility will remain a non-major source and will operate within the limits of the ambient air quality standards. To ensure compliance, the operating hours will be monitored by the use of a non-resetting hour meter on the diesel engine. Air pollution controls at the facility consist of water sprays at various locations.

Issuance of a Temporary Covered Source Permit is recommended based on the review of the information provided by the applicant and the conservative nature of the calculations.

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Appendix
Emissions Calculations
Ambient Air Quality Analysis
Modeling