

**PERMIT APPLICATION REVIEW
Minor Modification to Covered Source Permit (CSP) No. 0522-01-C**

Permit No.: 0522-01-C

Application File No.: 0522-03

Applicant: Grace Pacific Corporation

Facility: 300 TPH Asphalt Plant

SIC Code: 2951 (asphalt paving mixtures & blocks)

Location: Kapaa Quarry, Kailua, Oahu

UTM Coordinates: 626,200 m East and 2,366,050 m North
(updated per Grace Pacific 4/11/06 application submittal)

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I. Background

In its application dated 4/11/06, Grace Pacific Corporation (Grace Pacific) has proposed a minor modification to its facility to add a fiberbed mist collector system. The system is intended to control and minimize "blue smoke" emissions from load-out and silo-filling activities, resulting in a decrease in facility emissions.

Blue smoke results from heating asphalt cement inside the drum mixer. Some of the organic compounds from the asphalt are volatilized, and once these VOCs cool sufficiently, some condense to form a fine liquid particulate or "blue smoke" plume.

In order to remove particles from the exhaust gas, the fiberbed mist collector incorporates temperature reduction to allow particles to condense out of the gas stream, and filters to trap particles through impaction, interception, and Brownian diffusion, described as follows:

- **Impaction:** Although air will flow around any obstacle such as a filter fiber that is in its path, particles in the 5-micron range have sufficient mass and momentum to continue along their original path until impacting a fiber which removes them from the gas stream.
- **Interception:** Interception applies to smaller particles in the 1 - 3 micron range. Since these particles have less mass and momentum, they can more easily maneuver around media fibers, along with air molecules in the gas stream. However, these particles will tend to travel along the outer edges of the streamline, and here they end up brushing against the edge of a fiber which removes them from the gas stream.
- **Brownian diffusion:** Brownian diffusion, or random motion, applies to particles less than 1 micron in diameter which having very little mass, collide with air molecules in the gas stream. The random movements allow particles to move independently, eventually making contact with media fibers that remove them from the gas stream. Like gases and other solutions, the particles tend to diffuse from areas of high to low particle concentration.

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The fiberbed collector unit consists of three sections: the knock-out, prefilter, and coalescing candle filter sections, described as follows:

- Knock-out Section: In the *knock-out section*, emissions from the asphalt concrete storage bin and load-out activities are routed through exhaust ducts to the collector inlet chamber which is maintained at a temperature below 120 degrees Fahrenheit. This is accomplished using a 40 HP fan (maximum 12,000 scfm capacity) to cool the gases and a thermocouple to monitor temperature and trigger fan operation. The temperature decrease allows pollutants to condense out of the exhaust stream, collect at the bottom of the unit, and be discharged through an outlet pipe.
- Prefilter Section: The gas stream then passes through a bed of six filters (2' x 2' x 1') where some particles are collected.
- Coalescing Candle Filters: Finally, after passing through the prefilters, the gas stream moves underneath a vertical baffle and enters the bottom end of the candle filters. Hydrocarbons are captured on the inside of the filters where the particles coalesce into droplets. The droplets drain to the bottom and are periodically pumped out for disposal.

Control Efficiency:

Grace Pacific's application assumed a 95% control efficiency and used a boiling point criterion to determine whether different HAPs would condense out of the gas stream. As a result, various HAP pollutant emissions were shown to be significantly reduced.

However, personnel from CECO Filters, Inc. which manufactures the filters for Astec's fiberbed collector unit indicated, via a 5/30/06 email, that filter removal efficiency approaches 100% by weight for PM \geq 3 μ m and 99.5% by weight for PM < 3 μ m, but that the filters do not control CO or VOCs.

CECO personnel also indicated that no filter test data are available on the control of all the various HAPs, and that applying a 95% control efficiency to HAP emissions may not be appropriate. Therefore, in calculating emissions for this review, a 95% control efficiency was only applied to PM, PM-10, and PM-2.5 emissions and no control of HAPs was assumed. Emission calculations are contained in the appendix.

Other Permit & Facility Updates:

1. Drum mixer: Correct serial number.
2. *Unitek diesel*: Add permit conditions to ensure that the approved fuel is obtained from the specified vendor and provide for laboratory analyses of *Unitek diesel*.

Grace Pacific applied for a minor modification on 10/12/05 to allow combustion of *Unitek diesel* obtained from Unitek Solvent Services, Inc. which produces an alternate diesel fuel by processing spec used oil.

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The 11/21/05 application review examined *Unitek diesel* laboratory test results and concluded that emissions from *Unitek diesel* would be comparable to those of fuel oil no. 2. Since the resulting emissions increase was considered negligible, allowing combustion of *Unitek diesel* was processed as a minor modification.

3. Baghouse: Provide for maintaining pressure differential across filter bags in the range of 2 - 6 inches water.
4. RAP crusher: Remove the 150 TPH RAP crusher and screen from the list of permitted equipment and delete any associated requirements. Grace Pacific sold the equipment in 2005, and a 125 TPH RAP crusher and 275 HP diesel engine generator, permitted as a temporary noncovered source under NSP 0555-01-NT have been moved from Grace Pacific's lower Makakilo Quarry to the Kapaa Quarry.
5. Previous Asphalt Plant: Delete permit requirements associated with the previous asphalt plant (permitted under CSP 0037-01-C) which has since been dismantled and removed from Kapaa Quarry.
6. Insignificant Activities: Add "*Attachment II - INSIG: Special Conditions - Insignificant Activities*" which became effective after the initial issuance of CSP 0522-01-C.
7. Update the list of insignificant activities to include a 31,040 gallon liquid asphalt storage tank.
8. Calculate PM-2.5 emissions not previously determined in the original application review.

II. Equipment Description

Table 1: Equipment					
Description	Capacity	Manuf.	Model No.	Serial No.	Date
Drum mixer	300 TPH	Astec	RDB 8438	02-092-2201	2002
Burner	75 MMBTUH	Astec	WJ75UO/G1	02-092-2206	2002
Emergency DEG	750 kW, 58.8 fuel gph	Caterpillar	3412	2WJ00863	--
Baghouse	51,110 CFM	Astec	SBH-59:BP	94-109-217	1992
Fiberbed Mist Collector	12,000 CFM	Astec	BSC-16-FBF	06-042	2006

III. Air Pollution Controls

Table 2: Air Pollution Controls			
Emission Source	Control Measure	Control Efficiency	Control Efficiency Reference
Drum mixer	Baghouse	99%	AP-42, App. B, Table B.2-3, 1/95.
Silos & Truck load-out	Fiberbed mist collector	95% for PM	CECO filter manufacturer
Unpaved roads	Water spray	70% for PM	AP-42 §11.19.1.2, par. 3, 11/95.
Aggregate stockpiles	Water spray	70% for PM	AP-42 §11.19.1.2, par. 3, 11/95.
Storage bins	Water spray	70% for PM	AP-42 §11.19.1.2, par. 3, 11/95.

IV. Applicable Requirements

1. Hawaii Administrative Rules (HAR), Title 11

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

11-60.1-33 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

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

2. PSD Requirements

PSD requirements do not apply because the facility is not considered a major stationary source and is not proposing any modifications to trigger a major modification as defined in 40 CFR 52.21 and HAR Title 11, Chapter 60.1, Subchapter 7.

3. NSPS Requirements

40 CFR 60 - Standards of Performance for New Stationary Sources:

Subpart A - General Provisions

Subpart I - Standards of Performance for Hot Mix Asphalt Facilities

4. NESHAP Requirements

These requirements do not apply because no standard covering the facility's operation or equipment has been promulgated under 40 CFR 61.

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5. MACT Requirements

These requirements do not apply because the facility is not a major source of hazardous air pollutants and the facility does not belong to a source category or subcategory for which a standard has been promulgated under 40 CFR 63.

6. BACT Requirements

A BACT review is required for new or modified sources which generate a net emissions increase that is “significant,” as defined in HAR §11-60.1-1. Since the modification to this existing facility will decrease, rather than increase emissions, a BACT review is not required.

7. CAM Requirements (40 CFR 64)

The purpose of Compliance Assurance Monitoring (CAM) is to provide 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. CAM does not apply because this facility does not meet all five criteria.

8. CER/DOH Requirements

Consolidated Emissions Reporting (CER) requirements apply if emissions from the facility equal or exceed levels specified in 40 CFR 51, Subpart A, Appendix A shown in the table. CER requirements do not apply because the facility's emissions are below the CER thresholds.

The Department of Health (DOH) requires emissions reporting if total facility emissions of a particular pollutant exceed DOH levels. These reports are used internally within DOH and are not inputted into the CER database. Emissions reporting is required because facility-wide emissions of NOx exceed DOH levels.

Table 3: Emissions & Triggering Levels

Pollutant	Emissions (tpy)	CERR Type B (tpy)	DOH Reporting Level (tpy)
CO	81.2	1000	250
NOx	39.4	100	25
PM	35.2	N/A	25
PM-10	18.5	100	25
PM-2.5	18.5	100	25
SOx	6.7	100	25
VOC	36.2	100	25
HAPs	5.5	N/A	5

9. Major Source Determination

A major source, as defined in HAR 11-60.1-1, emits or has the potential to emit any hazardous air pollutant in the aggregate of 10 tpy, 25 tpy or more of any combination of HAPs, or 100 tpy of any pollutant. This facility is not a major source since potential emissions, considering operating limits and pollution controls, are below these levels.

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10. Synthetic Minor Determination

A synthetic minor is a facility that is potentially major (as defined in HAR §11-60.1-1) but is made non-major through federally enforceable permit conditions. The facility is a synthetic minor of CO because without operational limits, emissions would equal or exceed 100 tpy. (Reference: Review of Application 0522-01, 4/2/03).

V. Insignificant Activities / Exemptions

Table 4: Insignificant Activities		
No. of Items	Item Description	HAR Reference
1	750 kW emergency diesel engine generator	11-60.1-82(f)(5) Standby generators used exclusively to provide electricity...
1	10,000 gallon diesel fuel tank	11-60.1-82(f)(1) Any storage tank, reservoir, or other container of capacity equal to or less than 40,000 storing volatile organic compounds, except those storage tanks, reservoirs, or other containers subject to any standard or other requirement pursuant to Sections 111 and 112 of the Act.
1	6,000 gallon diesel fuel tank	
2	30,000 gallon asphalt storage tank	
1	25,000 gallon working asphalt tank	
1	31,040 gallon liquid asphalt tank	

VI. Alternate Operating Scenarios

None proposed.

VII. Project Emissions

Facility emissions determined in the 10/22/04 review of Grace Pacific's renewal application remain unchanged except for a decrease in PM, PM-10, and PM-2.5 emissions from load-out and silo-filling activities.

Table 5: Facility Emissions - 4,000 hr/yr operation (tpy)							
Pollutant	Drum Mixer	750 kW Emergency DEG - at 500 hr/yr	Unpaved Roads	Aggregate Handling	Load-Out	Silo-Filling	Total
CO	78.00	1.71			0.81	0.71	81.2
NOx	33.00	6.44					39.4
PM	19.80	0.20	10.05	5.11	0.02	0.02	35.2
PM-10	13.80	0.19	2.11	2.41	0.02	0.02	18.5
PM-2.5	13.80	0.19	2.11	2.41	0.02	0.02	18.5
SO2	6.60	0.10					6.7
VOC/TOC	26.40	0.18			2.35	7.31	36.2
Total HAPs	5.34	0.01			0.05	0.11	5.5

Note:
Emissions other than those for Load-Out & Silo-Filling are based on Review of Application No. 0522-01, 4/2/03, page 13, Facility-Wide Emissions table.

VIII. Air Quality Assessment

An Ambient Air Quality Impact Assessment (assessment), is generally performed for new or modified sources. Since no modification that will increase emissions is proposed for this existing facility, an assessment was not performed for this application review.

IX. Significant Permit Conditions

1. The inlet gas temperature to the fiberbed mist collector shall not exceed 120 degrees Fahrenheit.

Purpose: Allows particles to condense out of the exhaust gas stream.

2. The fiberbed mist collector prefilters shall be examined once per week or as recommended by the manufacturer to check for holes and tears. Prefilters shall be replaced when the pressure drop across the unit equals or exceeds 12 inches water.

Purpose: Prefilters must be functioning properly to effectively control PM.

3. *Unitek diesel* shall only be obtained from Unitek Solvent Services, Inc.

Purpose: Ensure that the fuel used is the same as specified in the 10/12/05 permit application.

4. The Department of Health may require a laboratory analysis to be performed on *Unitek diesel*.

Purpose: Monitor fuel properties.

X. Conclusion

Grace Pacific has proposed the addition of a fiberbed mist collector to its facility in order to control and reduce blue smoke emissions from load-out and silo-filling activities. Emissions may be somewhat less than calculated in this review for the following reasons:

- The filter manufacturer has indicated that filter control efficiency approaches 100% for PM $\geq 3 \mu\text{m}$ and 99.5% for PM $< 3 \mu\text{m}$. However, to provide a conservative analysis, a control efficiency of 95% was assumed for PM, PM-10, and PM-2.5 emissions.
- The filter media may be able to capture some non-VOC HAPs. However, since testing for HAP control has not been done by the filter manufacturer, no control efficiency was applied to HAP emissions from load-out and silo-filling activities.

Issuance of an amended covered source permit to allow the addition of a fiberbed mist collector is recommended based on review of information provided by the applicant and subject to significant permit conditions and EPA review.

April Matsumura
June 8, 2006