

**PERMIT APPLICATION REVIEW  
Minor Modification to Covered Source Permit (CSP) No. 0045-02-CT**

**Permit No.:** 0045-02-CT

**Application File No.:** 0045-22

**Applicant:** Grace Pacific Corporation

**Facility:** 334 TPH Asphalt Plant

**SIC Code:** 2951 (asphalt paving mixtures & blocks)

**Location:** 91-920 Farrington Highway, Kapolei, Oahu

**UTM Coordinates:** 596,953 m East and 2,361,208 m North

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## I. Background

In its application dated 4/12/06, 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.

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  $PM \geq 3 \mu m$  and 99.5% by weight for  $PM < 3 \mu m$ , 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 Updates:

1. 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.

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.

A permit condition will be added to provide for obtaining *Unitek diesel* from the vendor specified in the original application. A second condition will be added to provide for laboratory analyses of *Unitek diesel* if requested by the Department of Health, in order to ensure fuel properties remain relatively consistent.

2. PM-2.5 Emissions: PM-2.5 emissions, not previously calculated, are estimated in this review.
3. Change of Location Requirements: Location change requirements will be updated in the permit to require information on all structures within *100 meters* of the emissions unit.

II. Equipment Description

Table 1: Equipment					
Description	Capacity	Manuf.	Model No.	Serial No.	Date
Drum mixer	334 TPH	Astec	PDDC-835C	92-152	
Diesel engine generator	725 kW derated to 544 KW	Caterpillar	3412	2WJ01364	
Baghouse	58,255 CFM	Astec	RBH-58:DB	92-152437	12/92
Fiberbed Mist Collector	12,000 CFM	Astec	BSC-16-FBF	06-041	2006
Crusher	96 TPH	Telsmith	HSI-3036	232M337	
Screen	275 TPH	Telsmith	VK481	363M474	
Screen	4' x 12'1", single deck	Diester	USM-1412	579262	11/92

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
Aggregate piles & roads	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. SPS 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.

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 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 following table. CER requirements do not apply because the facility's emissions are below the CER threshold levels.

Table 3: Emissions & Triggering Levels		
Pollutant	Emissions (tpy)	CERR Type B (tpy)
CO	42.0	1000
NOx	38.4	100
PM	27.0	N/A
PM-10	12.2	100
PM-2.5	6.3	100
SOx	28.7	100
VOC	13.6	100
Pb	4.05E-03	N/A
HAPs	2.5	N/A

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.

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, NOx, PM, and SO2 because without operational limits, emissions of these pollutants would equal or exceed 100 tpy. (Reference: Review of Application 0045-14, 6/3/04).

V. Insignificant Activities / Exemptions

Table 4: Insignificant Activities		
Quantity	Description	HAR Section Reference
1	1.5 MMBtu/hr hot oil heater, Heatec HC-120	11-60.1-82(f)(7)
1	Specification used oil tank < 10,000 gallons	11-60.1-82(f)(1)
3	Fuel oil storage tanks - 3,000, 4,000, & 10,000 gallons	11-60.1-82(f)(1)
2	Liquid asphalt cement storage tanks - 30,000 gallons	11-60.1-82(f)(1)
1	Cold mix tank - 6,000 gallons	11-60.1-82(f)(1)

VI. Alternate Operating Scenarios

None proposed.

**VII. Project Emissions**

Facility emissions are shown in the following table and include PM-2.5 emissions which not determined in the last application review. Except for a decrease in PM and PM-10 emissions from load-out and silo-filling activities, emissions calculated in the 6/3/04 review of Grace Pacific's renewal application remain unchanged.

Table 5: Facility Emissions (tpy)								
Pollutant	Drum Mixer	RAP System	Material Conveying	DEG	Agg Handling, Paved Roads	Load-Out	Silo-Filling	Total
CO	35.10			6.26		0.36	0.32	42.04
NOx	14.85			23.56				38.41
PM	8.91	1.75	3.50	0.74	12.09	0.01	0.01	27.00
PM-10	6.21	0.84	1.67	0.42	3.00	0.01	0.01	12.16
PM-2.5	0.78	0.61	1.23	0.66	3.00	0.01	0.01	6.30
SO2	24.92			3.78				28.70
VOC/TOC	8.64			0.66		1.06	3.29	13.65
Lead	4.05E-03							4.05E-03
Total HAPs	2.40			0.03		0.02	0.05	2.51

Note:  
Emissions other than those for Load-Out & Silo-Filling are based on Review of Application No. 0045-14, 6/3/04, page 12, Table 2, Facility Emissions Summary.

**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 28, 2006