PROPOSED
Reviewed by: CS
August 30, 2004

Covered Source Permit Review No. 0036-01-CT
Application for Renewal/Significant Modification No. 0036-03
186 tph Drum Mix Asphalt Concrete Plant

Applicant: Grace Pacific Corporation

Equipment Description:

This permit encompasses the 186 tph drum mix asphalt concrete (AC) plant consisting of the following equipment and associated appurtenances:

a. 186 tph Astec Industries drum mixer (model no. PDM-636-C, ID No. 85-172, 1.75 gal of fuel per ton of asphalt);
b. one (1) Astec Industries baghouse (model no. PBH-30);
c. one (1) 655 kW Detroit diesel engine generator (model no. DDC 655, serial no. 16 VA 019208, max. fuel consumption 51.9 gal/hr);
d. one (1) four compartment cold feed bin;
e. one (1) recycled asphalt product (RAP) feed bin; and
f. three (3) portable conveyors

Equipment Location:

Halawa (adjacent to Hawaiian Cement Quarry)
Halawa Valley Road, Aiea (Oahu)
UTM Coordinates: 2,364,100m N; 613,400m E (NAD-83)

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Proposed Project:

This facility has been constructed in 1987 in accordance with authority to construct (ATC) permit no. A-728-668. Since then, the facility has been modified to be a covered temporary source and the diesel engine generator (DEG) and baghouse stacks have been extended to 6.7 and 8.2 meters respectively. These stack extensions were required to meet state ambient air quality standards (SAAQS) at the relocated site of Halawa Valley.

This permit application proposes the following modifications to its operations:

1. Electrical power will be obtained from Hawaiian Electric Company (HECO);
2. The DEG will normally be used as a back-up to power outage at the Halawa location and continue to be limited to 12 hr/day and 2,080 hr/yr of operation;
3. The AC plant will increase operations from 12 hr/day to 24 hr/day;
4. The total AC plant operating hours will increase from 2,080 to 3,500 hr/yr;
5. Add specification (spec) used oil, cooking oil, Jet-A and A-1, JP-5 and 8 fuels.

The description of processes are as follows:
Aggregate material are stored as stockpiles on site. The cold (unheated) aggregates are then transferred to the cold feed bins via a loader. The cold feed bins proportions the aggregate to a belt conveyor which feeds the drum mixer. The drum mixer heats and dries the aggregate and then discharges the product into the coater located below the drum dryer where the liquid asphalt is introduced. The baghouse system supplies induced draft and removes undesirable amounts of particulate from the drum mixer. The asphalt hot-mix is discharged from the revolving drum mixer into a silo until it is loaded onto a waiting truck. The plant is powered by electricity bought from HECO (the DEG will only be used in the event of a power outage at the Halawa location). The Standard Industrial Classification Code (SICC) for this plant is 2951- Asphalt Paving Mixtures and Blocks.

This permit review is based on the application dated 6/21/02 and its revisions dated 12/29/03 and 3/9/04. The application fee of $500.00 for a renewal/significant modification of a temporary covered source permit will be processed and the receipt will be issued with the permit. This permit shall supersede CSP No. 0036-01-C dated July 13, 1998, and its amendment dated August 20, 2001.

Air Pollution Controls:

A baghouse will be used to capture particulate matter (PM) when the aggregate is being heated and processed inside of the hot drum. This baghouse is required to ensure that the NSPS Subpart I emission limit is not exceeded. A 99% capture efficiency of PM is usually assumed for baghouses.

Applicable Requirements:

Hawaii Administrative Rules (HAR) Title 11 Chapter 59
Hawaii Administrative Rules (HAR) Title 11 Chapter 60.1
- Subchapter 1 - General Requirements
- Subchapter 2 - General Prohibitions
  - 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, Sections 111,112-115
- Subchapter 8 - New Source Performance Standards
- Subchapter 10 - Field Citations

NSPS 40 CFR Part 60 Subpart A - General Provisions
NSPS 40 CFR Part 60 Subpart I - Standards of Performance for Hot Mix Asphalt Facilities because this facility has been constructed after June 11, 1973.

Compliance Data System (CDS) since this is a covered source.

Synthetic Minor since NO_x and CO emissions would be greater than 100 tpy each (Major Source) if this source was to operate 8,760 hr/yr.

Non-Applicable Requirements:

40 CFR Parts 61 and 63 - National Emission Standard for Hazardous Air Pollutants (NESHAPS) and Maximum Achievable Control Technology (MACT) since there is no specific source category for asphalt concrete plants and DEGs and the facility is not a major source of hazardous air pollutant (HAP) emissions.

Prevention of Significant Deterioration (PSD) since this is not a major stationary source.

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 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 precontrol emissions that are greater than the major source level [>100 tpy]; and (5) not otherwise be exempt from CAM. CAM is not applicable to the asphalt concrete plant and DEG since item 1 does not apply.

Consolidated Emissions Reporting Rule (CERR) since the potential individual criteria pollutant emissions from the asphalt concrete plant is less than 100 tpy each when restricted to the operational limits. However, internal annual emissions reporting is required since NO_x and CO facility wide emissions are greater than 25 and 100 tpy, respectively.

A Best Available Control Technology (BACT) analysis is required for new sources or modifications to existing sources that would result in a net significant emissions increase as defined in HAR, Section 11-60.1-1. This is an existing source with proposed modifications in operations. However, since the increase in emissions are less than significant levels, a BACT analysis was not performed. Please refer to the **Project Emissions** for comparisons to the increase in emissions.

Insignificant Activities/Exemptions:

The following equipment are exempt by HAR 11-60.1-82(f)(1) any storage tank with a capacity of less than forty thousand gallons:

a. Two (2) 5,000 gallon fuel storage tanks; and
b. 25,000 gallon liquid asphalt tank.

The following equipment is exempt by HAR 11-60.1-82(f)(2) fuel burning equipment with a heat input value less than 1 MMBtu/hr:

a. Diesel fired ASTEC hot oil heater (model no. HAO-25PE).

Alternative Operating Scenarios:

The facility is not proposing any alternate operating scenarios.

Project Emissions:

The proposed increase in hours of operation and some of the new types of fuel will increase the potential air pollutant emissions at this facility. Spec used oil and cooking oil will increase certain air pollutants in comparison to fuel oil no. 2. However, the aviation fuels are not expected to increase potential emissions and the non-use of the DEG at Halawa will decrease actual emissions.

The worst case scenario using the maximum permitted spec used oil with the increase in hours of operation was calculated in the application. However, it assumed that cooking oil is comparable to fuel oil no. 2. DOH has found that cooking oil will increase some air pollutant emissions. Source performance tests of a boiler (with a wet scrubber) burning cooking oil and fuel oil no. 2 revealed the differences as shown in **TABLE 1**. Since these results included the use of a wet scrubber, no further efficiency factor will be applied for the use of the baghouse for this review. The increases from using cooking oil will be added to the project emissions that were checked and corrected by DOH as shown in **TABLE 2**.

TABLE 1
COOKING OIL VS. FUEL OIL NO. 2

POLLUTANT	Cooking oil [1] (lb/MMBtu)	Fuel Oil No. 2 [2] (lb/MMBtu)	Difference (lb/MMBtu)	Hourly Increase [3] (lb/hr)	Annual Increase [4] (ton/yr)
SO_2	0.0001	0.0085	-0.0084	n/a	n/a
NO_x	0.1461	0.1188	0.0273	1.24	2.18
CO	0.0735	0.0146	0.0589	2.68	4.70
PM	0.0360	0.0490	-0.0130	n/a	n/a
PM_{10}	0.0360	0.0490	-0.0130	n/a	n/a
VOC	0.0076	0.0040	0.0036	0.16	0.29
HAPs	insignificant	insignificant	insignificant	insignificant	insignificant

Notes:

1. All values were results of a 10/18/02 source performance test (SPT) for a boiler with a wet scrubber at HC&S Puunene Mill. Since there were no test for PM_{10}, it is assumed that PM=PM_{10}.

2. All values except for VOC were results of a 10/16/02 source performance test (SPT) for a boiler with a wet scrubber at HC&S Puunene Mill. Since there were no test for PM_{10}, it is assumed that PM=PM_{10}.

   VOC values were converted from AP-42 emission factors, table 1.3-3, 9/98 for fuel oil no. 2 combustion
   0.556 lb/1000 gal x 1 gal/0.140 MMBtu = 0.0040 lb/MMBtu.

3. Sample hourly NO_x increase
   0.0273 lb/MMBtu x 0.140 MMBtu/gal x 1.75 gal/ton x 186 ton/hr = 1.24 lb/hr.

4. Sample annual NO_x increase
   1.24 lb/hr x 3,500 hr/yr x 1ton/2,000 lbs = 2.18 ton/yr.

The calculations for the project emissions are based on maximum operational capacities, source performance tests as mentioned in **TABLE 1**, and current AP-42 emission factors:

3.4 - Large Diesel Industrial Engines, 10/96
11.1 - Hot Mix Asphalt Plants, 12/00
13.2.4 - Aggregate Handling and Storage Piles, 1/95

TABLE 2 is a summary of the maximum emissions with operating limitations of 3,500 hr/yr (except for the 2,080 hr/yr for the DEG):

TABLE 2
PROJECT EMISSIONS

POLLUTANT	DRUM MIX / BAGHOUSE [1] (TPY)	Cooking oil [2] (TPY)	DEG [3] (TPY)	HANDLING & STOCKPILES [4] (TPY)	TOTAL (TPY)
SO_2	4.93	n/a	3.82		8.75
NO_x	17.90	2.18	24.18		44.26
CO	42.32	4.70	6.42		53.44
PM	10.74	n/a	0.53	2.77	14.04
PM_{10}	7.49	n/a	0.43	2.77	10.69
VOC	10.42	0.29	0.68		11.39
HAPs	2.91	insignificant	0.01		2.92

Notes:
1. Includes worst case emissions from 100,000 gallons of spec used oil with the remaining hours of operation using fuel oil no. 2 (3,500 hr/yr total).
2. Increase in emissions when using cooking oil. See **TABLE 1**.
3. The DEG emissions remain unchanged from the previous CSP review and is still based on 2,080 hr/yr.
4. Fugitive emission factors from AP-42 section 11.1 were found insignificant (< 1tpy).

As shown in **TABLE 2** , this temporary source continues to be a non-major source (<100 tpy) with the increase in hours of operation as well as use of cooking oil and 100,000 gal/yr of spec used oil. The assumptions made are conservative because the emissions shown are the greatest using a combination of fuels (i.e. the increase in NO_x, CO, and VOC when using cooking oil did not include the simultaneous decrease in SO_2, PM, and PM_{10}). See **ENCLOSURE 1** for details. **TABLE 3** shows conservatively that all activities that will be affected by the modification will remain below significant levels. As such, a comparison to the past 2-yr average of actual emissions was not needed and a new BACT review was not required. **TABLE 3** also reflects a conservative worst case scenario because the DEG will only be used as a back-up in the event of a HECO power outage at the initial site in Halawa.

TABLE 3
MODIFICATION COMPARISON TO SIGNIFICANT LEVELS

POLLUTANT	DRUM MIX / BAGHOUSE (TPY)	Cooking oil (TPY)	HANDLING & STOCKPILES (TPY)	TOTAL (TPY)	SIGNIFICANT LEVELS (TPY)
SO_2	4.93	n/a		4.93	40
NO_x	17.90	2.18		20.08	40
CO	42.32	4.70		47.02	100
PM	10.74	n/a	2.77	13.51	25
PM_{10}	7.49	n/a	2.77	10.26	15
VOC	10.42	0.29		10.71	40
HAPs	2.91	insignificant		2.91	

Notes:
1. There is no proposed modification to the DEG, therefore its potential emissions were not included in this table.

The other proposed additional fuels will not increase any air pollutant emissions when compared to fuel oil no. 2. Jet-A and A-1; and JP-5 and 8 fuels are considered similar to fuel oil no. 2. A combustion class that was conducted by Dr. Taylor Beard on July 26 to 30, 2004 at 919 Ala Moana Blvd. confirmed that the chemical properties are very similar to other distillate fuel oils. The main difference is that the aviation fuels are able to ignite at very low temperatures (-20 degrees F).

Ambient Air Quality Analysis (AAQA):

A new AAQA is required for this permit renewal since the permittee requested to increase hours as well as use new fuels that will increase potential air pollutants. This AAQA will only analyze the AC/baghouse stack. The DEG will remain unchanged and is generally not required to be modeled again. Furthermore, the DEG will be used as a back-up to HECO power at this Halawa site. As previously determined from the relocation review for the Halawa site, a simple terrain model would be sufficient since the general area is flat. Also, the facility is located near the top of a hill. This would help dispersion of air pollutant emissions.

An AAQA was performed using an approved model, SCREEN3 program version dated 96043, to determine source compliance with National and State ambient air quality standards (NAAQS and SAAQS). The model, methodology and assumptions employed in the AAQA have been determined to be consistent with State and Federal guidelines and are discussed below.

The assumptions used in the SCREEN3 model included the following: regulatory default options, flat terrain, and rural dispersion parameters.

A Good Engineering Practice (GEP) review was performed for the previous relocation review to include the businesses and warehouses nearby. Those existing structures were found not to cause downwash. However, the structures within the property showed to cause downwash with the silo having the most impact. The silo dimensions were included with the model (approximately 9.14m high and 3.66m in diameter).

As shown in the application, an automatic array of receptors spread out radially from the stack were used as well as a receptor located at the fenceline (approximately 36m from the AC/baghouse stack). However, the location of highest concentration for the AC/baghouse was located outside of the fenceline (52m from the stack).

TABLE 4 presents the potential to emit/allowable emission rates and stack parameters of the AC/baghouse used in the AAQA. The stack parameters remain unchanged from the relocation review to Halawa. However, the emission rates include the potential increases when using spec used oil and cooking oil (see the **Project Emissions** for details).

The predicted concentrations presented in **TABLE 5** assumes maximum potential operations when operating 24 hrs/day and 3,500 hrs/yr as limited by the permit. A tier 2 factor was used to estimate that 0.75 of total NO_x would be converted to NO_2. Based on these assumptions, the facility will comply with NAAQS and SAAQS for SO_2, NO_2, CO, and PM_{10}. Pb and H_2S emissions are not expected at this facility.

TABLE 4
SOURCE EMISSION RATES AND STACK PARAMETERS FOR AIR MODELING

SOURCE		EMISSION RATES [1]					STACK PARAMETERS			
Equipment	Stack No.	SO_2 (g/s)	NO_x (g/s)	CO (g/s)	PM_{10} (g/s)	Pb (g/s)	Height (m)	Temp. (K)	Velocity (m/s)	Diam. [2] (m)
AC/baghouse	1	1.3593	1.7194	3.2631	0.5390	--	8.2	410	27.6089	0.7722

Note:

1. SO_2 emission rate is conservative by using the higher factor for the spec used oil. SO_2 is lower when using fuel oil no. 2 or cooking oil.

   NO_x emission rate includes the increase when using cooking oil: 1.24lb/hr x 453g/1lb x 1hr/3,600s = 0.1560 g/s.
   Therefore, 1.2890 + 0.1560 = 1.4450 g/s

   CO emission rate includes the increase when using cooking oil: 2.68lb/hr x 453g/1lb x 1hr/3,600s = 0.3372 g/s
   Therefore, 3.0467 + 0.3372 = 3.3839 g/s

   PM_{10} emission rate is conservative by using the higher factor for the spec used oil. PM_{10} is lower when using cooking oil.

2. The diameter for the A.C./baghouse is converted from the actual rectangular stack area.

TABLE 5
PREDICTED AMBIENT AIR QUALITY IMPACTS

AIR POLLUTANT	AVERAGING TIME	BAGHOUSE ($\mu g/m^3$)	DEG [1]	BACKGROUND [2] ($\mu g/m^3$)	TOTAL IMPACT ($\mu g/m^3$)	AIR STANDARD ($\mu g/m^3$)	PERCENT STANDARD
SO_2	3-Hour	266.94		30	296.94	1300	22.84%
	24-Hour [3]	118.64		9	127.64	365	34.97%
	Annual [4]	23.70		3	26.70	80	33.38%
NO_2	Annual [4, 5]	22.48		9	31.48	70	44.97%
CO	1-Hour	712.01		3990	4702.01	10000	47.02%
	8-Hour	498.41		1582	2080.41	5000	41.61%
PM_{10}	24-Hour [3]	47.04		101	148.04	150	98.69%
	Annual [4]	9.40		16	25.40	50	50.80%
Pb	Calendar Quarter	--		--	0.00	1.5	--
H_2S	1-Hour	--		--	0.00	35	--

Note:
1. The DEG is not included with this AAQA because it remained unchanged.
2. The background concentrations were taken from Hawaii Air Quality Data 2002 at Kapolei for NO_2, Liliha for PM_{10}, and Honolulu for all others.
3. The 24-hr concentrations were based on 24-hrs/day as permitted.
4. The annual concentrations were based on 3,500 hrs/yr as permitted.
5. Tier 2 (0.75 * NO_x concentrations) were used to calculate NO_2 concentrations.
6. The receptor locations of impact were 52 meters from the A.C./baghouse stack.

Other Issues:

None.

Existing Permit Conditions:

1. Fuel Oil #2 with 0.5% sulfur.
2. Pursuant to NSPS Subpart I annual stack test for PM and opacity. The PM standard is 90 mg/dscm (9.2 lb/hr) and opacity is 20%. This PM standard is more stringent than the state limit for process industries - ref. HAR 11-60.1-37 which is 40 lb/hr.
3. Operational hours for the DEG will remain at 12 hrs/day and 2,080 hrs/yr to comply with NAAQS and SAAQS.

New Permit Conditions:

1. Operational hours for the drum mixer have been increased from 12 hrs/day to 24 hrs/day for operational flexibility.
2. Operational hours for the drum mixer have been increased from 2,080 hrs/yr to 3,500 hrs/yr for operational flexibility while still complying with NAAQS and SAAQS.
3. The DEG will only be used as a back-up to HECO power to save money. Therefore, an hour meter will be installed, maintained, and operated for the drum mixer.
4. The following additional fuels maybe be used: cooking oil, Jet-A and A-1, JP-5 and 8 fuels maybe used in place of fuel oil no. 2. A maximum of 100,000 gal/yr of spec used oil may be used.

Conclusion and Recommendation:

In conclusion, this facility complies with all State and Federal laws, rules, regulations, and standards with regards to air pollution. Therefore, an issuance of a Renewal of a Covered Source Permit to Grace Pacific Corporation subject to the above permit conditions is recommended. The issuance of this permit is subject to a 30-day public comment period and 45-day EPA review period.