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NARRATIVE

TO: James Capp and Eric Cornwell

FROM: Tracey Hiltunen and John Yntema

DATE: May 4, 2009

SUBJECT: Generic Air Quality Permit for Asphalt Plants

General Information

This narrative explains the basis for this generic air quality permit (Permit No. 2951-GEN-0008-S-01-0). Generic permits are allowed under the authority of Georgia Rules 391-3-1-.03(12) and 391-3-1-.03(2)(f). This permit is for hot mix asphalt plants.

The purpose of this generic permit is to significantly decrease the amount of time it takes to review applications and issue state permits for most types and sizes of asphalt plant. It is also to establish the same permit conditions for all plants that can qualify for a generic permit.

To apply for a generic permit, the asphalt facility must submit both a state air quality application and the asphalt plant generic permit supplement application, and must meet the following requirements: (1) The asphalt plant must be either a drum mix plant or batch mix plant. (2) The plant must be operated at one fixed location. If the facility is relocated, the Permittee will be required to submit an application for a new permit. (3) The asphalt plant must use a baghouse to control particulate matter. Therefore, plants that use scrubbers or other control technologies are not eligible to obtain this generic permit. (4) The asphalt plant must be subject to the requirements of 40 CFR Part 60 Subpart I – Standards of Performance for Hot Mix Facilities. Therefore, plants that were originally constructed prior to June 11, 1973 are not eligible to obtain this generic permit. (5) The asphalt plant must fire fuel with no more than 1.5 percent sulfur and only one or more of the following fuels in the dryer and hot oil heater: natural gas, LPG, distillate oil, residual oil, and waste oil. If waste oil is to be fired, it must meet the used oil specifications under 40 CFR Part 279.11. (6) The facility must be willing to accept the production and fuel usage limits in the generic permit.

The following fuel oil and production limits will be included to limit emissions below the Title V major source thresholds: Fuel oil usage is limited to 800,000 gallons per 12 consecutive month period. Production is limited to 600,000 tons per year (tpy) for drum mix plants (statewide); 475,000 tpy for batch mix plants located outside the 13 county Atlanta area[1]; and 375,000 tpy for batch mix plants located in the 13 county Atlanta area.

Process Description

All hot mix asphalt facilities operate in the same general manner. Heated liquid asphalt is stored in an on-site tank (heated to a temperature that will allow it to flow, by a small boiler-like combustion unit called a hot oil heater). Various aggregate sizes, including sand, are stored on-site in piles, often delivered from a nearby quarry.

Processing begins as the aggregate is picked up by front-end loaders from the storage piles and dumped into one of several concrete hoppers of the cold feed unit. When the asphalt plant is operating, rock material is metered from

[1] The 13 county Atlanta area consists of the following counties: Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Paulding, and Rockdale. In these counties the major source threshold for NOx is 25 tons per year. Throughout the rest of the state, the Title V threshold is 100 tons per year.

the hoppers onto a below-ground conveyor belt. The conveyor leads into the upper end of a continuously heated tilted rotary drum dryer (typically gas-fired or oil-fired). A dryer is equipped with interior flights designed to, as the drum rotates, shower the aggregate inside the drum to promote drying efficiency. The aggregate dries and is heated up, as it works its way to the lower end of the drum, where it exits the drum. Most plants have a means to feed in crushed recycled asphalt (RAP). The final bulk aggregate moisture content target is generally between 3 and 5 percent, by weight. The drying plant exhaust gases exit the end of the drum and pass to the particulate matter control system; this must be a baghouse to obtain a generic permit.

By some means (depending on plant design), the hot aggregate is mixed with heated liquid asphalt cement and other small amounts of ingredients. The product is a salable asphalt concrete mixture, which can be stored in insulated bins. When needed, it can be quickly unloaded into an open-top truck for delivery.

There are several types of asphalt paving plants. The main ones are: (1) batch mix plants, (2) continuous mix (mix outside drum) plants, (3) parallel flow drum mix plants, and (4) counterflow drum mix plants. These plants typically operate 8 to 10 hours a day (usually only during daylight hours), 5 to 6 days a week, for 40 to 52 weeks a year (usually not when raining or during cold weather), depending on the job. The process descriptions here and below are mainly from AP-42: 11.1 Hot Mix Asphalt Plants (3/2004). The above order of listing of plant types generally reflects the chronological order of development and use within the Hot Mix Asphalt (HMA) industry. The AP-42 document states that all 4 types are still being manufactured. However, because continuous mix plants represent a very small fraction of the plants in use (less than 0.5 percent), such plants are not included in this generic permit.

Batch Mix Plants

In the batch mix HMA production process, the drum dryer heats the aggregate, but liquid asphalt is not introduced there. Heated aggregate exits the dryer, dropping into a bucket elevator, which conveys it up to a tower that encloses a set of vibrating screens. These screens classify the hot aggregate into as many as four different grades (sizes), which are dropped into individual "hot" bins. To make asphalt concrete, the operator controls the aggregate size distribution in the final batch mix by opening the hot bins over a weigh hopper until the desired mix and weight are obtained. Concurrent with the aggregate being weighed, liquid asphalt cement is pumped to an asphalt bucket, where it is weighed to achieve the desired aggregate-to asphalt cement ratio in the final mix.

The aggregate from the weigh hopper is dropped into the mixer (pug mill) and dry-mixed for 6 to 10 seconds. Hot liquid asphalt is then dropped into the pug mill where mixing continues. At older plants, crushed RAP typically can be conveyed directly to the pug mill from storage hoppers and combined with the hot aggregate. The total mixing time is usually less than 60 seconds. Then the hot mix is conveyed to a hot storage silo or is dropped directly into a truck and hauled to a job site.

An advantage of this type of plant is that the liquid asphalt is never near the dryer flame. A disadvantage is that the hot rock being processed in the vibrating screen tower wears out the tower and screens. Holes in the tower can develop, allowing fugitive dust emissions. Also, there is often more very fine material generated than can be used. This very fine rock dust may be disposed of at the end of the day, which can cause a fugitive dust problem.

The typical design capacity for a batch mix drum dryer is 300 tons per hour with a burner capacity of 90 MMBtu/hr.

Parallel-Flow Drum Mix Plants

The parallel-flow drum mix process is one type of drum process. All drum mix plants require that the aggregate mixture that is being conveyed to the drum dryer contain the actual mixture of stone desired. This requires the ability to precisely "dial in" the proportions of each size stone being dropped onto the conveyor. As compared to the batch process, the dryer is used not only to dry the material, it is where liquid asphalt cement is added and mixed with the heated and dried aggregates. In a parallel-flow plant, the burner is located at the upper end of the drum, where the aggregate is flowing in. As the drum rotates, the aggregates, as well as the combustion products, flow toward the other end of the drum in parallel. The liquid asphalt cement is introduced in the mixing zone, about midway down the drum. RAP can often be introduced midway, as well as particulate matter (PM) that has been

captured by the dryer baghouse. Liquid asphalt cement flow is controlled by a variable flow pump, usually electronically linked to the new (virgin) aggregate and RAP weigh scales. The hot asphalt concrete mixture is discharged at the end of the drum and is conveyed to either a surge bin or HMA storage silos, where it is loaded into transport trucks. The exhaust gases also exit that end of the drum and pass to the particulate matter collection system.

Parallel flow drum mixers have an advantage, in that mixing of liquid asphalt vapor in the discharge end of the drum captures a substantial portion of the aggregate dust, therefore lowering the load on the downstream PM collection equipment. Also, this avoids the necessity of a screen tower. A disadvantage is that, because the mixing of aggregate and liquid asphalt cement occurs in the hot combustion product flow, the generation of organic emissions (gaseous and liquid aerosol) may be greater. These organics are not captured by typical control devices and so flow out the stack, often resulting in a visible blue haze.

In Georgia, the typical design capacity for a parallel-flow drum mix dryer ranges from 200 to 400 tons per hour with a burner capacity of 100 MMBtu/hr, although it is possible for dryers and burners to have higher capacities.

Counterflow Drum Mix Plants
In a counterflow drum mix type plant, the heat source is located at the lower end of the drum, so the flame and heated gases flow in the opposite direction of the material. The liquid asphalt cement mixing zone is located behind and below the burner flame zone. This removes the possibility of the flame contacting liquid asphalt. RAP can also be introduced behind the flame, which reduces the vaporization of asphalt in the RAP. As with the parallel flow plant, liquid asphalt cement flow is controlled by a variable flow pump that is electronically linked to the virgin aggregate and RAP weigh scales.

Some counterflow drums are so-called double drum plants. In such designs, the lower 1/3 or so of the drum is encased in an outer drum. After the hot aggregate flows by the flame, it is allowed to drop out of the main drum into the outer drum, where it is carried uphill in the outer drum for a short distance. It is in that outer partial drum that hot asphalt is added and RAP can be added. This design keeps asphalt away from the flame and also makes it practical to direct asphalt fumes, generated by the mixing, to be ducted through the dryer flame.

Because the liquid asphalt cement, virgin aggregate and RAP are mixed in a zone removed from the exhaust gas stream, counterflow drum mix plants will likely have lower organic emissions (gaseous and liquid aerosol) than parallel-flow drum mix plants. However, the available data are insufficient to discern any differences in emissions that result from differences in the two processes. A counterflow drum mix plant can normally process RAP at ratios up to 50 percent with little or no observed effect upon emissions. Most other plants seem to be limited to about 20 percent RAP.

In Georgia, the typical design capacity for a counterflow drum mix dryer ranges from 200 to 400 tons per hour with a burner capacity of 100 MMBtu/hr, although it is possible to have dryers and burners with higher capacities.

Recycle Processes
In recent years, the use of RAP has been growing in the HMA industry. Reclaimed asphalt pavement significantly reduces the amount of virgin rock and asphalt cement needed to produce HMA.

In the reclamation process, a layer of old asphalt concrete pavement is removed from the road base before a new layer of asphalt is to be laid down. This allows the application of asphalt concrete without building the street level up higher than is desired. The collected RAP material is then transported to an asphalt plant site. Before it can be used, it must be crushed and screened to the appropriate size for further processing. This would usually be done by a crusher that would visit the site for several days per year. As indicated above, RAP can be mixed with new aggregate. Since RAP contains aggregate and asphalt cement, this recycling reduces the demand for virgin stone and asphalt cement.

The process descriptions are adapted from AP-42: 11.1 Hot Mix Asphalt Plants (3/04).

Emissions Summary

The primary emission source at the asphalt plant is the drum dryer. This equipment emits PM, NOx, CO, SO_2, VOC, and some HAP. There are other sources of emissions of criteria pollutants. Hot oil heaters burn No. 2 fuel oil and emit products of combustion. Lime silo-filling operations generate PM emissions. There are fugitive PM and CO emissions generated due to transport of the HMA from the drum dryer to the storage silo and also from the load-out operations to the delivery trucks. PM emissions are also generated during truck transport of material into and out of the plant, some from materials carried by the vehicle and some from the roadway.

Emissions estimates other than PM from hot mix asphalt facilities were made using data available from AP-42. The AP-42 emission factors are conservative values, based on testing data, covering all the operational variations and fuels which are allowed to be used, in accordance with generic permitting, for each of the two types of asphalt plants, batch mix and drum mix.

In order to provide synthetic minor status, the following limits have been established:

- Sulfur content in the fuel oil is limited to 1.5% (0.015).
- Total fuel oil usage is limited to 800,000 gallons per year.
- Total production of asphalt is limited to 600,000 tons per year for drum mix plants, 475,000 tons per year for batch mix plants located outside the 13 county Atlanta area, and 375,000 tons per year for batch mix plants located in the 13 county Atlanta area.

The calculations supporting these limits are found below:

NOx Emissions:
Drum mix asphalt plant
Using the AP-42 emission factor of 0.055 lb/ton for waste oil and the production limit of 600,000 tpy, the PTE is:
[600,000 tpy] * [0.055 lb/ton] / [2000 lb/ton] = 16.5 tpy

Batch mix asphalt plant (statewide except the 13 county Atlanta area)
Using the AP-42 emission factor of 0.12 lb/ton and the production limit of 475,000 tpy, the PTE is:
[475,000 tpy] * [0.12 lb/ton] / [2000 lb/ton] = 28.5 tpy Note: this is greater than 25 tpy.

Batch mix asphalt plant (13 county Atlanta non-attainment areas)
Using the AP-42 emission factor of 0.12 lb/ton and the production limit of 375,000 tpy, the PTE is:
[375,000 tpy] * [0.12 lb/ton] / [2000 lb/ton] = 22.5 tpy Note: this is less than 25 tpy.

CO Emissions:
Drum mix asphalt plant
Using the AP-42 emission factor of 0.13 lb/ton and the production limit of 600,000 tpy, the PTE is:
[600,000 tpy] * [0.13 lb/ton] / [2000 lb/ton] = 39 tpy

Batch mix asphalt plant (statewide)
Using the AP-42 emission factor of 0.40 lb/ton and the statewide production limit of 475,000 tpy, the PTE is:
[475,000 tpy] * [0.40 lb/ton] / [2000 lb/ton] = 95 tpy

VOC Emissions:
Drum mix asphalt plant
Using the AP-42 emission factor of 0.032 lb/ton and the production limit of 600,000 tpy, the PTE is:
[600,000 tpy] * [0.032 lb/ton] / [2000 lb/ton] = 9.6 tpy

Batch mix asphalt plant (statewide)
Using the AP-42 emission factor of 0.036 lb/ton and the production limit of 475,000 tpy, the PTE is:
[475,000 tpy] * [0.036 lb/ton] / [2000 lb/ton] = 8.55 tpy

SO_2 Emissions:
Using the Chapter 1.3 AP-42 emission factor[2] for No. 6 oil combustion of 157S lb/1000 gal, where S = 1.5%, and fuel usage is limited to 800,000 gallons per year, the PTE is:
[800,000 gal/yr] * [0.157 lb/gal *1.5] / [2000 lb/ton] = 94.2 tpy

PM Emissions:

Drum Dryer

Potential PM/PM10 emissions from the drum dryer are limited by the NSPS to 0.04 gr/dscf. Based on a review of more than 30 separate stack test reports for asphalt plants, it was found that 36,000 dscfm was the highest inlet flow rate. Using an inlet gas flow rate of 36,000 dscfm, emissions are estimated to be 54 tpy. Lower inlet flow rates will produce less PM emissions.

PM= [0.04 grain PM/PM10 / dscf] * [36,000 dscfm] * [1 lb / 7,000 grains] * [60 min / hr] * [8,760 hrs / yr] * [1 ton / 2,000 lbs] = 54 tpy

Lime Silo-filling Operations

When used, lime typically makes up 1% of the asphaltic concrete mixture. Therefore, based on the allowed annual asphalt production of 600,000 tons per year, up to 6,000 tons per year of lime can be consumed at the site. Most of the particulate matter emissions occur during the filling of the silo, caused by the displacement of dusty air by the incoming lime being blown into the silo. About 0.5 percent of the total mass is likely to be carried out of the silo in this manner. The annual potential to emit lime dust is therefore about 30 tons per year. Assuming a baghouse collection efficiency of 99%, the estimated actual emissions are 0.3 tons per year.

HMA Transport and Handling

There are fugitive PM and CO emissions generated from transport and handling of the HMA from the drum dryer to the storage silo and also from the load-out operations to the delivery trucks. Particulate matter and carbon monoxide emissions are generated from silo filling operations and at HMA load-out. These can be estimated by using the following predictive emission factor equations provided in Table 11.1-14 of the most recent version of AP-42 (dated 3/04) for Hot Mix Asphalt plants.

For PM

$EF=0.000181+0.00141\ (-V)\ e^{((0.0251)(T+460)-20.43)}$;	Plant load-out:	0.00052 lb/ton
$EF=0.000332+0.00105\ (-V)\ e^{((0.0251)(T+460)-20.43)}$;	Silo filling:	0.00059 lb/ton

For CO

$EF=0.00558\ (-V)\ e^{((0.0251)(T+460)-20.43)}$;	Plant load-out:	0.00135 lb/ton
$EF=0.00488\ (-V)\ e^{((0.0251)(T+460)-20.43)}$;	Silo filling:	0.00118 lb/ton

[2] The SO_2 emission factor from Chapter 1.3 was used because it is more conservative than the emission factors of 0.088 lb/ton for batch mix and 0.058 lb/ton for drum mix plants from Chapter 11.1– Hot Mix Asphalt Plants.

In the absence of site-specific data, a default value of –0.5 for V is assumed, as suggested in the AP-42. The HMA mixing temperature of 325 °F is also a default value. Using these values, the emission factors (EF) for the above processes are estimated to be 0.00052 lb/ton and 0.00059 lb/ton for PM; 0.00135 and 0.00118 lb/ton for CO from plant load out and silo filling operations, respectively, as shown above. Using the above AP-42 EFs and the production limit of 600,000 tons per year of asphalt produced, the annual estimated PM and CO emissions from these operations are shown in the table below.

Pollutant / Process	**Emission Factor, lb/ton of HMA**	**SM Limited Emissions Ton/year**
Particulate Matter		
Load-out	0.00052	0.16
Silo-filling	0.00059	0.18
		0.34
CO		
Load-out	0.00135	0.41
Silo-filling	0.00118	0.35
		0.76

Note: The emissions from these production operations, as estimated above, are less than one ton per year and hence are not significant as compared to the emissions from the dryer. Note that emissions from the lime silo are also estimated to be less than 1 ton per year of PM10. Adequate margin was provided for these emissions when setting emission limits to ensure that the air pollutants will not exceed the Title V major source threshold limits.

Adding emissions from the dryer, lime silo-filling operations, and HMA transport and handling together, potential emissions of PM/PM10 for the whole facility are estimated to be 54.6 tpy.

Formaldehyde Emissions:
In Table 11.1-10 of AP-42 Chapter 11.1 "Hot Mix Asphalt Plants," the formaldehyde emission factor is the highest in the HAPs list. As long as the formaldehyde PTE is less than 10 tons per year, the PTE for every other single HAP must be less than 10 tons per year.

Using the drum mix plant AP-42 emission factor of 0.0031 lb/ton and the production limit of 600,000 tpy, the PTE is estimated to be 0.93 tpy. Similarly, using the AP-42 batch mix emission factor of 0.00074 lb/ton, the batch mix plant PTE is estimated to be 0.22 tpy.

[600,000 tpy] * [0.0031 lb/ton] / [2000 lb/ton] = 0.93 tpy
[600,000 tpy] * [0.00074 lb/ton] / [2000 lb/ton] = 0.22 tpy

The average annual hourly emission rate for a drum mix plant is estimated to be 0.21 lb/hr. From a batch mix plant, it is estimated to be 0.05 lb/hr.

[0.93 tpy] * [2000 lb/ton] / [8760 hr/yr] = 0.21 lb/hr
[0.22 tpy] * [2000 lb/ton] / [8760 hr/yr] = 0.05 lb/hr

Total HAP Emissions:
Using the drum mix plant AP-42 emission factor of 0.010 lb/ton from Table 11.1-10, and the production limit of 600,000 tpy, the PTE is estimated to be 3.0 tpy. Similarly, using the AP-42 batch mix emission factor of 0.0077 lb/ton, the batch mix plant PTE is estimated to be 2.3 tpy.

[600,000 tpy] * [0.010 lb/ton] / [2000 lb/ton] = 3.0 tpy
[600,000 tpy] * [0.0077 lb/ton] / [2000 lb/ton] = 2.3 tpy

Regulatory Applicability

40 CFR 60 Subpart I
Asphalt plants constructed after the NSPS compliance date of June 11, 1973, are subject to NSPS 40 CFR 60 Subpart I - Standards of Performance for Hot Mix Asphalt Facilities. Subpart I limits PM emissions from the dryer to 0.04 gr/dscf, and limits visible emissions to 20% opacity. This rule is applicable since it is a condition for obtaining the generic permit.

40 CFR Part 279
This rule requires that all waste oil used for heat recovery be "on-specification" ("on-spec") by meeting concentration limits for certain compounds, as well as a minimum flash point. Because many asphalt plants are now burning waste oil as fuel oil, these limits are included in the generic permit.

Georgia Rule 391-3-1-.02(2)(b)
Georgia Rule (b) – Visible Emissions applies to all sources that are subject to at least one other emission limitation and are not subject to any other, more stringent, opacity standard. Georgia Rule (b) limits visible emissions to 40 percent opacity.

Georgia Rule 391-3-1-.02(2)(g)
Because asphalt plants burn fuel, they are subject to Georgia Rule (g) - Sulfur Dioxide. The rule limits plants with heat input capacities under 100 MMBtu/hour to 2.5% sulfur in the fuel and it limits plants with input heat capacity of 100 MMBtu/hr or more to 3.0% sulfur. The synthetic minor limit of 1% sulfur content is stricter than either, so only the SM limit need be referenced in the permit.

Georgia Rule 391-3-1-.02(2)(k)
Georgia Rule (k) – Particulate Emission from Asphaltic Concrete Hot Mix Plants, which limits emissions of particulate matter, is an applicable rule. Most asphalt plants are subject to 40 CFR 60 Subpart I, because they were constructed after the NSPS compliance date of June 11, 1973. As has already been noted, a facility must be subject to Subpart I, in order to obtain a generic permit. Since the PM and opacity limits in Subpart I are equal to or more stringent than those in Rule (k), no requirements for Georgia Rule (k) are included in the permit.

Permit Conditions

The permit contains all conditions typical of current batch mix and drum mix asphalt plants with synthetic minor status that are subject to Subpart I. These include Conditions 1.1, 1.2, 1.3, and 1.4 that are now included in all Synthetic minor permits. Also:

Condition No. 2.1 requires that the asphalt plant comply with NSPS Subpart I.

Condition No. 2.2 limits the sulfur content of fuel to 1.5% and fuel oil usage to 800,000 gallons per any 12 consecutive month period.

Condition No. 2.3 limits the opacity from any stack, unless otherwise limited, to the Rule (b) 40% opacity limit. This limit is included in many types of permits. It is being included in this generic permit to particularly address emissions from the hot oil heater stack.

Condition No. 2.4 limits production of asphalt for the plant to 600,000 tons for drum mix plants (statewide), 475,000 tons for batch mix plants outside the 13 county Atlanta area, and 375,000 tons for batch mix plants in the 13 county Atlanta area, for any 12 consecutive month period.

Condition No. 2.5 provides waste oil specifications for fuel being fired in the dryer.

Condition No. 3.1 is a standard condition specifying the requirements for Rule (n) regarding fugitive dust.

Condition No. 4.1 is a standard condition requiring routine maintenance on air pollution control equipment.

Condition No. 4.2 contains the standard requirement that the company must keep extra bags on hand, so baghouse bags that fail can be replaced in a reasonable amount of time.

Condition No. 4.3 requires the facility to implement a Preventative Maintenance Program for the baghouses. This includes:

4.3a - requiring checking the baghouse pressure drop daily, and checking that against a range determined to indicate compliance with the NSPS particulate matter limit.

4.3b - requiring a weekly check on the baghouse mechanical operation to help assure it is functioning properly.

4.3c - requiring a weekly check on the baghouse hoppers and conveying systems for proper operation.

4.3d - requiring that the visible emissions from the lime silo be checked, when it is being filled with lime dust, to assure the proper functioning of the bin vent baghouse.

Condition No. 5.1 is a standard condition, requiring that monitoring systems be operated and kept in good repair.

Condition No. 5.2 is a standard condition for facilities with baghouses that receive combustion air, requiring that pressure drop and temperature be monitored.

Condition No. 5.3 is a standard requirement, for a baghouse receiving combustion air, for the temperature to be periodically recorded.

Condition No. 5.4 provides methods for analyzing used oil, if requested by the Division.

Condition No. 6.1 is a standard condition, providing information regarding testing requirements.

Condition No. 6.2 requires the Permittee to conduct performance testing to demonstrate compliance with particulate matter and visible emissions opacity limits, within 60 days after achieving the maximum production rate at which the source will be operating, but no later than 180 days after the initial startup. If this is a new asphalt plant, this test is required by the NSPS. If this is an existing plant, it applies in order for EPD to assure that the plant can comply with the NSPS. This condition also requires the facility to conduct additional testing at 48 month intervals.

Condition No. 6.3 specifies that if production rates increase above the rate at which the plant was originally tested, the Permittee may be required to re-test.

Condition No. 7.1 requires the facility to provide notification of the actual startup date of the equipment at this site.

Condition No. 7.2 is a standard condition, requiring that records be maintained of the startup, shutdown, or malfunction of the plant, as well as malfunctions of the control equipment and monitoring equipment.

Condition No. 7.3 contains standard synthetic minor record keeping requirements for asphalt production, fuel usage, fuel analyses, and fuel oil supplier certifications.

Condition No. 7.4 requires the facility to notify the Division within 15 days of using off-specification oil or exceeding any limits specified in Condition Nos. 2.2 or 2.4.

Condition 8.1 is a standard condition allowing the Division to re-open the permit if it is determined that additional emissions control is necessary to ensure the safety of the public.

Condition 8.2 requires the payment of annual permit fees, in accordance with the Georgia Rules for Air Quality Control and the fee manual.

Condition 8.3 requires that the facility keep specified generic permit documents at the facility.

Toxic Impact Assessment

The Georgia Air Toxic Guidelines specify that the emissions of toxic pollutants are not allowed to adversely impact the public. Specifically, the Guidelines require that the worst-case off-site concentrations do not exceed a toxicity data based long-term acceptable ambient concentration (AAC) or a short-term AAC. Therefore, prior to making a recommendation to the Director of EPD for issuance of an asphalt plant permit, a Toxic Impact Assessment (TIA) must be conducted.

The Guidelines provide a list of toxicity data sources that are to be used to develop long-term and short-term Risk Based Air Concentrations (RBACs). The highest priority source for this data is EPA's Integrated Risk Information System (IRIS); the next highest priority source is the OSHA Time Weighted Average Permissible Exposure Limit (PEL-TWA) and PEL Ceiling Limit (PEL-C).

The US EPA's Integrated Risk Information System (IRIS) provides a carcinogenicity assessment for a substance including the weight-of-evidence judgment and a quantitative risk estimate from inhalation exposure. The weight-of-evidence gives formaldehyde a B1 classification, which is a "probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals." According to IRIS, a formaldehyde concentration of 0.8 micrograms per cubic meter ($\mu g/m^3$) represents a cancer risk of one in 100,000. Therefore it must be shown that the off-site long-term concentration does not exceed 0.8 $\mu g/m^3$.

In 29 CFR 1910.1048(c)(2), OSHA provides a short-term work-place exposure limit, which is 2 parts per million (ppm). With a molecular weight of 30.03 grams/mole, this is equivalent to 2.46 milligrams per cubic meter (mg/m^3). As specified in the Guidelines, this must be modified by an uncertainty factor of 10. Therefore, the short-term limit is 246 $\mu g/m^3$.

According to Tables 11.1-9 and 11.1-10 in AP-42, which is EPA's compendium of emission factors, asphalt plants emit a number of toxic pollutants. Most of these are emitted in very small concentrations. A review of the pollutant emission rates for asphalt plants indicates that, based on emission rates of various organic pollutants and the threshold limit values for said pollutants, formaldehyde is the "worst case" pollutant in regard to toxic modeling. This means that if the worst-case off-site formaldehyde concentration passes the Toxic Guidelines (i.e., does not exceed the AAC), all other toxics will pass as well.

Using the production capacity of the asphalt plant and the AP-42 formaldehyde emission factor for that plant, the review engineer will calculate the highest predicted emission rate of formaldehyde. This rate is then modeled to determine the maximum off-site ground-level concentration of formaldehyde. The simplest way to do this is by using a conservative computer screening model. This determines the maximum concentration, based on conservative assumptions of atmospheric conditions. At this time, EPD is using EPA's SCREEN3 model. This screening model will be run by the engineer, using the proposed stack parameters (stack height & diameter, plume velocity, and plume temperature). With these inputs, the model then calculates a worst-case one-hour average concentration.

Screen3 modeling was conducted for the formaldehyde emissions from the dryer/mixer baghouse stack of a generic 500 ton per hour asphalt plant to determine if it was in compliance with the Division's Toxic Guidelines (see attached calculations). The Screen3 model inputs for the generic asphalt plant are based on parameters from completed performance tests conducted by asphalt plants. The inputs used include the stack parameters for an

average plant, with stack height of 30 feet and stack diameter of 4 feet. In order to be conservative, minimum values for the exit velocity (30 ft/sec) and exit temperature (220 ^{o}F) were used to represent the worst-case scenario. The average plant emission rates, the long-term AAC of 0.8 $\mu g/m^3$ and the short-term AAC of 246 $\mu g/m^3$, were entered into a spreadsheet to complete the evaluation. The results indicate an annual concentration of 0.105 $\mu g/m^3$ and a maximum short-term 15-minute concentration of 12.8 $\mu g/m^3$. As shown below, the maximum ground level concentrations of formaldehyde are significantly less than the AACs, on both an annual and 15-minute average basis.

AAC_{annual} = 0.8 $\mu g/m^3$ $MGLC_{annual}$ = 0.105 $\mu g/m^3$ (13.1% of AAC_{annual})

$AAC_{15\text{-}min}$ = 246 $\mu g/m^3$ $MGLC_{15\text{-}min}$ = 12.8 $\mu g/m^3$ (5.2% of $AAC_{15\text{-}min}$)

All computer models done thus far for asphalt plants have shown that off-site concentrations are well under the AACs. However, to be conservative, a model is required for each proposed facility. A copy of the modeling output should therefore be attached to this narrative.

Public Input

In accordance with the Air Branch public advisory policy, upon receipt of an application for an asphalt plant, a public advisory is issued regarding the asphalt plant application. It must allow 30 days for citizens to submit comments. If any comments related to air quality are submitted, these comments must be reviewed by EPD and a response prepared that would be incorporated into an attachment. A permit could not be issued until the public advisory period has ended and all public comments have been addressed. EPD's responses would then be found in an attachment to this generic narrative. If a hearing has been held, any comments, along with EPD's responses, would also be found in an attachment. Note: If comments that were received showed that the plant could not operate in compliance with its permit, the permit could not be issued.

In developing the Generic Permit, EPD sought input from the asphalt industry regarding the proposed limits. EPD incorporated those comments into the final generic permit.

Source Status

Each facility receiving an asphalt plant generic permit is classified as a synthetic minor (SM) source with regard to the Title V permitting rules of the Clean Air Act of 1990. Responsibility for compliance and complaint investigation is assigned to an EPD district office, based upon the county in which the facility is located.