

NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

DIVISION OF AIR QUALITY



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To: Regional Air Quality Supervisors
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Through: Keith Overcash *fo*

From: Laura S. Butler *LSB*

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Re: Procedures for Permitting and Estimating Emissions from Hot Mix Asphalt (HMA) Plants

Because of the increased scrutiny of hot mix asphalt (HMA) plants by the public and the availability of improved emission factor information, the North Carolina Division of Air Quality (NC DAQ) is revising some of the permitting procedures for these facilities. The revised procedures for permitting HMA plants are summarized below and discussed in greater detail later in this memorandum.

1. Stack Emission Factors - The most recent draft of the United States Environmental Protection Agency's (US EPA's) AP-42 Chapter 11 Section 1, Hot Mix Asphalt Plants, dated August 15, 1997 will be used to estimate stack emissions in the absence of source specific data. The appropriate fuel combustion emission factors will be used for estimating emissions from hot oil heaters and asphalt cement tank heaters if needed.
2. Silo Loading and Truck Loadout Emission Factors - Emission factors in Mr. Jay Evans' (NC DAQ) memorandum dated July 13, 1999 and that memorandum's attachment will be used to estimate emissions from silo loading and truck loadout in the absence of source specific data. Table 1 lists those emission factors.
3. Toxic Air Pollutant (TAP) Sources and Emissions - Table 2 lists sources of TAPs, pollutant types and requirements for including the sources in an air toxics evaluation.
4. Reclaimed Asphalt Pavement (RAP) Usage - RAP usage need not be prohibited based on emissions considerations since the emission factors in AP-42 represent



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plants using RAP. In the case of NSPS affected plants, RAP should be used during initial compliance testing for purposes of establishing representative operation.

5. Fuel Switching and Recycled Fuel Usage - All fuels burned at a HMA plant must be listed in the permit. Plants burning approved recycled fuel oils must maintain records of and report annually on fuels used, in accordance with permit conditions established from the Waste Oil Assessment Plan. Permits should not list supplier names but the permittee should be required to report to the regional office when changing suppliers.

Adding a previously unpermitted fuel will be evaluated like any other change for purposes of determining whether or not a modification has been made under the air toxics program. Adding an approved recycled fuel oil to a permit already containing the same grade virgin oil would not constitute a modification under air toxics but may need to be reviewed for possible increases in sulfur dioxide emissions.

6. Additional HMA Issues - Additional memoranda will be issued as needed to address stack testing requirements, specific permit conditions, etc. for these facilities.

Additional information on the revised procedures for permitting HMA plants is provided below.

1. Stack Emission Factors - The draft AP-42 section provides higher quality emission factors for some pollutants and better documents differences in some factors between plant and fuel types than the current Hot Mix Asphalt Plants section. AP-42 sections on fuel combustion (fuel oils or natural gas) provide better quality emission factors for criteria and toxic air pollutants than the "E" quality factors in the current and draft Hot Mix Asphalt Plants sections.

Communications with Mr. Ron Meyers (US EPA) indicate that the draft AP-42 section has received few comments and is unlikely to change as it is finalized over the next year. (It should be noted that DAQ has identified a few emission factors in the draft AP-42 section that were incorrectly transcribed from the background document. These factors have been corrected in DAQ's HMA emission calculation spreadsheet pursuant to with correspondence with Mr. Meyers.) The spreadsheet also incorporates fuel oil sulfur content whereas the AP-42 sections do not explicitly consider this.

2. Silo Loading and Truck Loadout Emission Factors - Mr. Jay Evans' (DAQ) memorandum dated July 13, 1999, Draft EPA Report from Emissions Testing of

Asphalt Loading Operations, addresses the EPA study of silo loading and truck loadout emissions that are not included in the current or draft AP-42 sections. Mr. Meyers indicated that he foresees no substantive change in the data from the EPA test program referenced in Mr. Evans' memorandum.

The EPA study results, as outlined in Mr. Evans' memo, separately evaluated emissions from silo loading at drum mix plants and truck loadout at both drum and batch mix plants. The study quantified criteria pollutants as well as speciated hazardous air pollutants (HAPs). Table 1 lists the emission factors from the EPA study. Separate batch mix plant factors, for particulate matter and volatile organic compounds (VOCs), are shown in parentheses. All other factors should be used for both drum and batch mix plants.

Table 1
 Silo Loading and Truck Loadout Emission Factors

Pollutant	Emission Factor (lb/ton)	
	Silo Loading	Truck Loadout
Criteria Pollutants		
Particulate Matter	1.36E-04	4.95E-05 (1.75E-4)
Volatile Organic Compounds	2.69E-03	1.34E-03 (1.65E-3)
Carbon Monoxide	2.77E-04	2.84E-04
Toxic Air Pollutants		
Benzene	1.81E-06	7.91E-07
Benzo(a)pyrene	0.00E+00	1.15E-09
Carbon disulfide	8.94E-07	2.31E-07
Formaldehyde	4.40E-05	7.35E-07
n-Hexane	6.09E-06	7.33E-07
Methyl ethyl ketone	1.81E-06	1.01E-06
Methylene chloride	1.78E-08	0.00E+00
Phenol	0.00E+00	5.22E-07
Styrene	2.32E-07	4.39E-08
Toluene	3.42E-06	1.13E-06
Xylene	1.38E-05	3.28E-06

A DAQ study that was performed due to a lack of information for these sources previously estimated truck loadout emissions. This study is discussed in Dr. Donald van der Vaart's memorandum dated March 6, 1998, Estimated Ambient Impact from Asphalt Plants. The study determined a benzene emission factor for truck loadout (3.1E-07 lb/ton) that has the same order of magnitude as the EPA result.

3. Toxic Air Pollutant Sources and Emissions - An HMA plant applicant is responsible for quantifying emission rates of all TAPs emitted from the plant in order to determine whether or not an air toxics evaluation is triggered, which TAPs would need to be modeled in the event of an evaluation or to request avoidance of air toxics. Emissions can be quantified using DAQ's spreadsheet or any other technique the applicant chooses so long as the emission factor sources above are referenced or approved emission test results are provided.

Table 2 lists sources of toxic air pollutants (TAPs), pollutant types and requirements for including the source in an air toxics evaluation.

Table 2
TAP Emission Sources at HMA Plants

Emission Source	TAP Type	Include in evaluation?
Batch Mix Plants		
Dryer	Particulate (metals), polyaromatic hydrocarbons (PAHs) and organics	Yes
Pug mill mixer	PAHs and organics	Yes
Hot mixed storage silo(s)	PAHs and organics	Yes
Truck loadout	PAHs and organics	Yes
Hot oil heater	Metals, PAHs and organics	No per 2Q .0702(a)(18)
Drum Mix Plants		
Dryer/mixer	Metals, PAHs and organics	Yes
Hot mixed storage silo(s)	PAHs and organics	Yes
Truck loadout	PAHs and organics	Yes
Hot oil heater	Metals, PAHs and organics	No per 2Q .0702(a)(18)

Emissions from the batch mix plant pug mill mixer are typically ducted through the dryer stack and are accounted for in the AP-42 factors. In the event that pug mill emissions are ducted to a separate emission point or released as fugitive emissions, the emission factors for silo loading should be used to estimate those emissions.

Plant stacks and silo vents should be modeled as point sources unless site specific information dictates otherwise. Silo vents can be partially blocked by the drag conveyor or falling asphalt and, as such, should be modeled as though they have a rain cap. Silo emissions should be based on total asphalt produced (hourly and annually) and divided between multiple silos as appropriate. That is, for a plant with three silos permitted to produce 300,000 tons per year (tpy), silo emissions would be based on 100,000 tons per silo per year or the total 300,000 tpy from the "worst case" silo.

Truck loadout and pug mills not ducted to a stack should be modeled as volume or area sources. As with emissions from multiple silos, emissions from multiple loadout stations (or multiple pug mills, if they exist) should be based on total asphalt produced.

This modeling guidance is not intended to substitute for an approved modeling protocol or more specific guidance from the Air Quality Analysis Branch.

4. Reclaimed Asphalt Pavement (RAP) Usage - AP-42 makes no distinction between emission factors for HMA plants using RAP and those not using RAP despite the fact that tests were conducted on plants using both types of raw material feed. As such, DAQ will use AP-42 factors appropriate for plant and fuel types without consideration of whether or not RAP is substituted for virgin aggregate in batch pug mills or drum dryers/mixers. Thus, permit restrictions on RAP usage need not be based on the failure of the applicant to specifically request the use of RAP in the permit application. Recycling for the purposes of reducing raw material usage is environmentally beneficial and should be encouraged wherever possible.

It should be noted that DAQ has the full authority to enforce state and federal emission standards and permit limits. In the event that complaints, regional office inspections or increased visible emissions raise any question of a source's compliance status the Division also has the authority to require testing to demonstrate compliance with those limits.

Regarding RAP crushing, HMA plant owners and operators frequently contract for RAP crushing services and may not maintain crushers at their plants. RAP crushers and associated handling equipment installed at the plant may require a permit, however. As such, the regional office and permit engineer should verify whether or not such equipment will be installed at the plant. Finally RAP is considered a nonmetallic mineral for purposes of determining the applicability of NSPS Subpart 000. Therefore RAP systems that include crushers should be evaluated for Subpart 000 applicability.

5. Recycled Fuel Oils and Fuel Switching - Don Johnson (NC DAQ) included a list of approved waste oil suppliers providing fuels considered equivalent to virgin oils with his August 27, 1999 e-mail to the Division. It should be noted that the term "waste" oil is often used interchangeably with "used" or "recycled" oil and that AP-42 provides emission factors for HMA plants firing "waste" oil. However, since DAQ considers approved, recycled oils equivalent to virgin oils (with the exception of recycled No. 2 fuel

content), the appropriate fuel oil emission factors from AP-42 should be used unless an actual "waste" oil (one not supplied by an approved supplier) is being burned.

Permits can be written to allow firing either virgin or equivalent fuel oils so long as the worst case fuels are considered. The permit must contain conditions requiring analyses and reporting of equivalent oils used at the plant. The permit should not contain supplier names but should require the source to report to the appropriate regional office if they change suppliers. This will allow verification of the status of that supplier. Again, recycling should be encouraged and plant operators frequently request the ability to burn equivalent oils in mid-season. Including these fuels at the beginning of the permit process allows plant operators to switch fuels without requiring a permit modification while ensuring that the Division receives timely information on such fuel usage.

Since TAP emission factors listed in AP-42 do not differ based on the grade of fuel oil, no net emission increase can be demonstrated based on switching oils and air toxics is not triggered. Please note that this analysis assumes that the plant capacity is not changed as a result of the fuel switch. Also note that a permit change would be required to switch from one fuel to another if the permit does not specifically allow the new fuel to be used at the plant.