Attachment

Technical Support Document for Potential to Emit Guidance Memo. Documentation of Emission Calculations.

Tim Smith, USEPA/OAQPS. April 1998

Section 1. Introduction

This document provides the background calculations for the specific values for that appear in EPA's policy guidance memo, "Potential to Emit Guidance for Specific Source Categories," released in April 1998. In the guidance memo, the EPA calculated cutoffs that States can use to establish prohibitory rule or general permit cutoffs that sources could use as enforceable limitations on their operations, thereby achieving minor source status.

This document covers calculations made for the following categories:

-- Gasoline Service Stations and Bulk Plants (Section 2)

-- Oil and Natural Gas Combustion in Industrial Boilers Having Capacity of 100 million BTU/hour or less (Section 3)

-- Cotton Gins (Section 4)

-- Coating Sources (Section 5)

-- Printing, publishing and packaging operations (Section 6)

-- Degreasers Using Volatile Organic Solvents (Section 7)

-- Hot Mix Asphalt Plants (Section 8)

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Section 2. Gasoline Service Stations and Bulk Plants.

2.1. Gasoline Service Stations

A. Pertinent Data and Calculations

The EPA agrees with findings of industry comments and the California Air Pollution Control Officers Association (CAPCOA) that the major source determination for service stations will always have volatile organic compounds (VOC) as the limiting case. (Ref: Fax with attachments from John Huber, Petroleum Marketers Association of America to Tim Smith, EPA, January 10, 1997). (Ref: Fax with attachments from Judy Yee, California Air Resources Board, February 10, 1997.) This is because each individual hazardous air pollutant (HAP) contributes less than 10% of the organic emission total, and the total across all HAP contributes less than 25%. The highest individual HAP percentage would be roughly 10% for MTBE for an area that is nonattainment for ozone and CO. Accordingly, in an ozone attainment area (or moderate ozone nonattainment area) with a 100 ton/yr VOC major source cutoff, that 100 ton/yr cutoff would be reached before any individual HAP would reach 10 ton/yr, and before any combination of HAP would reach 25 tons/yr. VOC would, of course, also be limiting for ozone nonattainment areas for which the VOC cutoff was 50, 25 or 10 tons per year because HAPs would be a proportionally smaller fraction of the major source cutoff when the major source VOC cutoff was reached.

The EPA has calculated the number of "refueling stations" at a gasoline service station that could result in emissions greater than major source amounts. The term "refueling position" is used rather than the more ambiguous terms "pump" or "nozzle." The number of "refueling positions" is the number of vehicles that could be pumping simultaneously. For example, a typical service station island with two dispensers has three nozzles on each side of both dispensers. Such a two-dispenser design would yield four "refueling positions," because a maximum of four vehicles could be refueling at any given time. The results of these calculations are presented in Table 1.

The EPA has also calculated the number of gallons of gas pumped that would correspond to the major source cutoff based upon the available emissions factors in Table 3. This value will vary depending on the VOC major source cutoff, and depending on whether vapor recovery during tank loading (Stage I vapor recovery) and vapor recovery during vehicle fueling (Stage II) is required. These values are summarized in Table 2.

Finally, to put these values in perspective, the EPA reviewed data related to throughputs at average-sized and large gasoline dispensing facilities. Data from broad surveys indicate average gasoline sales of about 65,000 to 100,000 gallons/month [780,000 to 1.2 million gallons/year] for "service stations," while "pumpers" averaged 110,000 to 145,000 gallons/month [1.3 to 1.7 million gallons/year]. (Ref: Market Facts '96. Facts, Figures and Trends.) Data for the New Jersey Turnpike Authority facilities, judged to be among the largest in the nation,

indicated average gasoline sales of 264,000 to 550,000 gallons/month [3.2 to 6.9 million gallons per year]. (Ref: December 10, 1996 letter and attachments from Edward Gross, Acting Director, New Jersey Turnpike Authority to Eric DeGesero, Associate Director, Fuel Merchants Association of New Jersey). According to the California Air Resources Board, there are only a few gasoline stations that would approach or exceed the 7 million gallon per year cutoff in the CAPCOA model rule. (Ref: Judy Yee, California Air Resources Board, personal communication with Tim Smith, EPA. February 1997). It also may be useful to note that a gasoline tank truck's capacity is about 8000 gallons, and 240,000 gallons per month would represent a station with a full tank truck unloading every day.

B. Recommended Approaches for Screening Cutoffs

For sources where gasoline dispensing operations account for more than 90% of all emissions, the EPA recommends the following guidelines for a State or local prohibitory rule or general permit:

(A) The source's total sales of gasoline in gallons/month must not exceed the following limits in any calendar month: (the cutoff level varies depending on VOC major source cutoff and on the type of vapor recovery required): (These values represent 50% of the values in table 2, and are converted to a monthly basis to make the cutoffs correspond to records already being kept).

VOC Major Source Level tons/yr)	Type of Control Required	Gallons/Month At 50% of Major Source
100	No controls	380,000
100	Stage I	630,000
100	Stage I and Stage II	2,900,000
50	No controls	190,000
50	Stage I	310,000
50	Stage I and Stage II	1,500,000
25	No controls	95,000
25	Stage I	160,000
25	Stage I and Stage II	740,000
10	No controls	38,000
10	Stage I	63,000
10	Stage II	290,000

(B) to demonstrate compliance with this limit, monthly records of throughput. [Records for many if not most should be already available due to the EPA underground storage tank inventory control requirements].

(C) A source may be considered low priority (no need for formal notification) if it contains less than or equal to the number of refueling positions identified in table 1.

2.2. Bulk Plants

A. Pertinent Data and Calculations

A "bulk plant" generally means a bulk gasoline loading facility that is smaller than a "bulk terminal." Air quality regulations define of "bulk terminals" as those with a capacity greater than 20,000 gallons per day, and define "bulk plants" as those less than or equal to 20,000 gallons per day. (See 40 CFR 60.111b). In terms of emission characteristics, there are three types of bulk plants, as follows:

(1) uncontrolled facilities,

(2) facilities with vapor balancing of storage tank and incoming tank trucks, and

(3) facilities with vapor balancing of storage tank and incoming and outgoing tank trucks.

Emission factors for each of these three types are contained below in Table 4. The EPA believes that all bulk plants in VOC nonattainment areas will have vapor balancing controls. In states with regulations that mirror the CTG, facilities less than 4000 gallons per day require vapor balancing of storage tank and incoming tank trucks, and facilities greater than 4000 gallons per day require vapor balancing of outgoing tank trucks as well.

A bulk plant (i.e., gasoline loading facility with a capacity of 20,000 gallons per day) operating 365 days per year would have a maximum possible annual throughput of 7,300,000 gallons per year. Typical bulk plants operate at less than 20,000 gallons per day for 300 days per year or fewer. Assuming the highest theoretical operation of 7.3 million gallons per year, and using the emission factors in table 4, the maximum theoretical emissions from an uncontrolled facility would be:

7,300,000 X 1/1000 thousand gallons X 2460 mg/l
X 0.0083 [conversion from mg/l to lb/1000 gallon] X 1 ton/ 2000 lb = 75 tons VOC/year

Assuming that 4000 gallons per day is the maximum throughput for a facility for which vapor balancing would not be required in a nonattainment area for outgoing trucks, then the maximum possible annual throughput for such facilities is 4000 X 365 = 1.5 million gallons. The

maximum possible emissions from such facilities, using the emission factor of 830 mg/l in table 4, are as follows:

1,500,000 X 1/1000 X 830 X 0.0083 X 1/2000 = 5.2 tons/year

Finally, assuming the maximum theoretical throughput of 7,300,00 gallons per year, and using the emission factor of 130 mg/l in table 4, are as follows:

7,300,000 X 1/1000 X 130 X 0.0083 X 1/2000 = 4 tons per year.

The results of the above three calculations illustrate that, even in a worst-possible case, no facility whose actual throughput is less than 20,000 gallon per day definition of “bulk plant” will be emitting major amounts of pollutants.

B. Recommended Approach for Screening Cutoffs

For this category, it does not appear necessary to calculate a throughput level as a “screening cutoff” because any source which meets the basic 20,000 gallons per day definition would not be a major source. The basic definition itself should serve adequately as the basis for a “limitation.”

Table 2.1. Low priority gas stations

Type of service station	Refueling positions				
	Attainment 100 tpy	Marginal or Moderate 100 tpy	Serious 50 tpy	Severe 25 tpy	Extreme 10 tpy
Uncontrolled	17	17	9	4	2
Stage I	29	29	14	7	3
Stage I & II	134	134	67	34	13

Notes:
These calculations assume:
-- the average vehicle dispenses 10 gallons in one minute time period
-- each vehicle is replaced by another vehicle at every refueling position at the the service station every 10 minutes over the entire year.
-- as a result, each refueling position pumps 10 gallons six times and hour, which is equivalent to one gallon/minute at each position

These assumptions are based upon EPA's technical judgment rather than actual data. The EPA believes they represent very conservative upper bounds. The following calculation demonstrates the conservative nature of the assumption:

> 1 gallon/minute X 60 minutes/hour X 24 hours/day X 30 days month = 43,200 gallons/month

Thus, the worst-case assumptions would result in a configuration with 10 refueling positions [5 2-sided pumps], pumping 432,000 gallons per month. This is a volume equivalent to the pumping rates at a very large station on the New Jersey turnpike. In reality, such a small station would not pump as much as a New Jersey turnpike station. The EPA believes, therefore, that this calculation suggests that gasoline stations having no more refueling positions than indicated in the above table would be unlikely to emit major source amounts, even if for some a physical possibility may exist. Accordingly, the EPA believes that State prohibitory rules and general permits may treat such stations as low priority sources: that is, the sources would be covered by the prohibitory rule or general permit even if no formal notification was required.

Table 2.2. Gallons/year at major source threshold using EPA emission factors

Type of service station	Gallons/year of gasoline at the major source threshold				
	Attainment 100 tpy	Marginal or Moderate 100 tpy	Serious 50 tpy	Severe 25 tpy	Extreme 10 tpy
Uncontrolled	9.1 million	9.1 million	4.5 million	2.3 million	0.91 million
Stage I	15 million	15 million	7.5 million	3.8 million	1.5 million
Stage II	71 million	71 million	35 million	18 million	7.1 million

Table 2.3. Service Station VOC Emissions from Gasoline Storage and Handling Operations
[Milligrams of VOC per Liter of Gasoline Transferred (mg/l)]

Source	Uncontrolled Emissions[1]	STAGE I: Vapor Balancing of Tank Truck and UST		STAGE I & I: Vapor Balancing of Tank Truck, UST, & Vehicle Refueling	
		% Red. Applied	Emissions	% Red. Applied	Emissions
UNDERGROUND STORAGE TANKS (UST) LOSSES:					
Truck Unloading/ UST Filling Loss	1100[2]	95%[3]	55	95%[3]	55
Breathing/Emptying	120	0%	120	86%[4]	17
VEHICLE REFUELING LOSSES:					
Displacement	1340	0%	1340	86%[4]	188
Spillage	80	0%	80	0%	80
TOTAL:	2640	40%	1600	87%	340

[1] US EPA, "Gasoline Distribution Industry (Stage I) -Background Information for Proposed Standards", EPA 453/R-94-002a, January 1994, page 3-35 unless otherwise noted.

[2] Assuming 50% splash loading (1556 mg/l) and 50% submerged fill (1556 mg/l x 41%)

[3] US EPA, "Technical Guidance - Stage I Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities, Volume I Chapters", EPA 450/3-91-022a, November 1991, page 4-50. pg 4-35.

[4] US EPA, "Technical Guidance - Stage I Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities, Volume I Chapters", EPA 450/3-91-022a, November 1991, page 4-50.

Table 2.4. Bulk Plant VOC Emissions from Gasoline Storage and Handling Operations
[Milligrams of VOC per Liter of Gasoline Transferred (mg/l)]

Source	Uncontrolled Emissions[5]	Vapor Balancing of Storage Tank and Incoming Tank Truck		Vapor Balancing of Storage Tank and Incoming and Outgoing Tank Truck	
		% Red. Applied	Emissions	% Red. Applied	Emissions
STORAGE TANKS:					
Emptying losses	432	95%[6]	22	95%[2]	22
Breathing losses	203		10		10
Filling losses	1081		54		54
TRUCK LOADING :					
Submerged fill	738	0%	738	95%[2]	37
EQUIPMENT LEAKS[7]:					
Pumps:	1.2	0%	1.2	0%	1.2
Valves:	2.6	0%	2.6	0%	2.6
TOTAL:	2,460	66%	830	95%	130

[5] US EPA, "Gasoline Distrbution Industry (Stage I) -Background Information for Proposed Standards", EPA 453/R-94-002a, January 1994, page 3-33 unless otherwise noted.

[6]Reference 8, pg 4-34.

[7] Calculated using footnote a from reference 1 above, plus new emission factors in US EPA, "Gasoline Distribution Industry (Stage I) -Background Information for Promulgated Standards", EPA 453/R-94-002b, November 1994, page C-9. [5.3x10-4 lb./hr x 300d/yr x 24hr/d x 4 pumps x 0.454 kg/lb x 10*6 mg/kg / (5,000 gal/day x 300d/yr x 3.785 l/gal)] and same calculation for valves except 9.2*10-5 lbs/hr and 50 valves.

Section 3. Oil and Natural Gas Combustion in Industrial Boilers Having Capacity of 100 million BTU/hour or less

The purpose of this section is to document the calculations leading to guidance for establishing general limitations for small industrial and commercial boilers combusting natural gas and/or fuel oil. This section does not address emissions from boilers with capacity greater than 100 million BTU/hour, nor does it address emissions from solid fuels such as coal and wood, or liquid petroleum gas (LPG). In addition, this section does not address emissions from other types of combustion devices such as gas turbines, pumps, compressor or internal combustion engines. The calculations contained in this section are support for EPA guidance aimed at creating streamlined approaches for limiting the potential to emit for low-emitting small businesses.

3.1. Pertinent Data and Calculations

A. Emission Factors for Natural Gas combustion.

For natural gas combustion, NO_x is the primary pollutant of concern for major source determination. The emission factor for industrial boilers that are 100 million BTU/hour or less is 140 lb of NO_X per million cubic foot of natural gas combusted, while the emission factor for "large industrial and utility boilers" greater than 100 million BTU/hour is 550 lb of NO_X per million cubic foot. (Ref: AP-42, Section 1.4). For "small industrial boilers" (10-100 MMBTU/hr) the emission factors listed in AP-42, table 1.4-1 are as follows:

Pollutant	**Emission factor (lb/million cubic feet)**
SO_2	0.6
NO_X (uncontrolled)	140
CO	35
PM	14 [filterable + condensible]
VOC	< 5.8 [total organics = 5.8]

B. Fuel Oil Emission Factors

For fuel oil combustion, sulfur dioxide is usually the pollutant most likely to trigger major source status, but NO_X can be important in some cases, particularly where stringent fuel sulfur regulations are in place. Emissions factors for SO_2 and NO_X tend to be greater for residual oil than for distillate oil.

The emission factors for distillate oil[8] are as follows:

[8]Two major categories of fuel oil are burned by combustion sources: distillate and residual oils. These oils are further distinguished by grade numbers, with Nos. 1 and 2 being distillate oils;

Pollutant	Emission factor (lb/1000 gallons)
SO_2	142 times S [where S= weight percent of suflur in fuel. For example, for 0.5% sulfur, S=0.5 and the emission factor is 71]
NOX (uncontrolled)	20
CO	5
PM	2 [filterable]
VOC	0.2 [non-methane organics]

For residual oil, the emission factors are:

Pollutant	Emission factor (lb/1000 gallons)
SO2	157 times S
NO_X (uncontrolled)	55
CO	5
PM	9.19(S) + 3.22 [filterable]
VOC	0.28 [non-methane organics]

OAQPS emission factor staff have indicated that 4% sulfur for residual oil, and 1 % sulfur for distillate oil, represent the highest values from the top of the range of data on fuel sulfur. These would equate to emission factors of (157)(4), or 628 lb/1000 gallon for sulfur dioxide for residual oil, and (142)(1), or 142 lb/1000 gallon for distillate oil.

Based upon reviewing the above emission factors, and based upon review of calculations for State programs outlined below, the EPA has concluded that for the major source determination for natural gas, distillate and residual oil combustion in industrial boilers, sulfur dioxide and nitrogen dioxide are the pollutants that would trigger the major source status first. Any fuel use that would result in minor emissions for these two pollutants will result in minor

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Nos. 5 and 6 being residual oils; and No. 4 being either distillate oil or a mixture of distillate and residual oils. No. 6 fuel oil is sometimes referred to as Bunker C. Distillate oils are more volatile and less viscous than residual oils. They have negligible nitrogen and ash contents and usually contain less than 0.3 percent sulfur (by weight). Distillate oils are used mainly in domestic and small commercial applications, and include kerosene and diesel fuels. Being more viscous and less volatile than distillate oils, the heavier residual oils (Nos. 5 and 6) may need to be heated for ease of handling and to facilitate proper atomization. Because residual oils are produced from the residue remaining after the lighter fractions (gasoline, kerosene, and distillate oils) have been removed from the crude oil, they contain significant quantities of ash, nitrogen, and sulfur.

amounts for all other pollutants as well. Accordingly, the discussion that follows contains calculations for these two pollutants only.

C. Combined emission factors for facilities capable of burning both natural gas and fuel oil

Many facilities have the capability of burning both fuel oil and natural gas. As discussed above, in determining whether a given amount of fuel burned will exceed the major source threshold, it is necessary to address NO_X and SO_2 emissions.

For facilities with the capability of burning natural gas and distillate oil, for a given amount of fuel burned , emissions of NO_X and SO_2 are the following:

NO_X:

[----- 1000 gallons distillate oil X 20 lb/1000 gallons + ----- million cubic feet natural gas X 140 lb/million cubic foot] X 1 ton/2000 lb

SO_2 :

[----- 1000 gallons distillate oil X 142S lb/1000 gallons + ----- million cubic feet natural gas X 0.6 lb/million cubic foot] X 1 ton/2000 lb

For facilities with the capability of burning natural gas and bot h distillate and residual oil, for a given amount of fuel burned , emissions of NO_X and SO_2 are the following:

NO_X:

[----- 1000 gallons distillate oil X 20 lb/1000 gallons + ---- 1000 gallons residual oil X 55 lb/1000 gallons + ----- million cubic feet natural gas X 140 lb/million cubic foot] X 1 ton/2000 lb

SO_2 :

[----- 1000 gallons distillate oil X 142S lb/1000 gallons + ----- 1000 gallons residual oil X 157S lb/1000 gallons + ----- million cubic feet natural gas X 0.6 lb/million cubic foot] X 1 ton/2000 lb

Because SO2 emissions tend to be greater for residual oil, and NOX tends to be greater for natural gas, it is possible to devise prohibitory rule/general permit type limitations that allow significant amounts of both natural gas and fuel oil to be combusted.

3.2. Review of State and Local Approaches to Addressing Oil and Natural Gas Combustion in Industrial Boilers

In structuring guidance for use in general permits and prohibitory rules, it is useful to review the approaches State and local agencies have already taken. All use very similar calculations, but no two prohibitory rules are structured the same, and all address slightly different fuel usage scenarios.

Georgia. The Georgia "permit-by-rule"system addresses two scenarios for combustion of natural gas and fuel oil (a) facilities with capability of burning distillate oil and natural gas or (b) facilities with capability of burning residual oil and natural gas. The rule only applies to boilers with capacity less than or equal to 100 million BTU/hour. As indicated in documentation provided by the Georgia Air Protection Branch, values are calculated based upon 80% of the major source threshold. The residual oil calculations assume 2.5% sulfur. The calculations address 100 ton and 50 ton NO_X areas, but do not address 10 and 25 ton areas because such areas do not exist in Georgia. Cutoffs in the rule, which sources may qualify for by sending in a written certification, are as follows:

Distillate and Natural Gas:

100 ton NO_X areas:	900 million cubic feet natural gas 1.6 million gallons distillate oil
50 ton NO_X areas:	450 million cubic feet natural gas 800,000 gallons distillate oil

Residual Oil and Natural Gas:

100 ton NO_X areas:	1000 million cubic feet natural gas 400,000 million gallons residual oil
50 ton NO_X areas:	400 million cubic feet natural gas 400,000 gallons residual oil

New York. New York's regulation 201.7.3 is a system for "emissions capping by rule" which is designed to provide sources with a streamlined approach to limiting their emissions to 50% of the major source threshold. The New York "capping" approach provides specific values for use by facilities burning (a) distillate oil exclusively (b) residual oil exclusively, and (c) natural gas exclusively. In addition, there is a paragraph for "dual-fueled units" allowing sources to document that total use of the "dual fuels" would not lead to annual emission greater than 50% of the major source threshold for every twelve month period. The New York program differs from Georgia in that no attempt was made to provide specific cutoffs that could be used for dual-fuel situations. Another difference to note is that the New York program does not appear to disallow utility-sized boilers from being covered, and consequently uses larger emission factors for NO_X for natural gas (550 lb/million cubic foot rather than 140 lb/million cubic foot). In New York, sulfur in

fuel limits exist for both distillate oil (weight percent 0.2, 0.37, 1.0, 1.1 and 1.5, depending on the location within the State) and residual oil (weight percent 0.3, 0.37, 1, 1.1 and 1.5, depending on the location). In evaluating NO_X, it was necessary for the State to make calculations for both severe ozone nonattainment areas (where the 50% cap equates to NO_X emissions of 12.5 tons/year) and attainment and "marginal" areas (where the 50% cap equates to 50 tons/year NO_X). Because the sulfur weight percentages vary among the various "severe" areas, it was necessary for the residual oil to perform calculations for each area to ascertain whether NO_X or SO_2 was the limiting case. The following is a summary of the cutoffs in the New York program, and the basis for those cutoffs:

Fuel	**Cutoff**	**Basis**
Distillate	1,250,000 gal/yr	12.5 tons of NO_X. Emission factor: 20 lb/1000 gal
	704,000	50 tons SO_2 Weight limit: 1.0 %
Distillate (cont)	640,000	50 tons SO_2 Weight limit: 1.1 %
	469,000	50 tons SO_2 Weight limit: 1.5%
Residual	333,000 gal/yr	12.5 tons of NO_X. Emission factor: 75 lb/1000 gal
	579,000	50 tons SO_2 Weight limit: 1.1 %
	424,000	50 tons SO_2 Weight limit: 1.5 %
Natural Gas	45 million cubic ft	12.5 tons of NO_X Emission factor: 550 lb/million cu ft
	181	50 tons of NO_X Emission factor: 550 lb/million cu ft

California. The CAPCOA model prohibitory rule includes generally applicable "de minimis" values for natural gas combustion (71,400,000 cubic feet) and distillate oil

(500,000 gallons). Sources may take advantage of these de minimis values if either distillate oil or natural gas combustion comprises 90% of that stationary source's emissions. These values were calculated based upon 5 tons per year NO_X. A substantial fraction of the industrial boilers taking advantage of the CAPCOA model rule in any District where it was adopted would probably take advantage of the generally applicable provisions requiring monthly fuel usage and content records sufficient to show that for all 12-month periods, emissions are less than 50% of the major source threshold.

Wisconsin. The Wisconsin program does not contain a prohibitory rule or general permit approach for boilers, but it does contain exemptions based upon capacity cutoffs. EPA believes these cutoffs are intended to identify size cutoffs for boilers that could operate continously at the maximum capacity and not emit major amounts. In Wisconsin regulation 407.03, boilers are exempted from consideration if they burn the following fuels and have a combined total capacity (sum of all boilers present) less than the indicated amount:

Fuel	**Cutoff**
Residual oil	5 million BTU/hour
Distillate	10 million BTU/hour
Natural gas	25 million BTU/hour

Other agencies. Doubtless, there are other prohibitory rules, general permits, etc., that exist that have made similar calculations. For example, Knox County, Tennessee appears to have adopted an approach very similar to the Georgia permit-by-rule. The above discussion is not intended to be exhaustive. Rather, it is intended to illustrate the various approaches that have been used.

3.3. Recommended Approach for Screening Cutoffs

A. Natural Minor Cutoffs

The exemption levels (5 MMBTU per hour for residual oil, 10 MMBTU/hour for distillate, and 25 MMBTU/hour for natural gas) used by the State of Wisconsin appear to be useful values to use to identify natural minors. These would appear to be reasonable values for wider application, except in extreme ozone nonattainment areas. For extreme ozone nonattainment areas, the 25 million BTU/hour cutoff for natural gas should be replaced by a value of 10 million BTU/hour.

The following calculations document that total boiler capacities less than the cutoffs could not result in major emissions. (Reference for all emission factors: AP-42, sections 1.3 and 1.4). (*Please note: these values are appropriate only for boilers less than 100 MMBTU/hr, and do not apply to other types of combustion devices such as gas turbines and engines).* The value of 5 million BTU/hour for residual oil, even assuming a conservative worst-case of 4% sulfur, yields an annual sulfur dioxide total for a continuously operating boiler of less than 100 tons/year, calculated as follows:

157S = (157)(4) = 628 lb/1000 gallon
Converting to lb/million BTU ----> (628 lb/1000 gallon) / 150 MMBTU/1000 gallon
= 4.2 lb/million BTU
4.2 lb/million BTU X 5 million BTU/hr X 8760 hours/yr X 1 ton/2000 lb = 92 tons/yr

Other criteria pollutants, including NO_X, would be emitted in lesser quantities. A residual oil capacity of 5 million BTU/hour would yield the following NO_X emission rate if continously operated:

Emission factor = 55 lb/1000 gallon
Converting to lb/million BTU -----> 55/150 = 0.37 lb/million BTU
0.37 lb/million BTU X 5 million BTU/hr X 8760/2000 = 8 tons/year

For distillate oil, using 1% sulfur, similar calculations can be used to document that a capacity of 10 million BTU/hour would result in non-major amounts:

142S = 142 (1) 142 lb/1000 gallon
Converting to lb/million BTU --> (142 lb/1000 gallon) / 140 MMBTU/1000 gallon = 1.01 lb/million BTU
1.01 lb/million BTU X 10 million BTU/hr X 8760 /2000 = 44 tons/year

Other pollutants would be emitted at lesser quantities than 44 tons/year. NO_X emissions would be as follows:

Emission factor = 20 lb/1000 gallon
Converting to lb/million BTU ----> 20/140 = 0.14 lb/million BTU
0.14 X 10 X 8760/2000 = 6.2 tons/year

For natural gas-firing , where NO_X is the pollutant with greatest emissions per unit fuel burned, the following demonstrates that a combined capacity of 25 lb/MMBTU yields non-major emissions in all except extreme ozone nonattainment areas:

Emission factor = 140 lb/million cubic foot
Converting to lb/million BTU ---> 140/1000 = 0.14 lb/million BTU
0.14 X 25 X 8760/2000 = 15 tons per year

B. Guidance for Prohibitory Rules. Emissions < 50% Approach.

It would also be relatively straightforward to establish an approach in a prohibitory rule under which a source would commit to demonstrating that actual fuel use resulted in emissions less than 50% of the major source threshold. The source would merely need to plug the actual fuel use values into the blanks in the equations in section I.C. above. The equations could be listed in the rule, and sources could be required to keep records of fuel use necessary to plug into the equations.

C. Guidance for Prohibitory Rule Cutoffs. Simplified screening cutoffs.

To make it even easier on source owners, prohibitory rules could include a screening approach in which the rule would include fuel usage caps. Rather than requiring sources to calculate emissions, sources would merely be required to demonstrate that fuel usage is below the cap. This is basically the approach used in the New York and Georgia rules. As illustrated by these two rules, there are various forms these caps could take. In the New York rule, the cap addresses boilers which burn natural gas exclusively, residual oil exclusively, or distillate oil exclusively. For sources capable of burning more than one fuel, the system reverts to demonstrating that emissions are less than 50 percent of the threshold. In the Georgia rule, the cap addresses combined use of oil and natural gas, because it was judged that many facilities opting into this cap would probably have dual fuel capbility.

In order to calculate the screening fuel usage caps, the following questions must be answered:

(1) what fraction of the major source cutoff should serve as the basis for the calculation?

(2) should the cap approach include utility and large industrial boilers (for which the calculations must take into account larger emission factors for NO_X?

(3) what combination of fuels should be addressed?

(4) in designing a cap for a specific jurisdication for a given fuel combination:

-- what is the major source cutoff for NO_X?
-- what is the fuel sulfur limit?

The EPA believes that this guidance is intended primarily for low-emitting small business emitting well under the major source threshold. Accordingly, the guidance does not address large industrial and utility boilers greater than 100 MMBTU/hr in the guidance.

It appears that many agencies have used the 50% level as the demarcation for identifying the low-emitting small bsinesses for whom this guidance is primarily targeted. The following cutoffs represent “tier 1" fuel use values that would ensure that emissions are less than 50% of the major source threshold, and they are based upon fuel sulfur weight percentages of 1% for distillate, and 4% for residual oil. Separate values are calculated for each discrete possible fuel combination. Values listed in *italics* are based upon SO2 as the limiting pollutant, and hence the values could increase if a State or local sulfur-in-fuel limitation is taken into account.

It should be noted that equivalent numbers can be calculated for addressing dual-fuel capabilities, and that for any given tons/yr amount, there is no unique “correct” answer. For example, for the “natural gas and distillate oil” scenario listed below for 100 tpy areas, the values listed are 320 million cubic feet and 260,000 gallons. One could increase the natural gas value, while decreasing the value for oil. So long as the fuel usage caps, when plugged into the equations in Section I.C. above, yield values less than 50% of the major source cutoff, that would be an acceptable set of values to use.

Fuel Capability	**Major Source Cutoff for NO_X**	**12-month Throughput Limit**
Natural Gas Only	100 tpy	710 million cubic feet
	50 tpy	360 million cubic feet
	25 tpy	180 million cubic feet
	10 tpy	71 million cubic feet
Distillate only	100 tpy	*700,000 gallons*
	50 tpy	*700,000 gallons*
	25 tpy	*700,000 gallons*
	10 tpy	500,000 gallons
Residual only	100 tpy	*160,000 gallons*
	50 tpy	*160,000 gallons*
	25 tpy	*160,000 gallons*
	10 tpy	*160,000 gallons*
Natural Gas or Distillate Oil	100 tpy	630 million cubic feet AND 600,000 gallons distillate
	50 tpy	320 million cubic feet and 260,000 gallons distillate
	25 tpy	160 million cubic feet and 130,000 gallons distillate

	10 tpy	65 million cubic feet and 52,000 gallons distillate
Natural Gas or Residual	100 tpy	650 million cubic feet and *160,000* gallons residual
	50 typ	300 million cubic feet and *160,000* gallons residual
	25 tpy	150 million cubic feet and *160,000 gallons* residual
	10 tpy	51 million cubic feet and *51,000 gallons* residual
Natural gas, residual and distillate	[For this situation, the worst-case would Be 100% use of residual oil. So EPA suggests assigning the same values as the "natural gas or residual" scenario, as "total oil burned" caps]	

3.4. Hazardous Air Pollutants

Hazardous air pollutants do not appear to be at issue relative to the major source cutoff for oil or natural gas-fired industrial boilers. The major source threshold for nitrogen oxides and sulfur dioxide will be reached at a fuel usage amount much less than that which would trigger the major source threshold for any individual HAP or for total HAPs.

Section 4. Cotton Gins

4.1 Pertinent Data and Calculations

AP-42 emission factors for PM-10 were revised during 1996. (Reference: AP-42 Section 9.7. Cotton Ginning. Revision July 1996). Two cotton gin configurations are listed in AP-42, with different total emssion factors. Configuration “No. 1" is for cotton gins with all exhaust streams controlled with high-efficiency cyclones. The “total No. 1" emission factor is 0.82 lbs PM-10 per bale. Configuration “No. 2" is for cotton gins with screened drums or cages controlling the lint cleaner and battery condenser exhausts, with cyclones on the remaining exhaust streams. The total PM-10 emission factor for the “total no. 2" configuration is 1.2 pounds per bale.

Another source of information on PM-10 emission factors was developed by the San Joaquin Valley Unified Air Pollution Control District and the California Cotton Ginners Association (CCGA). The San Joaquin Valley District and the CCGA maintain a complilation of PM and PM10 source tests, referred to as the Cotton Gin Emission Factor Handbook. The largest emission factor suggested based upon the California emission factor handbook is for certain sources controlled by older cylones, and for “configuration” two described above. For these cotton gins, the Handbook recommends, and the San Joaquin Air Pollution Control District has accepted, an emission factor of 2.45 lb/bale (PM-10). This 2.45 lb/bale (PM-10) figure was used for purposes of calculating emission reduction credits.

4.2 Recommended Approach for Screening Cutoffs

The EPA believes that the 2.45 lb/bale value represents the most conservative value that has been used (worst than the typical “worst-case”) for the gin configurations listed above. Note that this value is about three times the AP-42 emission factor. Using this value, and based upon 90% of the major source threshold, the EPA calculates the following guidelines for prohibitory rules:

200,000 pounds PM10 X 0.90 = N bales per year X 2.5 pounds per bale

N = 72,000 bales.

Similar calculations for a 70 ton “serious” PM-10 nonattainment area yield a guideline of 50,000 bales for those areas. [The EPA believes that the only serious PM10 areas containing cotton gins are in California and Arizona.]

For cotton gins having cyclones on all exhausts (“configuration 1"), the EPA, based upon discussions with the San Joaquin Air Pollution Control District and reviewing the California guidelines, a very conservative upper-bound for these gins is 2 pounds per bale. This value is very conservative (the AP-42 average value is 0.82 pounds per bale), but takes into account tests in

California for certain older 2D-2D designs. Using this 2 pound per bale figure, the EPA calculates the following guidelines:

180,000 pounds = N bales per year X 2 pound/bale
N = 90,000 bales

For 70 ton/year serious PM-10 areas, this value becomes 0.7 times 90,000, or 63,000 bales.

The EPA notes that the practical effect of the guideline is not terribly sensitive to the precise level selected. The great majority of existing cotton gins produce 40,000 bales or fewer. Thus, for any prohibitory value selected in the 50,000 to 100,000 bale range, almost all cotton gins would have the opportunity to become subject to the prohibitory rule.

Finally, the EPA notes that, consistent with current EPA regulation and policy, the above calculations do not include fugitive emissions. Were EPA regulation or policy to change to include such fugitives, these values may need to be re-calculated.

4.3 Hazardous air pollutants.

The EPA believes that hazardous air pollutants are not at issue for cotton gins. The only pollutant emitted in any appreciable quantity is PM-10. Arsenic is no longer used in the industry, and the EPA has concluded that there is not toxic component in the PM-10 that would approach the HAP threshold..

Section 5. Surface Coating Sources

5.1 Pertinent Data and Calculations

Emission calculations for these sources are somewhat more straightforward than other types of emitting sources. For purposes of major source applicability, the amount of VOC or HAP solvents used in coating sources can be assumed to be emitted on-site. The VOC content of coatings for many types of source categories, especially in ozone nonattainment areas, will be subject to RACT limits. Many of the individual organic solvents are also on the HAP list, and so it is necessary to consider both VOC and HAP in identifying whether a given plantsite is a major source.

For the wood furniture NESHAP, the EPA determined that 3000 gallons per year was a conservative estimate of the coatings usage that could trigger the 10 ton/year major source threshold. This calculation was based on 9 tons/yr [90% of the major source threshold] and assumed a worst case HAP content of 6 lb/gallon for any individual HAP constituent.

For coatings, if the same 6 lb/gallon assumption is used, EPA has concluded that HAPs are the limiting case for computing a screening value. This is clearly the case where the VOC major source threshold is 25 tons/yr and greater. (For example, at 3000 gallons per 12-month peirod, 25 tons (50,000 pounds), would require nearly 17 pounds VOC per gallon to reach the major source threshold, a level that is probably not physically possible). The only possible exception where VOC might be limiting is for extreme ozone nonattainment areas, where it may be possible in some very limited cases for coatings to exceed 6 pounds of VOC per gallon.

5.2 Recommended Approach for Screening Cutoffs

For sources where VOC in coatings, dilution solvent and cleaning solvent acount for more than 90% of all emissions, multi-tier approach

Tier 1: Screening approach. Usage records only.

-- Sources that commit to using less than 3000 gallons per each 12-month period are presumed to be nonmajor sources regardless of material content. 3000 gallons includes coating, dilution solvent and cleaning solvent. Records must be kept demonstrating usage less than this value.

Tier 2: Demonstrate that emissions remain below 50% of all applicable thresholds (without add-on controls).

Prohibitory rules can readily establish a second tier of coating sources using amounts greater than the 3000 gallons screening cutoff, but agree to a limitation of less than 50% of the

major source threshold, and agree to keeping CONTENT and USAGE records showing < 50 % of all applicable thresholds.. [Note that even under Tier 2, add-on controls are not considered]. An example worksheet for providing this documentation is included in "Guidance for State Rules for Optional Federally-Enforceable Emissions Limits Based on Volatile Organic Compound Use," memo from D. Kent Berry, OAQPS, to EPA Regional Offices, October 15, 1993. [The EPA is considering incorporating this worksheet, or a similar one, into user-friendly computer software that could prompt the source owner with readily-answerable questions that could facility compliance with the limit].

5.3 Considerations for Auto Refinishing Shops

The EPA believes that for one important surface coating category, automobile body and repainting facilities, that many if not most of the sources in the source category have a very low likekihood of emitting major amounts,

A. Background Information on the Industry

There are about 50,000 auto body shops in the United States. (Ref: Personal communication with Mark Morris, EPA/OAQPS, 1997). The average number of jobs performed by these facilities is 12 jobs per week, with the following distribution: (Ref: Body Shop Business . 1993 Annual Industry Report.):

Table 5.1 NUMBER OF JOBS PERFORMED PER WEEK:

JOB RANGE	**ALL SHOPS**	< $100,000	$100K - 150K	$ 150K - 250K	$250K - 350 K	350K - 750K	$750K +
1 - 25 jobs	89.8%	100%	100%	95.7%	93.9%	84.6%	62.2%
26- 50 jobs	8.7%				6.1%	13.9%	35.6%
51- 75 jobs	1.2%			4.3%		1.5%	
76 - 100 jobs	0.3%						2.2%
TOTAL	100%	100%	100%	100%	100%	100%	100%
Average	11.6 jobs	3.7 jobs	7.3 jobs	9.7 jobs	10.2 jobs	15.1 jobs	25.4 jobs

EPA believes that for purposes of assessing the "potential" of an automobile re-painting facility, it is necessary to address as separate cases two general types of facilities. The first type includes auto body shop facilities that perform collision repair as their primary business, and must get an exact color match with the original color. The second type of facility, which includes facilities such as Earl Scheib, are primarily involved in repainting entire vehicles, but do not need

an exact color match with the existing color. It appears that the amount of paint used per job for the two types of facilities may not differ greatly. For facilities which tend to paint entire cars, primers do not tend to be used, fewer coats are applied, and followup for color matching is not required. The time to complete a job, however, is greater on average for an auto body shop because additional steps are needed to repair the vehicle before repainting.

B. Considerations for Auto Body/Repair Shops

The EPA estimates, for auto body shops, that a conservative value unlikely to be exceeded, is 9 pounds of VOCs are emitted for an average job. (Ref: calculations by Mark Morris, EPA/OAQPS. December 1997. This estimation was made by reviewing information on paint coverage, transfer efficiency, and VOC content; additional, the calculation assumes that primer is used plus several additional coats). For screening purposes, the EPA assumed that 100% of the VOCs could be one of the HAPs, but that only 50% of the VOC total would be contributed from any individual HAP. Note that this estimate is for facilities involved in automobile repair, and is not appropriate for facilities capable of painting much larger surfaces such as buses or earth-moving equipment. In addressing "extreme" ozone nonattainment areas, the EPA considered the South Coast's regulation of 3.5 lb/gallon in the calculations. For facilities meeting this regulation, the EPA estimates that no more than 4.8 pounds of VOCs could be emitted per average job.

Using the these conservative assumptions, the EPA calculated the number of jobs that would equate to the major source threshold as follows:

Table 5.2

Major source threshold	**Emission Factor**	**# of Jobs/Week**
100 tons VOC	9 lb/job	427
50 tons VOC	9 lb/job	214
25 tons VOC	9 lb/job	107
10 tons VOC	4.8 lb/job	80
25 tons total HAP	9 lb/job	107
10 tons single HAP	4.5 lb/job	85

Example calculation:

100 tons VOC X 2000 lb/ton = 9 lb/job X ----- average jobs/week X 52 weeks/yr
------ = 100 X 2000 / (9X 52)

= 427 jobs/week

The EPA believes that this table indicates that a facility with a potential to conduct 75 or fewer jobs per week can be considered as a minor source.

Actual operations at almost all auto body shops are well below this level. The following table, reproduced from the 1993 Body Shop Business report, displays the types of operations typically present at an auto body shop.

Table 5.3 AVERAGE NUMBER OF BAYS DEVOTED TO SPECIFIC DUTIES

DUTY	**ALL SHOPS**	< $100,000	$100K - 150K	$ 150K - 250K	$250K - 350 K	350K - 750K	$750K +
Body Work	4.5	1.7	2.9	3.6	4.6	5.3	9.8
Painting	*2.0*	*0.9*	*1.5*	*1.6*	*1.8*	*2.6*	*4.2*
Detailing	0.5	0.2	0.2	0.4	0.6	0.6	1.3
Prep Work	0.8	0.2	0.5	0.6	0.8	0.8	2.1
Mechanical Work	0.6	0.2	0.2	0.7	1.2	0.5	0.8
Combination of Duties	1.4	1.1	1.6	2.2	1.6	1.1	1.2
AVG TOTAL BAYS	**9.8**	**4.5**	**6.8**	**9.1**	**10.7**	**11.0**	**19.4**

The EPA believes that the data in table 5.1 and 5.3, when viewed together, suggests that a reasonable probability exists that the number of jobs performed per week by a single painting area spray booth or spray area at an auto body/repair shop would not exceed 25 jobs per painting station per week. Table 5.1 shows that only 1.5% of shops perform more than 50 jobs per week. Table 5.3 strongly suggests that those 1.5% of the total are performed at shops with several spray paint booths-- the average number of “bays devoted to painting”, for the far right-hand column (“>$750,000 in business) is more than 4.

Using the 25 jobs/week/spray booth estimate, and the estimates of jobs/week that would equate to major source amounts as indicated in table 5.2, the EPA calculates that no collision damage repair facility with 2 or fewer paint booths, or is otherwise capable of painting 2 or fewer automobiles at any one time, has any reasonable likelikhood of emitting major amounts, even if for some facilities a physical capability may exist. Accordingly, the EPA believes that such sources could be treated as low priority sources by State and local agency general permits and prohibitory rules.

The only type of shop where this estimate could have a reasonable probability of underestimating the number of jobs per week would be those facilities for which collision repair, and the associated extra preparation steps, are not present, and the facility is primarily involved in repainting entire vehicles. For example, Earl Scheib facilities contain one spray booth, and are designed for a capacity of 40-50 cars per week, although actual operations are about half of this value. (Ref: personal communication with Jeffrey Pearl, Earl Scheib. December 1997). The VOC and HAP contents of paint for such facilities appear to be less than the amount assumed for table 5.2 above. The EPA recommends a more conservative approach for these repainting facilities. That is, repainting facilities having only 1 paint booth could be treated as sources not requiring notifications.

Section 6. Printing, Publishing and Packaging Operations

6.1 Pertinent Data and Calculations

The printing, publishing and packaging industry is comprised of a number of production process categories, including sheetfeed offset lithography, web offset lithography (heatset and nonheatset), screen printing, flexography, and rotogravure printing. Process descriptions of these various types of printers can be found in Profile of the Printing Industry, EPA/310-R-95-014.

The EPA agrees with the printing industry that the following equations represent a conservative approach to emission calculations for the printing, publishing and packaging industry:

VOC Calculations For Nonheatset Web And Sheetfed Offset Lithographic Printing

VOC Emissions = Amt of Ink* (lbs) x VOC Content (weight %) x 0.05** +
Amt of Hand Cleaning Solvent (gal) x VOC Content (lbs/gal) x 0.50***+
Amt of Automatic Blanket Wash (gal) x VOC Content (lbs/gal) +
Amt of Fountain Solution Concentrate (gal) x VOC Content (lbs/gal) +
Amt of Fountain Solution Additive (gal) X VOC Content (lbs/gal)+
Amt of Adhesive (lb) X VOC content (wt %)**** +
Amt of Coating (lb) X VOC content (wt %) ****

* Include any conventional varnish used in the "amt of ink" total.

** The 0.05 factor reflects 95% ink oil retention as documented in the draft CTG document Control of Volatile Organic Compound Emissions from Offset Lithographic Printing, EPA-453/D-95-001, page 5-2.

*** Use the 0.50 multiplier only if the VOC Composite Vapor Pressure Is Less Than 10 mm Hg at 20°C, and only if the source owner is required to store shop towels in closed containers.

**** If adhesives and coatings are purchased by the gallon, then use:
Amt (gal) X VOC content (lb/gal)

<u>HAP Calculations For Nonheatset Web And Sheetfed Offset Lithographic Printing</u>

Single HAP:

HAP Emissions =

Amt of Ink* (lbs) x HAP Content (weight %) x 0.05+
Amt of Hand Cleaning Solvent (gal) x HAP Content (lbs/gal)** x 0.50***+
Amt of Fountain Solution Concentrate (gal) x HAP Content (lbs/gal) +
Amt of Fountain Solution Additive (gal) X HAP Content (lbs/gal) +
Amt of Automatic Blanket Wash (gal) X HAP Content (lbs/gal)+
Amt of Adhesive (lb) X HAP Content (wt %)**** +
Amt of Coating (lb) X HAP Content (wt %) ****

* Include any conventional varnish used in the "amt of ink" total. There should be no HAPs in lithographic inks -- confirm with supplier

** HAP Content (lbs/gallon) = wt. % HAP X product density.

*** Use the 0.50 multiplier only if the VOC Composite Vapor Pressure Is Less Than 10 mm Hg at 20°C, and only if the source owner is required to store shop towels in closed containers.

**** If adhesives and coatings are purchased by the gallon, then use use:
Amt (gal) X HAP Content (lb/gal)

Multiple HAPs:

HAP Emissions =

Amt of Ink* (lbs) x HAP Content (weight %) x 0.05
Amt of Hand Cleaning Solvent (gal) x HAP Content** (lbs/gal) x 0.50***+
Amt of Fountain Solution Concentrate (gal) x HAP Content (lbs/gal) +
Amt of Fountain Solution Additive (gal) X HAP Content (lbs/gal) +
Amt of Automatic Blanket Wash (gal) X HAP content (lbs/gal)+
Amt of Adhesive (lb) X HAP content (wt %)****+
Amt of Coating (lb) X HAP content (wt %) ****

* Include any conventional varnish used in the "amt of ink" total

** HAP Content (lbs/gallon) = wt. % HAP X product density.

*** Use the 0.50 multiplier only if the VOC Composite Vapor Pressure Is Less Than 10 mm Hg at 20°C, and only if the source owner is required to store shop towels in closed containers.

**** If adhesives and coatings are purchased by the gallon, then use:
Amt (gal) X HAP Content (lb/gal)

VOC Calculations For Heatset Web Offset Lithographic Printing (uncontrolled)

VOC Emissions =Amt of Ink* (lbs) x VOC Content (weight %) x 0.80 +
Amt of Hand Cleaning Solvent (gal) x VOC Content (lbs/gal) x .50**+
Amt of Automatic Blanket Wash (gal) x VOC Content (lbs/gal) +
Amt of Fountain Solution concentrate (gal) x VOC Content (lbs/gal) +
Amt of Adhesive (lb) X VOC content (wt %)*** +
Amt of Coating (lb) X VOC content (wt %) ***

* Include any conventional varnish used in the "amt of ink" total. The 0.80 factor reflects 20% ink oil retention as documented in the draft CTG document Control of Volatile Organic Compound Emissions from Offset Lithographic Printing, EPA-453/D-95-001, page 5-2.

**** Use the 0.50 multiplier only if the VOC Composite Vapor Pressure Is Less Than 10 mm Hg at 20°C, and only if the source owner is required to store shop towels in closed containers.

**** If adhesives and coatings are purchased by the gallon, then use:
Amt (gal) X VOC content (lb/gal)

HAP Calculations For Heatset Web Offset Lithographic Printing (uncontrolled)

Single HAP:

HAP Emissions =

Amt of Ink* (lbs) x HAP Content (weight %) x 0.80 +
Amt of Hand Cleaning Solvent (gal) x HAP Content (lbs/gal) x 0.50**+
Amt of Automatic Blanket Wash (gal) x HAP Content**lbs/gal) +
Amt of Fountain Solution concentrate (gal) x HAP Content**(lbs/gal) +
Amt of Adhesive (lb) X HAP content (wt %)*** +
Amt of Coating (lb) X HAP content (wt %) ***

* Include any conventional varnish used in the "amt of ink" total. There should be no HAPs in lithographic inks -- confirm with supplier

** HAP content (lbs/gallon) = wt. % HAP X product density. Use the 0.50 multiplier only if the VOC Composite Vapor Pressure Is Less Than 10 mm Hg at 20°C, and only if the source owner is required to store shop towels in closed containers.

*** If adhesives and coatings are purchased by the gallon, then use:
Amt (gal) X HAP content (lb/gal)

Multiple HAPs:

HAP Emissions =

Amt of Ink* (lbs) x HAP Content (weight %) x 0.80 +
Amt of Hand Cleaning Solvent (gal) x HAP Content** (lbs/gal) x 0.50***+
Amt of Automatic Blanket Wash (gal) x HAP Content (lbs/gal) +
Amt of Fountain Solution (gal) x HAP Content (lbs/gal) +
Amt of Adhesive (lb) X HAP content (wt %)**** +
Amt of Coating (lb) X HAP content (wt %) ****

* Include any conventional varnish used in the "amt of ink" total.

** There should be no HAPs in lithographic inks -- confirm with supplier

*** HAP content (lbs/gallon) = wt. % HAP X product density. Use the 0.50 multiplier only if the VOC Composite Vapor Pressure Is Less Than 10 mm Hg at 20°C, and only if the source owner is required to store shop towels in closed containers.

**** If adhesives and coatings are purchased by the gallon, then use:
Amt (gal) X HAP content (lb/gal)

<u>VOC Calculations For Screen Printing Operations</u>

VOC Emissions = Amt of Ink (gal) x VOC Content (lbs/gal) +
Amt of Coating (gal) x VOC Content (lbs/gal) +
Amt of Adhesive (gal) x VOC Content (lbs/gal) +
Amt of Cleaning Solvent (gal) x VOC Content (lbs/gal)

<u>HAP Calculations For Screen Printing Operations</u>

HAP Emissions = Amt of Ink (gal) x HAP Content (lbs/gal) +
Amt of Coating (gal) x HAP Content (lbs/gal) +
Amt of Adhesive (gal) x HAP Content (lbs/gal) +
Amt of Cleaning Solvent (gal) x HAP Content (lbs/gal)

Note: HAP content (lbs/gal) = wt. % X product density

VOC Calculations For Solvent-Based Flexographic and Rotogravure Operations (uncontrolled)

VOC Emissions = Amt of Ink (lbs) x VOC Content (weight %) +
Amt of Coating (lbs) x VOC Content (weight %) +
Amt of Adhesive (lbs) x VOC Content (weight %) +
Amt of Diluents (gallons) x VOC Content (lbs/gal) +
Amt of Cleaning Solvent (gal) x VOC Content (lbs/gal)+

[“Diluents” means ink, coating, and adhesive dilution solvents]

HAP Calculations For Solvent-Based Flexographic and Rotogravure Operations (uncontrolled)

HAP Emissions = Amt of Ink (lbs) x HAP Content (weight %) +
Amt of Coating (lbs) x HAP Content (weight %) +
Amt of Adhesive (lbs) x HAP Content (weight %) +
Amt of Diluents (gallons) x VOC Content (lbs/gal) +
Amt of Cleaning Solvent (gal) x HAP Content (lbs/gal)

VOC Calculations For Water-Based Flexographic and Rotogravure Operations

VOC Emissions = Amt of Ink (lbs) x VOC Content (weight %) +
Amt of Coating (lbs) x VOC Content (weight %) +
Amt of Adhesive (lbs) x VOC Content (weight %) +
Amt of Diluents (lbs) x VOC Content (weight %) +
Amt of Cleaning Solvent (gal) x VOC Content (lbs/gal)

HAP Calculations For Water-Based Flexographic and Rotogravure Operations

HAP Emissions = Amt of Ink (lbs) x HAP Content (weight %) +
Amt of Coating (lbs) x HAP Content (weight %) +
Amt of Adhesive (lbs) x HAP Content (weight %) +
Amt of Diluents (lbs) x VOC Content (weight %) +
Amt of Cleaning Solvent (gal) x HAP Content (lbs/gal)

6.2 Recommended Approach for Screening Cutoffs

The EPA recommends a two-tiered system for the various printing, publishing and packaging categories. The EPA intends to develop software that would help small business owners implement one of these two approaches, for use in States that have set up a prohibitory rule or general permit system for printers.

Tier 1: Screening approach. Usage records only.

As shown in table 6.1, a list of indicator chemicals can be used to devise a tier one screening level. This table takes into account both HAPs and VOCs. Sources who commit to staying beneath these levels would need to maintain records of the total material use, and would not need to provide records of material contents.

Tier 2: Demonstrate that emissions remain below 50% of all applicable thresholds.

The above equations can be used to demonstrate that a source is less than 50% of the major source threshold. Sources exceeding the “tier 1" screening threshold would need to keep records of material content and amounts to make use of the equations, and would need to formally commit to keeping those records and maintaining emissions below the 50% cutoff.

Table 6.1 Input Material Indicators Associated with a "Cap" of 50% of the Major Source Threshold
[Amounts list ed are 12-month amounts]

Printing Process	**Extreme** **10 TPY VOC**	**Severe** **25 TPY VOC**	**Serious and OTR** **50 TPY VOC**	**Moderate and Marginal** **100 TPY VOC**	**Hazardous Air Pollutants** **10 TPY Single HAP** **25 TPY HAPs Total**
Sheetfed (nonheatset) Offset Lithography	1,425 gallons of cleaning solvent and fountain solution additives]	3,550 gallons of cleaning solvent and fountain solution additives	7,125 gallons of cleaning solvent and fountain solution additives	14,275 gallons of cleaning solvent and fountain solution additives	1,333 gallons of material containing single HAP. 3,333 gallons of all HAP containing materials
Nonheatset Web Offset Lithography	1,425 gallons of cleaning solvent and fountain solution additives	3,550 gallons of cleaning solvent and fountain solution additives	7,125 gallons of cleaning solvent and fountain solution additives	14,275 gallons of cleaning solvent and fountain solution additives	1,333 gallons of material containing single HAP. 3,333 gallons of all HAP containing materials
Heatset Web Offset Lithography -- uncontrolled	10,000 pounds of ink, cleaning solvent, and fountain solution additives	25,000 pounds of ink, cleaning solvent, and fountain solution additives	50,000 pounds of ink, cleaning solvent, and fountain solution additives	100,000 pounds of ink, cleaning solvent, and fountain solution additives	1,333 gallons of material containing single HAP. 3,333 gallons of all HAP containing materials
Screen	1,425 gallons of solvent from the sum of: (a) solvent based inks, (b) cleaning solvent, (c) adhesives and (d) coatings	3,550 gallons of solvent from the sum of: (a) solvent based inks, (b) cleaning solvent, (c) adhesives and (d) coatings	7,125 gallons of solvent from the sum of: (a) solvent based inks, (b) cleaning solvent, (c) adhesives and (d) coatings	14,275 gallons of solvent from the sum of: (a) solvent based inks, (b) cleaning solvent, (c) adhesives and (d) coatings	1,333 gallons of material containing single HAP. 3,333 gallons of all HAP containing materials
Flexography-- Waterbased or UV-cured inks, coatings and adhesives	40,000 pounds of the sum of: (a) inks, (b) coatings and (c) adhesives	100,000 pounds of the sum of: (a) inks, (b) coatings and (c) adhesives	200,000 pounds of the sum of: (a) inks, (b) coatings and (c) adhesives	400,000 pounds of the sum of: (a) inks, (b) coatings and (c) adhesives	1,333 gallons of material containing single HAP. 3,333 gallons of all HAP containing materials

Printing Process	Extreme 10 TPY VOC	Severe 25 TPY VOC	Serious and OTR 50 TPY VOC	Moderate and Marginal 100 TPY VOC	Hazardous Air Pollutants 10 TPY Single HAP 25 TPY HAPs Total
Flexography -- Solvent Inks -- uncontrolled	10,000 pounds of the sum of (a) ink, (b) coatings, (c) adhesives, (d) dilution solvents and (e) cleaning solvents	25,000 pounds of the sum of (a) ink, (b) coatings, (c) adhesives, (d) dilution solvents and (e) cleaning solvents	50,000 pounds of the sum of (a) ink, (b) coatings, (c) adhesives, (d) dilution solvents and (e) cleaning solvents	100,000 pounds of the sum of (a) ink, (b) coatings, (c) adhesives, (d) dilution solvents and (e) cleaning solvents	1,333 gallons of material containing single HAP. 3,333 gallons of all HAP containing materials
Rotogravure -- Waterbased or UV-cured inks, coatings and adhesives	40,000 pounds of the sum of: (a) inks, (b) coatings and (c) adhesives	100,000 pounds of the sum of: (a) inks, (b) coatings and (c) adhesives	200,000 pounds of the sum of: (a) inks, (b) coatings and (c) adhesives	400,000 pounds of the sum of: (a) inks, (b) coatings and (c) adhesives	1,333 gallons of material containing single HAP. 3,333 gallons of all HAP containing materials
Rotogravure -- Solvent Inks -- Uncontrolled	10,000 pounds of the sum of (a) ink, (b) coatings, (c) adhesives, (d) dilution solvents and (e) cleaning solvents	25,000 pounds of the sum of (a) ink, (b) coatings, (c) adhesives, (d) dilution solvents and (e) cleaning solvents	50,000 pounds of the sum of (a) ink, (b) coatings, (c) adhesives, (d) dilution solvents and (e) cleaning solvents	100,000 pounds of the sum of (a) ink, (b) coatings, (c) adhesives, (d) dilution solvents and (e) cleaning solvents	1,333 gallons of material containing single HAP. 3,333 gallons of all HAP containing materials

Notes on assumptions made in constructing this table:

1. For purposes of these calculations, where the term “cleaning solvent” appears, the weight of the cleaning solvent is assumed to be 7.0 lbs/gallon, 100% VOC and all evaporated.

2. “ Fountain solution additives” include isopropyl alcohol, n-propyl alcohol, n-butanol, and alcohol substitutes. The weight of isopropyl alcohol is 6.6 lbs/gallon, but for purposes of this table, the density is assumed to be 7.0 lbs/gallon, the density of EGBE (alcohol substitute), 7.5 lbs/gal, 100% VOC and all evaporated.

3. Where “adhesives” are listed for solvent-based operations, the weight of the solvent in the adhesive is assumed to be 7.0 lbs/gallon, 100% VOC and all evaporated.

[Example calculation based upon footnotes 1, 2 and 3: 1425 gallons of "cleaning solvent and fountain solution additive" times the assumed 7.0 lbs/gallon density equates to 10,000 pounds (5 tons) VOC, or 50% of the major source threshold for VOC in extreme ozone nonattainment areas. Similarly, 1425 gallons of "solvent based inks, cleaning solvent and adhesives" for screening printing X 7 lb/gallon equates to 10,000 pounds].

4. The waterbased inks, coatings and adhesives are assumed to contain no more than 25% of the volatile fraction as VOC and all is assumed to evaporate. (Reference: Control Techniques Guidelines for Graphic Arts--Rotogravure and Flexography. EPA-450/2-78-033). [Example calculation: 40,000 pounds of inks, coatings and adhesives for flexography-waterbased inks times 25% is 10,000 pounds].

5. In calculating the gallons of HAP-containing materials, the screening values in this table are based upon 2-butoxyethanol as the representative HAP, which weighs 7.5 lbs/gallon, all evaporated. [Example calculation: 10,000 pounds VOC divided by 7.5 lbs/gallon = 1333 gallons of single HAP-containing material. 25,000 pounds of VOC divided by 7.5 lbs/gallon = 3333 gallons of total HAP-containing material].

Section 7. Degreasers Using Organic Solvents

7.1 Pertinent Data and Calculations

Emission calculations for degreasers are very straightforward. Basically, net usage of the degreasing solvent equals the amount emitted.

The number of gallons of degreasing solvent usage that equates to the major source threshold will depend on the density of the degreasing material used. Non-halogenated solvents tend to have relatively low densities, typically on the order of 7 pounds per gallon, while halogenated solvents such as methyl chloroform, trichloroethane (TCE), methylene chloride have relatively greater densities on the order of 11-12 pounds per gallon. In addition, all of the halogenated solvents are on the HAPs list. For purposes of the values appearing in the CAPCOA model rule, non-halogenated densities were assumed to have an average density of 7.36 pounds VOC per gallon. The density of TCE, 12.3 pounds per gallon, was used in the CAPCOA model rule for purposes of establishing usage limits for halogenated solvents relative to the 10 and 25 ton/year HAP thresholds.

Using the CAPCOA density assumption of 7.36 lb/gallon, the following amounts of non-halogenated solvents equate to the major source thresholds for VOC:

Major source cutoff for VOC	**Gallons per 12-month rolling period Non-halogenated degreasing solvent**
10 tons per year	2700
25 tons/year	6800
50 tons/year	14,000
100 tons/year	27,000

Using the CAPCOA assumption (i.e., density = 12.3 lb/gallon), the following amounts of halogenated solvents equate to the HAPs thresholds:

Major source threshold	**Gallons per 12-month rolling period Halogenated degreasing solvent**
10 tons/yr, single HAP	1600
25 tons/yr, all HAPs	4100

7.2 Recommended approach to screening cutoffs

The CAPCOA model rule uses the following values as prohibitory rule cutoffs. These values are designed to ensure that single HAP emissions are less than about 8 tons per year and total HAP emissions are less than 17.5 tons per year.

-- Non-halogenated solvents: 2200 gallons of any one solvent-containing material (if no halogenated solvents), and 5400 gallons of any combination of solvent-containing materials

-- Halogenated solvents used: 1200 gallons of any one solvent-containing material, and 2900 gallons of any combination of solvent-containing materials.

[Note: these values would also ensure compliance with major source VOC threshold, except for the 5400 gallon amount which would not be protective of the major source threshold for extreme ozone nonattainment areas. Hence, adjustments should be made in applying these cutoffs in extreme ozone nonattainment areas.]

The EPA believes that the cutoffs in the CAPCOA model rule would be useful in other jurisdictions as well. EPA believes that the great majority of small business sources with degreasers will fall well below these cutoffs.

7.3 Emission-Based Approaches

Another approach, similar to that for coating and printing sources would be useful for sources using amounts exceeding the screening levels, but able to document emissions less than 50% of the major source threshold. Such an approach would involve keeping records of degreaser solvent usage and content sufficient to demonstrate that emissions are less than 50% of the major source threshold. This “tiered” approach could also be used for sources for which contributions to emission totals occur from both surface coating and degreasing.

Section 8. Hot-Mix Asphalt Plants

8.1 Pertinent Data and Calculations

Hot-mix asphalt plants are described well in AP-42, section 11.1, and in a document prepared by the National Asphalt Paving Association entitled Dealing with Title V Operating Permits--the Synthetic Minor Alternative. There are about 3600 active asphalt plants in the United States, of which 2,300 are batch plants, 1,000 are parallel flow drum mix plants, and 300 are counterflow drum mix plants.

For purposes of major source applicability, the pollutants of greatest interest are PM-10, CO, and SO_2. Emission factors for other criteria pollutants, such as NO_x and VOC, are much less than those for these three pollutants. Hazardous air pollutants (metals, PAHs, benzene, ethylbenzene, toluene xylene, and formaldehyde) are emitted in relatively small quantities relative to criteria pollutants.

8.1.A. PM10 Emission Calculations

In addressing particulate emissions, both stack and fugitive emissions must be addressed. The New Source Performance Standard (NSPS) for hot mix asphalt plants, codified in subpart I of 40 CFR part 60, was promulgated during the 1970s. For major source identification purposes, fugitive emissions must be addressed for any " ... stationary source category which, as of August 7, 1980, is being regulated under section 111 or 112 of the Act..." It should be noted that for such stationary source categories, fugitive emissions must be calculated for any source in the category, and not just those subject to the NSPS.

The State of Minnesota calculated fugitive emissions from material handling and stockpiles, using the equation in section 13.2.4 of AP-42:

E = k (0.0032)[(U/5)**1.3]/[(M/2)**1.4]

where: E = emission factor (lb/ton of material transferred)
k = particle size multiplier (0.35 for PM10)
U= mean wind spead (10 miles/hr was used for Minnesota)
M = material moisture content (1.5% assumed as worst case)

Using this equation a PM-10 factor of 0.00413 lb/ton of aggregate transferred was derived. This factor was multiplied by two, based upon a conservative assumption that each ton of aggregate is transferred twice, to yield an emission factor for material handling of 0.00816 lb/ton of hot mix asphalt produced.

Minnesota also calculated PM-10 emission from roads, using a conversative assumption that there would be 1/2 mile of unpaved roads at the site. The unpaved road calculations, used the following equation in AP-42, section 13.2.2:

Emission factor (lb PM-10 per vehicle mile traveled) =

k (5.9) X (s/12) X (S/30) X (W/3)**0.7 X (w/4)**0.5 X (365-p)/365

where: k = 0.36 for PM-10
s = silt content (%). (Minnesota calculations assumed 4.8%)
S = mean vehicle speed (miles per hour). (Minnesota calcuations assumed 20 mph)
W = mean vehicle weight (tons). (Minnesota assumed 15 tons)
w = number of wheels. (Minnesota assumed 10 wheels)
p = number of days with ≥ -.-1" rain (Minnesota used 111)

As a result of these calculations, Minnesota derived an emission factor of 1.92 pounds of PM10 per vehicle mile travel. Note that this emission factor is an uncontrolled factor which does not take credit for measures such as road watering. This was then converted to units of pounds PM10 per ton of hot mix asphalt, assuming 15 tons of asphalt per vehicle, and asuming each ton of asphalt travels twice on all unpaved roads at the site, and assuming 1/2 mile of unpaved road, as follows:

1.92 lb PM10/vehicle mile X 1vehicle/ 15 tons X 2 X 1/2 =
0.128 lb PM10/(ton asphalt produced)

In addition to the fugitive emissions there are also stack emissions from hot mix asphalt production, generally from a particulate control device controlling emissions from the dryer and other emission points. Uncontrolled PM10 emission from batch mix plants, as indicated in table 11.1-2 of AP-42, are 4.5 lbs PM10 per ton of hot mix asphalt produced, while controlled emissions are less than 0.1 lb PM10 per ton.

For PM10 emissions from sources subject to the NSPS (that is, those for which construction or modification commenced after June 11, 1973), the EPA believes that the NSPS will assure that allowable PM10 emissions will be consistent with the “controlled emission” values listed in AP-42. For sources not subject to the NSPS, the required PM10 emission rate will vary from State to State. For example, in Minnesota, a process rate equation yields a required lb/ton for PM (total PM, not PM10) for a non-NSPS plant operating at 200 tons per hour of 40 pounds per hour, or 0.2 pounds PM per ton. In Mississippi, the process weight calculation for a similarly-sized facility of 200 tons/hour would be as follows:

Allowable emissions = 4.1 X[(200 tons/hr)**0.67] = 142 pounds/hour

Expressed as a lb ton figure, this value would be 142/200, or about 0.7 lb/ton.

In Georgia, the process rate equation is as follows:

E = 10 X P**0.4

For a process rate, P of 200 tons per hour, the Georgia allowable emission rate would be about 83 pounds per hour. Expressed as a lb/ton figure, this would equate to 83/200, or about 0.4 lb/ton.

8.1.B Sulfur Dioxide Calculations

Sulfur dioxide becomes an important pollutant to consider for hot mix asphalt plants with fuel oil-fired dryers, particularly those with residual fuel capability. The sulfur dioxide emission factor in AP-42, table 11.1-8, is 0.24 pounds per ton of asphalt produced, based upon a test for which firing was with #6 fuel oil. Footnote (e) to table 11.1-7 states that dryers fired with other fuel oils will have different emission factors.

The Minnesota calculations for sulfur dioxide assumed that a batch plant burning #6 residual oil with a sulfur content of 1.8% sulfur. Based upon source test results in the State, a further assumption was made that there would be a 20 percent reduction in sulfur dioxide emissions due to adsorption by the aggregate in the dryer. The result of these assumptions was an emission factor of 226.8 pounds SO_2 per 1000 gallons of fuel burned. Finally, the calculations assumed that 1.5 gallons of fuel oil must be burned for every ton of asphalt produced. For purposes of comparison with AP-42, the EPA converted this emission factor to a lb/ton basis and obtained an emission factor of (226.8/1000) X 1.5, or 0.34 lbs SO_2 per ton asphalt produced.

Calculations provided to the EPA by the State of Mississippi were also reviewed. For the Mississippi calculations, the SO_2 emissions were calculated based upon the fuel capacity of several example sized units. Example 1 in the calculations was a small batch plant with production capacity of 60 tons/hour and fuel capacity of 50 MMBTU/hr. Example 2 was a larger batch plant with production capacity of 190 tons per hour and fuel capacity of 86.3 MMBTU/hour. The Mississippi calculations are more conservative than for Minnesota, in that a much higher % sulfur is assumed (4.8 lb/MMBTU, or roughly 4.8% sulfur). The end result of the Minnesota calculations is 1814 tons sulfur dioxide per year for a plan with a capacity of 190 tons per hour. The effective emission factor of these calculations, is, therefore

1814 tons/yr X 2000 lb/ton X 1 year/8760 hours = 414 lb/hour
414 lb/hour/ 190 tons/hour = 2.1 lb SO_2 per ton

8.1.C. Carbon Monoxide Calculations

Carbon monoxide emission factors are listed in table 11.1-7 and 11.1-8 of AP-42. The listed emission factors are larger for natural gas-fired dryers than for oil-fired dryers. The emission factor listed for natural gas-fired dryers at batch plants is 0.34 lb CO per ton of hot mix asphalt produced. For drum mix plants, the natural gas emission factor for CO is 0.056 lb/ton. A draft revision to AP-42 is currently under review that would raise the value for batch mix plants to 0.50 pounds per ton. Although CO emission factors are less for drum mix, the EPA for purposes of this guidance used the 0.50 value as a conservative case, rather than to develop guidance that differentiate between the various types of plants.

8.2 Recommended Approach for Screening Cutoffs

The EPA believes that 250,000 tons per 12-month rolling period is a possible demarcation between hot mix asphalt plants that would achieve synthetic minor status by general permit or prohibitory rule, while it may be reasonable to require those above 250,000 tons to seek synthetic minor status by case-by-case permit. A high percentage of asphalt plants operate at less than this level. (Ref: Personnel communication with Gary Fore, National Asphalt Paving Association). The calculations below suggest this to be a reasonable cutoff for prohibitory rules, with a few possible exceptions.

Based upon the above assumptions, CO is generally the limiting case for purposes of prohibitory rule or general permit limitations. Even with the draft CO emission factor of 0.5 lbs/ton, CO emission would be 250,000 tons X 0.5 lbs/ton X 1 ton/2000 lb, or 62.5 tons per year. This amount is considerably less than the major source threshold of 100 tons per year. For drum mix plants, CO emissions would be an even lesser fraction of the major source threshold.

For PM-10, a production rate of 250,000 tons per year would yield:

-- (based upon the Minnesota emission factors above), there would be fugitive emissions of 0.00826 lb/ton for material handling and 0.128 lb/ton for unpaved roads. Hence, fugitive emissions are (0.00826 + 0.128) lb/ton X 250,000 tons/year X 1 ton/2000 lb, or about 17 tons per year.

-- for NSPS sources, potential stack emissions of PM10 would be less than 0.1 lb/ton, and hence annual emissions would be less than 250,000 X 0.1/2000, or less than 12.5 tons per year.

-- for non-NSPS sources, allowable emissions are more difficult to assess, because it is beyond the scope of this effort to explore any possible process weight table or other SIP limit that may exist. It appears, however, that in most cases a limit of 250,000 tons per year would like ensure nonmajor amounts even for non-NSPS sources. For example, the Mississippi SIP limit which equates to roughly 0.7 pounds per ton of PM, would equate to 250,000 X 0.7/2000, or about 82.5 tons per year of PM. Because some fraction of the total particulate emissions from an

asphalt plant dryer is likely to contain particles greater than 10 microns, 82.5 tons per year of PM is likely to equate to a value of PM that is sufficient to be protective of the major source threshold, even if fugitive emissions on the order of 17 tons per year are considered. The EPA emphasizes, however, that before using the 250,000 tons per year value, the control agency must conduct an assessment of the allowable PM10 emissions for pre-NSPS sources before concluding that a 250,000 ton/year limit is adequate for a prohibitory rule. A comprehensive statement on this issue is beyond the scope of EPA's guidance effort.

For SO_2, 250,000 tons of hot mix asphalt production would yield annual emissions, using the 0.24 lb/ton figure in AP-42, of 30 tons per year. Using Minnesota's emission factor (as noted above, the 226.8 lb/1000 gallon emission factor is equivalent to 0.34 lb/ton), 250,000 tons of hot mix asphalt production would equate to 43 tons per year. These calculations suggest that even with residual oil firing capability, this level of production would be very unlikely to exceed 100 tons per year at this level of production.

8.3 Observation about Minor NSR

Asphalt plants provide an excellent example as to why guidance for cutoffs for synthetic minor limitations should NOT be construed as guidance for sources that do not need minor NSR permits. Conversations with State and local agency personnel indicate that at nonmajor emission levels, asphalt plants can be of concern for ambient concentrations of criteria pollutants such as sulfur dioxide. For example, Minnesota requires demonstration of compliance with sulfur dioxide ambient air quality standards through the use of EPA's SCREEN3 model if fule exceeding 0.70 percent sulfur is burned by the asphalt dryer burner. If compliance is not demonstrated with SCREEN3, the source has two options: (1) to limit the sulfur content to 0.7% or (2) obtain a permit reflecting refined dispersion calculations.

In addition, the fact that control equipment is required by SIP regulations makes these plants a source for which any new plant would logically be reviewed by a permit engineer before a plant is constructed.