A COMMENTARY ON "BE SAFE – ASPHALT PLANT POLLUTION"
A CLOSER LOOK
AT A DOCUMENT BY CENTER FOR HEALTH, ENVIRONMENT & JUSTICE (CHEJ) PRIMARILY WRITTEN AND DISTRIBUTED BY BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE (BREDL)

(www.bredl.org/pdf/BeSafe_Asphalt.pdf)

Opening Statement: "Asphalt plants mix gravel and sand with crude oil derivatives to make the asphalt used to pave roads, highways, and parking lots across the U.S." This statement establishes that this document is targeting one type of facility specifically: a **hot mix** asphalt plant. However, the entire document is convoluted with non-applicable information using the *generic* term "asphalt".

Over the last several years, the *three bullets* on the front page of this "Be Safe" document have surfaced as a "factual" attack on the hot mix asphalt industry. However, ***it is less about fact*** and more about the widespread dissemination of misinformation through misinterpretation, misapplication, and misrepresentation. Firstly, note that the primary reference is www.epa.gov/ttn/chief/ap42/ch11/final/c11s01.pdf, which is for a hot mix asphalt plant exclusively. The "Be Safe" document itself was originally affiliated with CHEJ on www.besafenet.com. But that website is now defunct, and CHEJ does not promote this document on www.chej.org. Now, note the "primary contributor" among the references. It is actually BREDL that perpetuates the distribution of this document through their website.

References:

US EPA Office of Air Quality Planning & Standards, AP-42, Fifth Edition, Volume I, Chapter 11: Mineral Products Industry, [EPA] **http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s01.pdf**. *Final Rule to Reduce Toxic Air Emissions From Asphalt Processing & Asphalt Roofing Manufacturing Facilities*, Environmental Protection Agency, June 2000 [EPA]. *Hazardous Substance Fact Sheet, Asphalt Fumes*. New Jersey Department of Health and Senior Services, January 2001 [NJDHSS]. Agency for Toxic Substances and Disease Registry (ATSDR). 1995. *Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs)*. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service[DHHS]. Blue Ridge Environmental Defense League Asphalt Health Survey, [BREDL]. Dr. R. Nadkarni developed mass balance equation to estimate total fugitive emissions and his comments to Virginia Dept. of Environmental Quality are at **www.bredl.org/pdf/DEQ072503.pdf.** [Dr. R. Nadkarni].

Primary Contributor: Lou Zeller, Blue Ridge Environmental Defense League.

So, let's examine those three bullets in more detail.

A COMMENTARY ON "BE SAFE – ASPHALT PLANT POLLUTION"
A CLOSER LOOK
Bullet #1 – "Asphalt Fumes are Known Toxins."

■ **Asphalt Fumes are Known Toxins.** The federal Environmental Protection Agency (EPA) states "Asphalt processing and asphalt roofing manufacturing facilities are major sources of hazardous air pollutants such as formaldehyde, hexane, phenol, polycyclic organic matter, and toluene. Exposure to these air toxics may cause cancer, central nervous system problems, liver damage, respiratory problems and skin irritation." [EPA]. According to one health agency, asphalt fumes contain substances known to cause cancer, can cause coughing, wheezing or shortness of breath, severe irritation of the skin, headaches, dizziness, and nausea. [NJDHSS] Animal studies show PAHs affect reproduction, cause birth defects and are harmful to the immune system. [NJDHSS] The US Department of Health and Human Services has determined that PAHs may be carcinogenic to humans. [DHHS]

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BREDL's Quoted Statement: The federal Environmental Protection Agency (EPA) states "*Asphalt processing and asphalt roofing manufacturing* facilities are major sources of hazardous air pollutants such as formaldehyde, hexane, phenol, polycyclic organic matter, and toluene. Exposure to these air toxics may cause cancer, central nervous system problems, liver damage, respiratory problems and skin irritation."

BREDL's Reference: "Final Rule to Reduce Toxic Air Emissions From *Asphalt Processing & Asphalt Roofing Manufacturing* Facilities, Environmental Protection Agency, June 2000 [EPA]."

Comment (See Appendix 1-1)**:**

- The FIRST quoted sentence in BREDL's statement comes from the EPA website abstract from the final rule and not the rule itself, which is the: *40 CFR Part 63: National Emission Standards for Hazardous Air Pollutants for Area Sources: Asphalt Processing and Asphalt Roofing Manufacturing; Final Rule*. **More importantly**, the subpart AAAAAAA of 40 CFR Part 63 now specifically says that it "…does not apply to hot mix asphalt plant operations that are used in the paving of roads…" completely excluding the hot mix asphalt industry. *"Asphalt Processing"* and *"Asphalt Roofing Manufacturing"* are **not** the same as *"Hot Mix Asphalt Manufacturing"*.
- The SECOND quoted sentence in BREDL's statement is not stated anywhere in the final rule.

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BREDL's Quoted Statement: According to one health agency, *asphalt fumes contain substances known to cause cancer*, can cause coughing, wheezing or shortness of breath, severe irritation of the skin, headaches, dizziness, and nausea. Animal studies show PAHs affect reproduction, cause birth defects and are harmful to the immune system.

BREDL Reference: "Hazardous Substance Fact Sheet, *Asphalt Fumes*. New Jersey Department of Health and Senior Services, January 2001 [NJDHSS]."

Comment (See Appendix 1-2)**:**

- The FIRST quoted sentence in BREDL's statement does not come from the New Jersey's Hazardous Substance Fact Sheet on "Asphalt Fumes", because there isn't one.
- The FIRST quoted sentence in BREDL's statement does come from the New Jersey's Hazardous Substance Fact Sheet on "Asphalt" *EXCEPT for the interjected comment on asphalt fumes and cancer*. In fact, that sheet states: "While asphalt has not been identified as a carcinogen, it should be handled with caution since extracts of certain asphalts have been shown to cause cancer in animals". Nowhere in that sentence does it mention fumes; and note that it refers only to *extracts of certain asphalts*. **More importantly**, further investigation reveals that the sheet specifically lists oxidized asphalt and cut-back asphalt as the points of concern. ***Oxidized (aka blown) asphalt*** *is for* ***roofing***

***and sealing**, and **cut-back asphalt** is for **cold mix.** "Oxidized Asphalt" and "Cut-Back Asphalt" are **not** the same as "Hot Mix Asphalt".*

- **But there is even more information**, the state of New Jersey publishes its fact sheets based on the "Right to Know" Act. A master list of hazardous substances is maintained that catalogs these substances along with the appropriate fact sheet and any SHHC (Special Heath Hazard Code) as a quick reference check. Among all the asphalt references, the 2010 master list indicates only ***oxidized asphalt*** as carcinogenic and only ***cut-back asphalt*** as flammable. *All other asphalt references, including "fumes", have **NO** SHHC indications.*
- The SECOND quoted sentence in BREDL's statement is not stated anywhere in the fact sheet.

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BREDL's Quoted Statement: The US Department of Health and Human Services has determined that PAHs *may* be carcinogenic to humans.

BREDL Reference: "Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs). Atlanta, GA: U.S. Department 1995 [DHHS]."

Comment: This toxicological profile is a 487 page paper discussing PAHs both generally and in a few cases specifically. Asphalt is only generally mentioned as a source of PAHs associated with roofing, processing, and paving. And *sources of PAHs are everywhere!*

- Page 13 – "They [PAHs] are found throughout the environment in the air, water, and soil. There are more than 100 different PAH compounds and the health effects of the individual PAHs are not exactly alike."
- Page 3 – "*PAHs enter the environment **mostly** as releases to air from* volcanoes, forest fires, *residential wood burning, and exhaust from automobiles and trucks*."
- Page 230 – "The greatest sources of exposure to PAHs for most of the United States population are active or passive inhalation of the compounds in tobacco smoke, wood smoke, and contaminated air, and ingestion of the compounds in foodstuffs. The general population may also be exposed to PAHs in drinking water and through skin contact with soot and tars. Higher than background levels of PAHs are found in foods that are grilled or smoked."

Comment (See Appendix 1-3)**:** This toxicological profile cites an impressive 1200+ publications and suggests referral to the appropriate in-depth study corresponding to the each source of the PAH's. One of the most referenced study agencies in the profile is the International Agency for Research on Cancer (IARC).

- A Case–Control Study of Lung Cancer Nested in a Cohort of European Asphalt Workers by Olsson et. al. was released in 2010 on paving asphalt with IARC support. "Conclusions: *We found **no consistent evidence** of an association between indicators of either inhalation or dermal exposure to bitumen and lung cancer risk.* A sizable proportion of the excess mortality from lung cancer relative to the general population observed in the earlier cohort phase is likely attributable to high tobacco consumption and possibly to coal tar exposure, whereas other occupational agents do not appear to play an important role."

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A COMMENTARY ON "BE SAFE – ASPHALT PLANT POLLUTION"
A CLOSER LOOK
Bullet #2 – "Health Impacts & Loss of Property Value."

■ **Health Impacts & Loss of Property Value.** The Blue Ridge Environmental Defense League (BREDL), a regional environmental organization, has done two studies on the adverse impacts on property values and health for residents living near asphalt plants. A property value study documented losses of up to 56% because of the presence of a nearby asphalt plant. In another study, nearly half of the residents reported negative impacts on their health from a new asphalt plant. The door-to-door health survey found 45% of residents living within a half mile of the plant reported a deterioration of their health, which began after the plant opened. The most frequent health problems cited were high blood pressure (18% of people surveyed), sinus problems (18%), headaches (14%), and shortness of breath (9%). [BREDL]

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BREDL's Quoted Statement: The Blue Ridge Environmental Defense League (BREDL), a regional environmental organization, has done *two studies* on the adverse impacts on property values and health for residents living near asphalt plants.

BREDL Reference: ***SELF*** – [BREDL]

Comment: *BREDL refers to these two documents as "studies" in an effort to depict them as "published" materials.* But any publishing of these materials is only through their own website: www.bredl.org/air/maymead_propertystudy.htm and www.bredl.org/air/cullasaja-bethel_healthsurvey.htm

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BREDL's Quoted Statement: A property value study documented losses of up to 56% because of the presence of a nearby asphalt plant.

BREDL Reference: ***SELF*** – No Title Given [BREDL]

Comment: *This study has been refuted.* – See Additional Materials: "AVERY COUNTY, NC - "PROPERTIES DEVALUED AROUND PINEOLA ASPHALT PLANT" A CLOSER LOOK AT THE REPORT BY THE BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE (BREDL)"

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BREDL's Quoted Statement: In another study, nearly half of the residents reported negative impacts on their health from a new asphalt plant. The door-to-door health survey found 45% of residents living within a half mile of the plant reported a deterioration of their health, which began after the plant opened. The most frequent health problems cited were high blood pressure (18% of people surveyed), sinus problems (18%), headaches (14%), and shortness of breath (9%).

BREDL Reference: ***SELF*** – "Blue Ridge Environmental Defense League Asphalt Health Survey [BREDL]."

Comment: *This study has been refuted.* – See Additional Materials: FRANKLIN, NC - A "COMMUNITY HEALTH SURVEY REPORT" (CULLASAJA AND BETHEL) A CLOSER LOOK AT THE REPORT BY BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE (BREDL)

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A COMMENTARY ON "BE SAFE – ASPHALT PLANT POLLUTION"
A CLOSER LOOK
Bullet #3 – "Flawed Tests Underestimate Health Risks."

■ **Flawed Tests Underestimate Health Risks.** In addition to smokestack emissions, large amounts of harmful "fugitive emissions" are released as the asphalt is moved around in trucks and conveyor belts, and is stored in stockpiles. A small asphalt plant producing 100 thousand tons of asphalt a year may release up to 50 tons of toxic fugitive emissions into the air. [Dr. R. Nadkarni] Stagnant air and local weather patterns often increase the level of exposure to local communities. In fact, most asphalt plants are not even tested for toxic emissions. The amounts of these pollutants that are released from a facility are estimated by computers and mathematical formulas rather than by actual stack testing, estimates that experts agree do not accurately predict the amount of toxic fugitive emissions released and the risks they pose. According to Dr. Luanne Williams, a North Carolina state toxicologist, 40% of the toxins from asphalt plant smokestacks even meet air quality standards—and for the other 60% of these emissions, the state lacks sufficient data to determine safe levels.

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BREDL's Quoted Statement: In addition to smokestack emissions, large amounts of harmful "fugitive emissions" are released as the asphalt is moved around in trucks and conveyor belts, and is stored in stockpiles. A small asphalt plant producing 100 thousand tons of asphalt a year may release up to 50 tons of toxic fugitive emissions into the air. Stagnant air and local weather patterns often increase the level of exposure to local communities.

BREDL Reference: "*Dr. R. Nadkarni* developed mass balance equation to estimate total fugitive emissions and *his* comments to Virginia Dept. of Environmental Quality are at www.bredl.org/pdf/DEQ072503.pdf. [Dr. R. Nadkarni]."

Comment (See Appendix 3-1)**:** By directly following the link provided by BREDL: www.bredl.org/pdf/DEQ072503.pdf, one discovers that the author of a letter to the Virginia Department of Environmental Quality (DEQ) is NOT Dr. R. Nadkarni. *Rather, it is written by a BREDL staff member: Mark E. Barker.*

- This is an 8 page letter where only *2 paragraphs* even mention fugitive emissions.
- The FIRST quoted sentence in BREDL's statement says asphalt is moved around by conveyor belts and stored in stockpiles. For that to be true, the "asphalt" reference must mean RAP (Reclaimed Asphalt Pavement). RAP is removed road surface. There are **no** VOC fugitive emissions in RAP, because it is kept at ambient temperatures. And there are **little or more likely no** PM fugitive emissions due to the adhesive nature of the asphalt cement and the moisture present.
- The SECOND quoted sentence in BREDL's statement says that "A small [hot mix] asphalt plant producing 100 thousand tons of asphalt a year may release up to 50 tons of toxic fugitive emissions into the air." That statement is a *mathematical formula*, presented in the letter by Barker *based on an un-notated Nadkarni reference*, as "Asphalt cement comprises 5% (0.05) of the total hot mix plant production. Fugitive air emissions equal 1.07% (0.0107) of the consumed asphalt cement *(data from Dr. R.M. Nadkarni)*." This represents the hot mix asphalt emissions from silo-filling and truck-loadout. So, 100,000 tons of hot mix asphalt x 0.05 tons of liquid asphalt cement/tons of hot mix asphalt x 0.0107 tons of fugitive emissions/tons of liquid asphalt cement = 53.5 tons of fugitive emissions. ***EPA data indicates that it is less than 2% of the Nadkarni data.***
- **THE DILEMMA: Who should be believed for the data: the EPA or Nadkarni?** (See Appendix 3-2). "Critics of asphalt plants sometimes raise concerns over fugitive emissions during "loadout" of hot asphalt into trucks. One critic in particular, Dr. Ravi Nadkarni, has made some engineering estimates that suggest that loadout emissions could be responsible for relatively high emission rates of organic compounds. As it turns out, though, the physical basis of *his calculations is overly simplistic and perhaps seriously flawed*…He assumes that hot-mix behaves as a liquid pool of a volatile substance. As wind blows over the hot-mix asphalt, organic compounds are assumed to evaporate. Hot-mix asphalt, however, is not a liquid in which volatile molecules are free to mix vertically to the surface (and hence become available for evaporation)…Another factor that Dr. Nadkarni fails to consider is

the “skin layer” effect, in which the surface of hot-mix asphalt exposed to air cools and hardens relative to its internal temperature and consistency. The cooled surface layer, even though very thin, will likely reduce the level of VOC emissions below that predicted by the simple loadout model...*U.S. EPA has evaluated this question, and finds that Nadkarni’s estimates are likely to be quite substantial overestimates.*” – Dr. Laura C. Green

- **So, who are Dr. Nadkarni and Dr. Green?** Dr. Ravindra M. Nadkarni, P.E. is a retired "chemical engineer" in Massachusetts with a Ph.D. in "Metallurgy and Ceramic Engineering". Neither the degree nor the practice experience qualifies him to suggest inapplicable "mechanical engineering" calculations as fact. Dr. Laura C. Green works as a consultant and researcher in Massachusetts for Cambridge Environmental, which evaluates and minimizes risks to health and the environment for clients including the federal, state, and local governments, industry, law firms and community groups. She has authored or co-authored dozens of publications and books. She is a lecturer in Biological Engineering at MIT.
- The THIRD quoted sentence in BREDL's statement is lifted verbatim from page 2 of the letter itself further proving this "Be Safe" document is actually authored by BREDL and not CHEJ.

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BREDL's Quoted Statement: In fact, most asphalt plants are not even tested for toxic emissions. The amounts of these pollutants that are released from a facility are estimated by *computers* and *mathematical formulas* rather than by actual stack testing, estimates that *experts* agree do not accurately predict the amount of toxic fugitive emissions released and the risks they pose.

BREDL Reference: *None*

Comment: *BREDL has suddenly switched the emission source discussion from fugitive to ducted process without explanation.*

- The FIRST quoted sentence in BREDL's statement is true that most hot mix asphalt plants are not stack tested for their air toxics. However, some are tested for their air toxics. Since those that are tested pass emissions testing, then all are capable of passing based on a specific plant manufacturer, although maintenance and operation are very important. Furthermore, ***all hot mix asphalt plants are stack tested*** with 6 months of start-up for those emissions appropriately designated by the state and local air districts.
- The SECOND quoted sentence in BREDL's statement suggests emissions from a hot mix asphalt plant are determined from "*mathematical formulas* rather than by actual stack testing". It is rather interesting that using mathematics is being addressed two sentences away from the statement: "A small asphalt plant producing 100 thousand tons of asphalt a year may release up to 50 tons of toxic fugitive emissions into the air". *So, in essence BREDL is implying that it may use mathematical formulas developed by Nadkarni, but no one else should use mathematical formulas developed by the EPA.*
- It is further ironic that BREDL freely uses the modeling (mathematics) computer program, SCREEN3, developed by the EPA (not Nadkarni) when arguing its position across multiple industries in many documents. *"That we used an EPA model is indisputable…The EPA developed the SCREEN3 model for general use by regulatory agencies. This is the model we employed in our report. It is a model used by the NC Division of Air Quality. [BREDL, www.bredl.org/pdf2/090526LTR_to_Rep. Harrison.pdf]"* And yet in the "Be Safe" document, BREDL says that computer modeling and mathematical formulas are not appropriate for a hot mix asphalt plant.
- **But there is even more information**, those EPA formulas were developed from several hundred stack tests of hot mix asphalt plants (www.epa.gov/ttn/chief/ap42/ch11/bgdocs/b11s01.pdf).
- The SECOND quoted sentence in BREDL's statement says "*experts agree*": what experts?

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BREDL's Quoted Statement: According to Dr. Luanne Williams, a North Carolina state toxicologist, 40% of the toxins from asphalt plant smokestacks even meet air quality standards – and for the other 60% of these emissions, the state lacks sufficient data to determine safe levels.

BREDL Reference: *None*

Comment (See Appendix 3-3)**:** *There is no supporting evidence that Dr. Luanne Williams made this statement.* Upon further investigation of BREDL's website, another version appears from which it seems paraphrased: "North Carolina air quality regulations do not even meet the above standards for protecting public health. According to Dr. Luanne Williams, state toxicologist, only 40% of the poisons which would be allowed to come from the Maymead's smokestack meet the standard. Sixty percent of these emissions have insufficient data to determine these safety levels. Also, the state does not adequately consider fugitive emissions which exceed the smokestack pollution." (www.bredl.org/air/maymead_Godexpects.htm)

- So, which is it: *Maymead or Asphalt Plants; Emissions or Poisons; North Carolina or the US; Ducted Process Emissions or Fugitive Emissions?*
- Dr. Luanne K. Williams works for Department of Health and Human Services in North Carolina (NCDHHS). It is hard to believe that Dr. Williams would ever verbally counter materials published through a sister agency, the North Carolina Department of Environment and Natural Resources (NCDENR). Those materials directly oppose and respond to **BREDL's non-scientific opinions** regarding hot mix asphalt plants.
- *One such NCDENR release addresses ALL of the points mentioned in Bullet #3.* "In North Carolina, asphalt plants must obtain air quality permits from the Division of Air Quality (DAQ)…*Our regulations for air toxics are more stringent than those required by the U.S. Environmental Protection Agency (EPA) and many states.* I am not aware of any state in the Southeast, other than North Carolina, that requires new asphalt plants to meet guidelines for toxic air pollutants…To obtain an air permit in North Carolina, businesses wanting to operate asphalt plants must demonstrate they can meet rules for controlling particulates (dust), sulfur dioxide, nitrogen oxides, and air toxics. *These demonstrations include computer modeling of toxic emissions from the plant's main stack as well as fugitive emissions, or fumes from asphalt storage and loading areas.* Plants must show they can meet air quality guidelines at their property lines…Modeling is done because toxic air emissions generally occur at levels too small to measure accurately…The models also assume "worst-case" meteorological conditions, whether they exist at a facility or not. Worst-case conditions include factors such as low wind speeds, temperature inversions, stagnant weather and temperatures most likely to prevent atmospheric mixing and concentrate air pollutants." (www.daq.state.nc.us/news/pr/2001/aspoped_0201.shtml)

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APPENDIX 1-1
Bullet #1 – EPA Excerpts

(www.epa.gov/ttn/caaa/t3/meta/m25830.html)

Technology Transfer Network

OAR Policy and Guidance

OAR Policy and Guidance Metarecord

Document Title/Subject: Asphalt Processing and Asphalt Roofing Manufacturing: Air Toxics Requirements: Final Rule **Related Documents:**	**Signed by:** Administrator Christine Todd Whitman **Signature Date:** 02/28/03 **Contact:** Rick Colyer 919 541-5262	**Filename(s):** http://www.epa.gov/ttn/oarpg/t3/fr_notices/aparm_fr.pdf **URL(s):**		
Regulatory Authority: Title 3	**Division/Director:** Emission Standards Division (OAQPS) / Sally Shaver	**Submitted By:** colyer.rick	**OGC Contact:** Steven Silverman **OGC Phone#:** (202) 564-5523	**Internet Contact:** Jeff Clark

Abstract:
The EPA is promulgating NESHAP for existing and new asphalt processing and asphalt roofing manufacturing facilities. Asphalt processing is the "blowing" of air through hot asphalt in order to change the properties of the asphalt for use in certain applications such as roofing manufacturing or paving. The EPA has identified asphalt processing and asphalt roofing manufacturing facilities as major sources of hazardous air pollutants (HAP) such as formaldehyde, hexane, hydrogen chloride (HCl), phenol, polycyclic organic matter (POM), and toluene. The total HAP reduction resulting from compliance with the rule is expected to be 86 megagrams per year. This file is the text of the final rule.

(NESHAP - Federal Register 12-02-2009 - final rule.pdf)

action is not a "major rule" as defined by 5 U.S.C. 804(2). This final rule will be effective December 2, 2009.

List of Subjects in 40 CFR Part 63

Environmental protection, Air pollution control, Hazardous substances, Reporting and recordkeeping requirements.

Dated: November 16, 2009.

Lisa P. Jackson,

Administrator.

■ For the reasons stated in the preamble, title 40, chapter I, part 63 of the Code of Federal Regulations is to be amended as follows:

PART 63—[AMENDED]

■ 1. The authority citation for part 63 continues to read as follows:

Authority: 42 U.S.C. 7401, *et seq.*

■ 2. Part 63 is amended by adding subpart AAAAAAA to read as follows:

Subpart AAAAAAA—National Emission Standards for Hazardous Air Pollutants for Area Sources: Asphalt Processing and Asphalt Roofing Manufacturing

Applicability and Compliance Dates

Sec.

63.11559 Am I Subject to this Subpart?

63.11560 What are my Compliance Dates?

Subpart AAAAAAA—National Emission Standards for Hazardous Air Pollutants for Area Sources: Asphalt Processing and Asphalt Roofing Manufacturing

Applicability and Compliance Dates

§ 63.11559 Am I Subject to this Subpart?

(a) You are subject to this subpart if you own or operate an asphalt processing operation and/or asphalt roofing manufacturing operation that is an area source of hazardous air pollutant (HAP) emissions, as defined in § 63.2.

(b) This subpart applies to each new or existing affected source as defined in paragraphs (b)(1) and (b)(2) of this section.

(1) *Asphalt processing.* The affected source for asphalt processing operations is the collection of all blowing stills, as defined in § 63.11566, at an asphalt processing operation.

(2) *Asphalt roofing manufacturing.* The affected source for asphalt roofing manufacturing operations is the collection of all asphalt coating equipment, as defined in § 63.11566, at an asphalt roofing manufacturing operation.

(c) This subpart does not apply to hot mix asphalt plant operations that are used in the paving of roads or hardstand, or operations where asphalt may be used in the fabrication of a built-up roof.

(b) If you own or operate a new affected source, you must be in compliance with the provisions in this subpart on or before December 2, 2009 or upon startup, whichever date is later. As specified in § 63.11562(g), you must demonstrate initial compliance with the applicable emission limits no later than 180 calendar days after December 2, 2009 or within 180 calendar days after startup of the source, whichever is later.

Standards and Compliance Requirements

§ 63.11561 What are my Standards and Management Practices?

(a) For asphalt processing operations, you must meet the emission limits specified in Table 1 of this subpart.

(b) For asphalt roofing manufacturing lines, you must meet the applicable emission limits specified in Table 2 of this subpart.

(c) These standards apply at all times.

§ 63.11562 What are my Initial Compliance Requirements?

(a) For asphalt processing operations, you must:

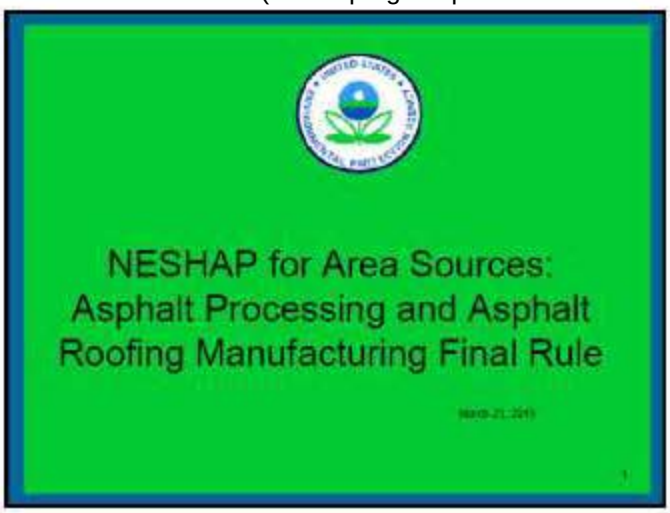
(1) Demonstrate initial compliance with the emission limits specified in Table 1 of this subpart by:

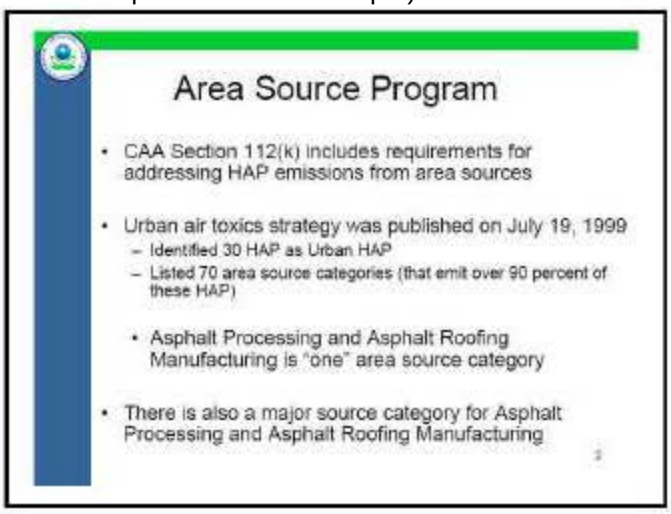
(i) Conducting emission tests using the methods specified in Table 3 of this subpart; or

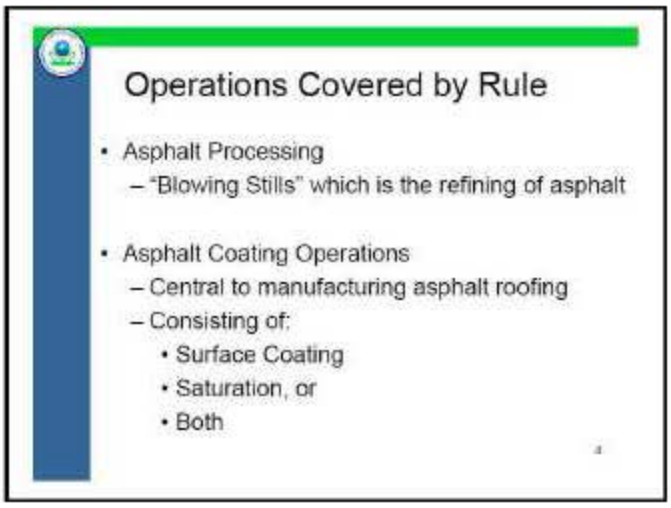
(ii) Using the results of a previously-conducted emission test as specified in

APPENDIX 1-1 Continued
Bullet #1 – EPA Excerpts

(www.epa.gov/apti/video/Webinar03232010/AsphaltWebinar32210.pdf)







APPENDIX 1-2
Bullet #1 – State of New Jersey Excerpts

(www.nj.gov/health/eoh/rtkweb/documents/hsl_alpha.pdf)

New Jersey Worker and Community Right to Know Act N.J.S.A. 34:5A-1 et. seq.

2010 RIGHT TO KNOW HAZARDOUS SUBSTANCE LIST

Special Health Hazard Codes - These codes (SHH codes) are in the right column and refer to the hazardous categories of the substances:

CA - Carcinogen	F4 – Flammable - Fourth Degree
MU - Mutagen	F3 – Flammable - Third Degree
TE - Teratogen	R4 – Reactive* - Fourth Degree
CO - Corrosive	R3 – Reactive* - Third Degree
	R2 – Reactive* - Second Degree

* "Reactive" is used interchangeably with the NFPA term "instability."

According to the hazard criteria defined in N.J.A.C. 8:59 – 10.2(a):

Carcinogenic, mutagenic and teratogenic substances are considered to be special health hazard substances when they are present as pure substances or in mixtures at a concentration of one-tenth of one percent (0.1%) or greater.

2010 Right to Know Hazardous Substance List

Substance Number		Common Name / *Chemical Name*	CAS	DOT	SHHC	Sources
0170		**ASPHALT** *ASPHALT*	8052-42-4	1999		2 3 4 7 15 17 *Page 29 of 367*
3172	#	**ASPHALT (CUTBACK)** see Fact Sheet # 0170 on ASPHALT	308062-76-2	1999	F3	3 15 17 *Page 29 of 367*
3197	#	**ASPHALT, OXIDIZED** *ASPHALT, OXIDIZED*	64742-93-4	1999	CA	2 3 4 7 15 17 *Page 29 of 367*
syn		**ASPHALT (TYPICAL)** see ASPHALT				*Page 29 of 367*
syn		**BITUMEN** see ASPHALT				*Page 45 of 367*
syn		**BITUMENS, OXIDIZED** see ASPHALT, OXIDIZED				*Page 45 of 367*
syn		**ROAD ASPHALT, LIQUID** see ASPHALT FUMES				*Page 305 of 367*

APPENDIX 1-3

Bullet #1 – IARC Excerpts

Research

A Case–Control Study of Lung Cancer Nested in a Cohort of European Asphalt Workers

Ann Olsson,[1,2] Hans Kromhout,[3] Michela Agostini,[3] Johnni Hansen,[4] Christina Funch Lassen,[4] Christoffer Johansen,[4,5] Kristina Kjaerheim,[6] Sverre Langård,[7] Isabelle Stücker,[8] Wolfgang Ahrens,[9] Thomas Behrens,[9] Marja-Liisa Lindbohm,[10] Pirjo Heikkilä,[10] Dick Heederik,[3] Lützen Portengen,[3] Judith Shaham,[11] Gilles Ferro,[1] Frank de Vocht,[12] Igor Burstyn,[13] and Paolo Boffetta[1,14,15]

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BACKGROUND: We conducted a nested case–control study in a cohort of European asphalt workers in which an increase in lung cancer risk has been reported among workers exposed to airborne bitumen fume, although potential bias and confounding were not fully addressed.

OBJECTIVE: We investigated the contribution of exposure to bitumen, other occupational agents, and tobacco smoking to the risk of lung cancer among asphalt workers.

METHODS: Cases were cohort members in Denmark, Finland, France, Germany, the Netherlands, Norway, and Israel who had died of lung cancer between 1980 and the end of follow-up (2002–2005). Controls were individually matched in a 3:1 ratio to cases on year of birth and country. We derived exposure estimates for bitumen fume and condensate, organic vapor, and polycyclic aromatic hydrocarbons, as well as for asbestos, crystalline silica, diesel motor exhaust, and coal tar. Odds ratios (ORs) were calculated for ever-exposure, duration, average exposure, and cumulative exposure after adjusting for tobacco smoking and exposure to coal tar.

RESULTS: A total of 433 cases and 1,253 controls were included in the analysis. The OR was 1.12 [95% confidence interval (CI), 0.84–1.49] for inhalation exposure to bitumen fume and 1.17 (95% CI, 0.88–1.56) for dermal exposure to bitumen condensate. No significant trend was observed between lung cancer risk and duration, average exposure, or cumulative exposure to bitumen fume or condensate.

CONCLUSIONS: We found no consistent evidence of an association between indicators of either inhalation or dermal exposure to bitumen and lung cancer risk. A sizable proportion of the excess mortality from lung cancer relative to the general population observed in the earlier cohort phase is likely attributable to high tobacco consumption and possibly to coal tar exposure, whereas other occupational agents do not appear to play an important role.

KEY WORDS: bitumen, case–control studies, coal tar, dermal exposure, inhalation exposure, lung neoplasm, occupational exposure, polycyclic aromatic hydrocarbons. *Environ Health Perspect* 118:1418–1424 (2010). doi:10.1289/ehp.0901800 [Online 9 June 2010]

Bitumen is the residual product from distillation of crude oil and is being used mainly as binder in asphalt mixes and in roofing applications (Asphalt Institute and Eurobitume 2008). Workers are primarily exposed to bitumen via inhalation or by skin contact (McClean et al. 2004a).

Bitumen fume and condensate contain a small fraction of polycyclic aromatic hydrocarbons (PAHs), of which benzo(*a*)pyrene is classified as a lung carcinogen by the International Agency for Research on Cancer (IARC) and others are suspected carcinogens (IARC 2010). Early epidemiologic studies of workers exposed to bitumen have suggested an increased risk of cancer, but the role of bitumen exposure in itself could not be disentangled from that of other occupational agents (in particular coal tar) and tobacco smoking (Partanen and Boffetta 1994; Schulte 2007). To investigate the risk of cancer among workers exposed to bitumen, a historical cohort study was conducted to investigate the mortality of European workers employed in road paving, asphalt mixing, waterproofing, and roofing (Boffetta et al. 1997, 2003a, 2003b). Road pavers represented the largest proportion of the study population. The workers were identified from companies in Denmark, Finland, France, Germany, Israel, the Netherlands, and Norway, and from a nationwide health surveillance program in Sweden. The mortality follow-up lasted between 1953 and 2000. The cohort study reported an increase in lung cancer mortality among workers exposed to bitumen fume overall and a relation between lung cancer mortality and increasing average exposure to bitumen fume, whereas a similar relation was not observed with increasing duration of exposure or cumulative exposure (Boffetta et al. 2001, 2003a, 2003b). Investigators in the Nordic countries also analyzed cancer incidence data; their results showed a small increase in lung cancer incidence (Kauppinen et al. 2003; Randem et al. 2003). However, the results of the mortality and the cancer incidence analyses could not contribute to a conclusion about the presence or absence of a causal link between exposure to bitumen fume and lung cancer because the assessment of bitumen exposure was rather crude, no information was available on employment in companies other than those included in the study, and very limited information was available for tobacco smoking (Burstyn et al. 2003). Subsequent sensitivity analyses, based on a Bayesian approach, suggested that neither

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Supplemental Material is available online (doi:10.1289/ehp.0901800 via http://dx.doi.org/).

We thank the Scientific Advisory Committee, the Liaison Committee, and national experts from different sectors of the asphalt industry for useful advice; T. Partanen, P. Romundstad, M. Lafontaine, and M. Hashibe for suggestions during various phases of the study. Interviewers and data managers are also gratefully acknowledged.

The study was partially supported by the industrial organizations CONCAWE, European Bitumen Association (Eurobitume), European Asphalt Paving Association (EAPA), National Asphalt Pavement Association (NAPA), Asphalt Roofing Manufacturers Association (ARMA), and National Roofing Contractors Association (NRCA), through an unrestricted grant to the International Agency for Research on Cancer.

The authors declare they have no actual or potential competing financial interests.

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APPENDIX 3-1
Bullet #3 – BREDL Virginia DEQ Excerpts

(www.bredl.org/pdf/DEQ072503.pdf)

(Page 1)

BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE
www.BREDL.org ~ PO Box 88 Glendale Springs, North Carolina 28629 ~ Phone (336) 982-2691 ~ Fax (336) 982-2954 ~ BREDL@skybest.com
IN VIRGINIA: 1828 Brandon Ave. SW Roanoke, Virginia 24015 ~ Phone (540) 342-5580 mebarker@rev.net

July 25, 2003
1828 Brandon Ave. SW
Roanoke, VA 24015

Robert G. Burnley
Director
Virginia Dept. of Environmental Quality
629 East Main Street
Richmond, Va. 23219

Re: W-L Construction and Paving, Inc., Registration No. 11119, Wythe County

Dear Mr. Burnley:

I write on behalf of the Board of Directors of the Blue Ridge Environmental Defense League (BREDL) and Wythe Environmental Action Group (WEAG). BREDL is a regional, community-based, non-profit environmental organization. Our founding principles are earth stewardship, environmental democracy, social justice, and community empowerment. BREDL has chapters throughout the Southeast, including Virginia. WEAG is a BREDL chapter based in Wythe County.

As you know, permits to operate an air pollution source must assure compliance with state and federal regulatory requirements. Based on our analysis, the asphalt plant air pollution permit proposed for the Black Lick community in Wythe County is fatally flawed and does not protect Virginia's environment or the health and well-being of the citizens of the Commonwealth. Conditions of the permit as written are not sufficient to meet NAAQS or to protect public health. This letter will describe the inconsistencies, omissions, and errors which we have identified in the Virginia Department of Environmental Quality's air permitting process. Further, we request that the air permit for the asphalt plant proposed for Wythe County be re-opened for cause as allowed under state regulations (9 VAC 5-80-1300).

(Page 7)

Facility Does Not Qualify for Permit Exemption

Under state and federal regulations, emissions of air pollutants must fall below certain benchmarks to escape more stringent regulatory oversight. The DEQ's permit fails to meet the emission rates for several criteria and hazardous air pollutants. Permit exemption limits stipulated in 9 VAC 5-80-1320 are 25 tons/year for particulate matter, 15 tons/year for PM-10, and 25 tons/year for volatile organic compounds. Based on the annual production limit of 200 thousand tons of asphalt, we estimate that the DEQ permit would allow 31 tons of VOC and 76 tons of particulates to be emitted into the air.

Asphalt cement comprises 5% (0.05) of the total hot mix plant production. Fugitive air emissions equal 1.07% (0.0107) of the consumed asphalt cement (data from Dr. R.M. Nadkarni). For an asphalt plant producing 200,000 tons of hot mix asphalt per year:

200,000 tons hot mix x 0.05 = 10,000 tons/year of asphalt cement consumed.

Fugitive air emissions equal 1.07% (0.0107) of the consumed asphalt.

10,000 x 0.0107 = 107 tons per year of asphalt vapor fugitive emissions

The bulk of these fugitive emissions are condensed particulates. Volatile organic compounds (VOC) emissions are about 29% of the this total. Therefore, about 15 tons of VOC and 38 tons of particulates would be emitted by a 200,000 ton/year asphalt plant as fugitive emissions. To this must be added the total emitted from the smokestack itself.

The US Department of Health and Human Services has determined that PAHs (Polycyclic aromatic hydrocarbons) may be carcinogenic to humans. Animal studies show that PAHs affect reproduction, cause birth defects, and cause harmful effects on skin, body fluids, and the immune system. Similar effects could occur in humans.

We request that the DEQ take steps to correct these the inconsistencies, omissions, and errors. We hereby request that the air permit for the asphalt plant proposed for Wythe County be re-opened for cause. Please reply to me at the address below. Feel free to contact me with any questions or requests for information.

Respectfully,

Mark E. Barker
SW VA Vice President
Blue Ridge Environmental Defense League
1828 Brandon Ave. SW

(www.epa.gov/ttn/chief/ap42/ch11/final/c11s01.pdf)

Hot Mix Asphalt Production Facility

Silo Filling and Truck Loadout - Fugitive Emissions (AP-42 Table 11.1-14)

Source: EPA, AP-42, Volume I, Fifth Edition, Chapter 11, Section 1, Mineral Products Industry, Updated 2004.
http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s01.pdf

Annual Production	100,000	ton/yr
Total Emission Factor = (0.332+0.181+(1.05+50.4+4.88+1.41+17.2+5.58)x(0.5)xe^(0.0251*(325+460)-20.43))/1000	0.01998	lb/ton
Annual Emissions = 100,000x0.01998	0.9991	ton/yr

APPENDIX 3-2
Bullet #3 – Nadkarni Excerpts

(http://permits.air.idem.in.gov/9662f.pdf)

Comment

Has any consideration been placed on the attainment versus nonattainment considerations for this area? Has there been a permissible emissions limit model done for this facility? If so, what are the results? Ms. Cruse then stated the carcinogenic effects of several HAPs that are emitted from the asphalt plant.

Response

Pending issuance of this FESOP, this plant would be approved to operate in all areas of the state including attainment and nonattainment counties, except Lake and Porter Counties which are severe nonattainment counties for ozone. Because of this, although Ripley County is attainment for all criteria pollutants (NOx, CO, Ozone (VOC), SO_2, and PM10), the permit was reviewed as if the plant was in a nonattainment area. All applicable rules for nonattainment areas were applied.

A modeling analysis, using the USEPA's SCREEN3 model, was done to determine the effects of the pollutants that will be emitted from this source. The concentrations of the three (3) air toxics and the three (3) criteria pollutants with the highest emissions from the source were modeled. The predicted concentrations of the air toxics and criteria pollutants were then compared to the Permissible Exposure Limits (PEL) developed by the Occupational Safety and Health Administration (OSHA). The predicted concentrations of the criteria pollutants were also compared to the 3 hour, 24 hour, and annual National Ambient Air Quality Standards (NAAQS) (there are no NAAQS for air toxics). The results of this analysis are shown on page 18. Additionally, this issue was discussed on page 22 of this Addendum.

The Paul H. Rohe Company submitted to IDEM a memorandum dated August 31, 1998. The memorandum was sent to Dan Crago of Paul H. Rohe Company from Laura Green, Ph.D., D.A.B.T. from Cambridge Environmental, Inc. in Cambridge, Massachusetts. The memo contains information and documents regarding the health effects of exposure to asphalt fumes. Some key points from the memorandum are as follows:

"In the case of emissions of asphalt fumes, as for all emissions to the atmosphere, what matters are the concentrations of pollutants reaching, for example, the nearest neighbors to an asphalt production facility, as well as, of course, the identity of those pollutants. For properly designed, built, and operated asphalt plants, the airborne concentrations of these pollutants will be, in my experience, acceptably small; and in terms of the identities of these pollutants, they are not dissimilar to the pollutants emitted by cars and trucks, for example, in that they derive from the heating of a petroleum product (asphalt cement)."

S "In general, exposures experienced by workers are considerably larger than exposures experienced by the general population - even by the specific population of those living closest to an asphalt plant or other production facility. In that regard, if workers exposed daily to relatively high concentrations of asphalt fumes suffer few or no adverse effects, then even fewer or no adverse effects would (again, in general) be expected among non-occupationally exposed neighbors. Peer-reviewed studies of the health of asphalt workers have in fact found few to no adverse effects associated with occupational exposures to asphalt fumes."

S "In apparent (but not real) contrast, there are two reports of excess morbidity and mortality in a group of Danish workers exposed to mastic asphalt (asphalt manufactured and used in Denmark which differs from the types of asphalt produced in the U.S. in a number of ways). This has been interpreted as evidence that asphalt fumes cause cancer. Recent work by my colleagues and me (Cole, Lash, and Green, submitted for publication to the Scandinavian Journal of Work, Environment & Health) review the underlying data in detail, and finds that they are simply and directly explained in terms of disease caused by smoking, excessive alcohol use, the interaction of the two, and other risk-taking behaviors. Thus, although these Danish mastic asphalt workers were indeed becoming sick and dying at extraordinary rates, they were doing so not because of their on-the-job exposures (which were, in any event, worse than and otherwise different from exposures faced by the average American asphalt paving worker), but instead because they both smoked and drank to considerable excess."

S "Critics of asphalt plants sometimes raise concerns over fugitive emissions during "loadout" of hot asphalt into trucks. One critic in particular, Dr. Ravi Nadkarni, has made some engineering estimates that suggest that loadout emissions could be responsible for relatively high emission rates of organic compounds. As it turns out, though, the physical basis of his calculations is overly simplistic and perhaps seriously flawed. The technical details of these issues have been described by my colleagues, who submitted their analysis to the U.S. EPA in response to a solicitation to comment on Dr. Nadkarni's calculations. .....The most serious shortcoming of Dr. Nadkarni's calculations is the applicability of the model on which they are based. He assumes that hot-mix behaves as a liquid pool of a volatile substance. As wind blows over the hot-mix asphalt, organic compounds are assumed to evaporate. Hot-mix asphalt, however, is not a liquid in which volatile molecules are free to mix vertically to the surface (and hence become available for evaporation). .....Another factor that Dr. Nadkarni fails to consider is the "skin layer" effect, in which the surface of hot-mix asphalt exposed to air cools and hardens relative to its internal temperature and consistency. The cooled surface layer, even though very thin, will likely reduce the level of VOC emissions below that predicted by the simple loadout model. .....Overall, then, Dr. Nadkarni's calculations likely overestimate the true level of loadout emissions, perhaps by a substantial degree. U.S. EPA has evaluated this question, and finds that Nadkarni's estimates are likely to be quite substantial overestimates."

S "Last year, The State of North Carolina Department of Environment and Natural Resources measured fugitive emissions at two hot-mix asphalt plants. .....Only very low levels of pollutants were detected. In particular, the State concluded that 'benzene concentrations encountered during this investigation are more typical of clean air. Therefore, this investigation completes...[this office's] assessment of asphalt plant fugitive emissions...'"

S "Some asphalt operations can be dusty, due to the use of crushed stone and gravel. There are two categories of dust sources at an asphalt plant: (1) ducted, which are conveyed through the plant's stack; and (2) fugitive, which may be released from various points on the plant site (generally away from the asphalt production machinery). Ducted emissions include dust from the aggregate dryer and other points (such as conveyors) that are operated under negative pressure to prevent the escape of dust. These potential dust emissions are well-controlled by the baghouse, which removes more than 99.9% of the particle loading that enters it. Fugitive dust emissions can result from the handling of aggregate material by front-end loaders and trucks, wind erosion from storage piles, and movement of vehicles over unpaved or dusty roads. These sources are typically effectively controlled by wetting on an as-needed basis."

APPENDIX 3-2 Continued
Bullet #3 – Nadkarni Excerpts

(http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=2000DVQP.txt)

EPA-454/R-00-030

HOT MIX ASPHALT PLANTS

STAKEHOLDERS OPINIONS REPORT

This document was prepared by:

Emissions Monitoring and Analysis Division
Office of Air Quality Planning and Standards
United States Environmental Protection Agency
Research Triangle Park, NC

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

April 2001

3.5.51 CAAP Factor Development Comment Number 23 (Ravi Nadkarni & Lloyd Fillion) -
Appendix B: Emission Factor Documentation for AP-42, Section 11.1, Hot Mix Asphalt Production, June 2000 Draft

47. Page 4-166, paragraph 4: This needs to be rewritten. It is obvious that this paragraph is recycled from some other writeup. There is no relevant "response 53" in the present writeup. Further, emissions are not only dependent on temperature, they are also dependent on convective effects, i.e. evaporation rate increases in the presence of strong convection.

3.5.52 Response to CAAP Factor Development Comment Number 23 - We agree that there is no relevant "response 53". In addition, the document to which "Response 53" refers is missing from the reference list at the end of the chapter. The statement refers to Response number 53 in the EPA report "Response to Comments on Testing Program for Asphalt Plants C and D." The reference number of this report was added to the text. It is not clear that convective effects would have a significant impact on the emissions from asphalt in the bed of transport trucks. First, emissions of low molecular weight hydrocarbons are more likely a function of the rate at which volatile compounds can reach the asphalt surface, the rate that the high molecular weight asphalt molecules crack thereby creating the more volatile compounds within the asphalt and the rate at which these volatile compound can migrate from air spaces inside the asphalt pile to the surface of the pile. Second, near the surface of the asphalt pile in the transport truck without ambient air movement, the concentration of these volatile compounds was measured at about 10 ppm. This is much lower than the saturation concentration of these compounds. In order for convection effects to significantly influence the evaporation rate, the surface concentrations would need to approach saturation without air movement. Third, in many States, the asphalt in the transport truck bed is required to be covered. This cover limits the convective effects the asphalt is exposed to during transport.

APPENDIX 3-3
Bullet #3 – NC DENR Excerpts

(www.daq.state.nc.us/news/pr/2001/aspoped_0201.shtml)

North Carolina Department of Environment and Natural Resources

Division of Air Quality

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News & Public Outreach >> Press Releases

Michael F. Easley, Governor — William G. Ross, Jr., Secretary

N.C. Department of Environment and Natural Resources

Release: Immediate
Date: February 2, 2001

Contact: Tom Mather (919) 715-7408
Distribution: Targeted

State and Local Governments Have Roles in Addressing Concerns about Asphalt Plants

[Editors: Alan Klimek, director of the N.C. Division of Air Quality, has written the following article to address many of the issues raised concerning asphalt plants and their emissions.] Please consider publishing this article on your op/ed pages.]

By Alan Klimek, Director, N.C. Division of Air Quality

Asphalt plants are like landfills - few people want to live near them. Although asphalt plants provide economic benefits to a community, some citizens have raised legitimate concerns about living near such facilities. Like many industrial plants, asphalt plants often are not the most attractive facilities to look at. They tend to generate more traffic from trucks picking up and delivering asphalt. They can be noisy at times, and they can generate odors similar to hot tar.

Such concerns, in part, have prompted North Carolina to strengthen substantially its permit review process for asphalt plants over the past three years. We apply stricter air pollution and analyses and limits for new and expanded plants. We also hold public hearings for many asphalt plant permits, even though such hearings aren't required under state or federal law. But despite additional oversight and controls, the permitting process for asphalt plants seems to have become more controversial -- particularly in the mountains.

In North Carolina, asphalt plants must obtain air quality permits from the Division of Air Quality (DAQ). The DAQ's job is to make sure that asphalt plants meet all state and federal regulations for air emissions. Our regulations for air toxics are more stringent than those required by the U.S. Environmental Protection Agency (EPA) and many states. I am not aware of any state in the Southeast, other than North Carolina, that requires new asphalt plants to meet guidelines for toxic air pollutants.

To obtain an air permit in North Carolina, businesses wanting to operate asphalt plants must demonstrate they can meet rules for controlling particulates (dust), sulfur dioxide, nitrogen oxides, and air toxics. These demonstrations include computer modeling of toxic emissions from the plant's main stack as well as fugitive emissions, or fumes from asphalt storage and loading areas. Plants must show they can meet air quality guidelines at their property lines - meaning nearby residents should not be exposed to unhealthy levels of air pollutants, even if they live next door to a plant. These guidelines assume that nearby residents would be exposed to the air emissions 24 hours a day, 365 days a year, over a 70-year period -- which is unlikely in most cases.

Modeling is done because toxic air emissions generally occur at levels too small to measure accurately. These computer models take into account the maximum projected emissions rates of a plant, the size and shape of its property, the characteristics of each emissions source (such as stack heights and gas temperatures), the elevation of the surrounding terrain, and other factors.

The models also assume "worst-case" meteorological conditions, whether they exist at a facility or not. Worst-case conditions include factors such as low wind speeds, temperature inversions, stagnant weather and temperatures most likely to prevent atmospheric mixing and concentrate air pollutants. As a result, if a plant can meet air quality guidelines under these worst-case conditions, we are confident that it would comply under the weather conditions that actually exist at the plant.

For example, an asphalt plant meeting North Carolina's air toxics rules must show through modeling that its emissions would not increase levels of benzene in the air by more than 1.8 micrograms per day at the plant's property lines. For comparison's sake, a typical person would be exposed to about 200 micrograms of benzene in total per day through activities such as breathing second-hand cigarette smoke (20 micrograms/day), driving in traffic (38 micrograms/day), breathing indoor air (62 micrograms/day), and pumping gasoline (92 micrograms/occurrence). A person smoking 1.5 packs of cigarettes per day would be exposed to about 1,800 micrograms/day. These numbers show that living near an asphalt plant is actually much less risky, in terms of benzene exposure, than many everyday activities.

Despite these facts, the Division of Air Quality often is besieged by requests for us to deny permit applications for new asphalt plants - mainly because people do not want to live near them. The DAQ does not have the authority to deny a permit based on such concerns. If people want to stop an asphalt plant from being built in a particular location, they should contact their local planning officials. In North Carolina, local governments have the primary control over land use and zoning. Although few mountain communities have land-use controls, that lack of control does not give the DAQ the authority to assume it.

In other words, the DAQ cannot tell an asphalt company where to locate a plant. We cannot deny a permit because other asphalt plants already exist in a community, because it may lower nearby property values, or because a proposed plant would be near a stream, a subdivision or a school. If a plant demonstrates that it can meet air quality regulations, we are required by law to issue it a permit.

It's ironic, in a sense, that asphalt plants have become so controversial because we are all responsible for their prevalence. North Carolina has about 150 asphalt plants located across the state. One reason why there are so many asphalt plants is because there are so many cars and trucks as well as the highways to accommodate them. North Carolina has the second-largest state-maintained highway system in the nation, with about 78,000 miles of roads in total. The state's rapid growth in recent years has created unprecedented demand for asphalt to pave or resurface highways, parking lots, subdivisions, driveways and other surfaces. Another factor contributing to the prevalence of asphalt plants is the nature of the material. Asphalt plants must be located fairly close to construction sites because delivery trucks can travel only limited distances and still maintain the temperatures needed for paving.

The Division of Air Quality is committed to ensuring that asphalt plants meet state and federal air regulations. However, local governments must exercise their authority over land-use matters if the public wants a say in where such facilities are located.

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North Carolina Department of Environment and Natural Resources (NCDENR)

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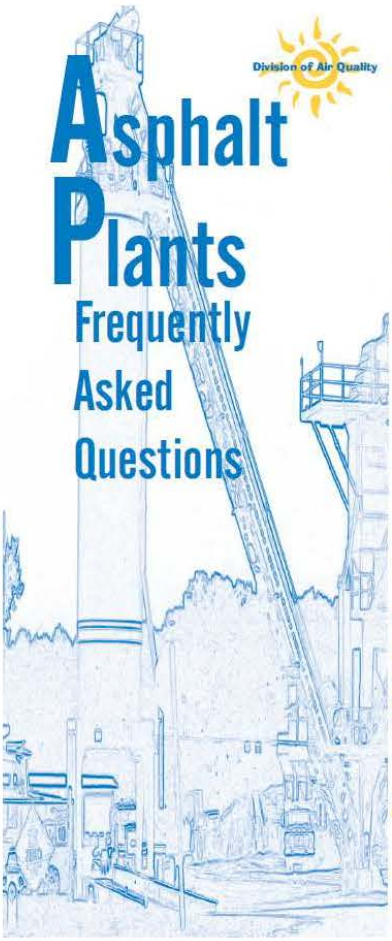
APPENDIX 3-3 Continued
Bullet #3 – NC DENR Excerpts

(www.daq.state.nc.us/news/brochures/asphalt.pdf)



Asphalt Plants: Frequently Asked Questions

The N.C. Department of Environment and Natural Resources (DENR) receives many calls and letters about asphalt plants, generally when companies apply for permits to build new facilities. North Carolina has about 150 asphalt plants, and about five new facilities are permitted each year. Many asphalt plants are portable, so they can be moved to different locations based on needs for new highways and other construction projects. Before a company can build or operate an asphalt plant, it must obtain an air quality permit and in some cases may need water quality permits. In DENR, the Division of Air Quality handles air permits for asphalt plants, and the Division of Water Quality handles water permits (if applicable).

How does the Division of Air Quality control asphalt plants?

All asphalt plants must obtain an air permit from the Division of Air Quality. The DAQ reviews all air permit applications for compliance with state and federal air quality regulations. All asphalt plants must meet air quality limits for particulates, which include dust and soot. In addition, all new, modified or relocated asphalt plants must comply with the state air toxics rules, including emissions from stacks and fugitive sources. To meet air quality limits, all asphalt plants have emissions control equipment such as bagfilters or scrubbers.

How do asphalt plants affect air quality?

Air emissions are created at several stages during asphalt production. Most of the emissions come from an asphalt plant's main stack. Fumes from asphalt storage and loading areas account for the remaining air emissions, collectively referred to as fugitive emissions.

Asphalt production, like any process in which materials are heated or burned, can produce a range of air emissions. Many of these same compounds are emitted by cars and trucks, fireplaces and wood stoves, wildfires, and other industries. While some of these emissions potentially can be unhealthy to breathe, such problems can be prevented by requiring asphalt plants to install controls or take other measures that reduce their emissions of harmful air pollutants. That is the guiding principle behind state air quality rules, which set stringent limits for a range of pollutants based on their known health effects. In addition, the Division of Air Quality (DAQ) plans to re-examine its permitting procedures pending the results of a nationwide study of asphalt plant emissions being conducted by the U.S. Environmental Protection Agency (EPA). If changes are warranted based on the EPA study, the DAQ can reopen asphalt plant permits issued since April 1998.

Is it safe to live near an asphalt plant?

North Carolina's air quality regulations are designed to protect public health. In addition, North Carolina has one of the more stringent state programs for regulating emissions of air toxics. The N.C. Environmental Management Commission adopted the state's air toxics rules in 1990, based on the recommendations of a panel of scientists and health experts who spent more than five years developing a list of air pollutants most likely to pose health risks. The air toxics rules set limits for 105 pollutants that are known to pose either short or long-term hazards for people who breathe them. Under these rules, facilities are not allowed to emit pollutants that exceed any of the air toxics limits at or beyond their property lines. Thus, citizens living near plants that meet the air toxics rules should not be exposed to unhealthy levels of air pollution.

Why are there are so many asphalt plants?

North Carolina has the second-largest state-maintained highway system in the United States, and it takes a lot of asphalt to pave those roads. The state has about 78,000 miles of roads, with more under construction every year. In addition, roads generally need resurfacing every 12 to 15 years, so about 4,400 miles of roads are repaved each year. Another factor contributing to the number of asphalt plants is the nature of the material. Paving is difficult at lower temperatures, and highway contractors must reject asphalt that is not hot enough (at least 250 degrees). That means asphalt plants must be located fairly close to road construction sites.