

Blue Ridge Environmental Defense League

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July 7, 2015

Jimmy Hodges, Chairman
Watauga County Board of Commissioners
814 West King Street
Boone, NC 28607

RE: Amendments to the High Impact Land Use Ordinance

Dear Chairman Hodges and members of the Commission:

On behalf of the Blue Ridge Environmental Defense League, its chapter High Country Wataugans Against Toxins Close to Home (HC WATCH) and our members in Watauga County, I write to provide comment on the amendments to the HILU ordinance.

Recommendations

With almost 2,000 dangerous chemicals in asphalt fume, asphalt plants simply should not be located where they may have a negative impact on air quality and public health. Therefore, we recommend:

- Watauga County must take deliberate action to protect its residents
- An extended moratorium is necessary for the county to develop reasonable, reliable protections
- Local government planning and health agencies must determine where it is unsuitable for polluting industries emitting toxic air pollution, unpleasant noise or odors to locate
- At a minimum, protected sites must include urban, suburban and rural residential areas, commercial areas, schools, nursing homes and others
- A 2000-foot setback of polluting industries from protected areas is reasonable, prudent and has precedent in North Carolina

Background

On June 12, 2015, Maymead, Inc. submitted an application to the North Carolina Department of Environment and Natural Resources Division of Air Quality requesting to construct and operate an asphalt plant designated by SIC/NAICS Code 2951, Asphalt Paving Mixtures and Blocks at the J.W. Hampton 421 site. The facility air pollution class requested is "synthetic minor." The emission sources listed in the application are an Astec Drum Mix Asphalt Plant burning #2 REC and #4 fuel oils, an asphalt storage silo, a silo loadout, and a recycled asphalt paving (RAP) crusher. The air pollution control device listed, CD-1, is a baghouse. The company plans to produce up to 300 thousand tons of asphalt per year. The maximum production rate would be 325 tons/hour.

General Comments

Asphalt plants are large sources of pollution. Asphalt plants have two major categories of emissions: ducted sources and fugitive sources. Ducted source emissions include air toxins vented to the atmosphere through some type of stack, vent, or pipe. Ducted emissions pass through an industrial ventilation system, typically a baghouse filter, and

emitted to the atmosphere through a stack. In addition, fugitive emissions resulting from the asphalt process are emitted directly from the source to the ambient air. Both types of emissions include a combination of gaseous pollutants and particulates. Road asphalt contains gravel and sand mixed with asphalt cement obtained from crude oil.

Hydrocarbons released into the air by the hot mix asphalt as it is loaded into trucks and hauled from the plant site include volatile organic compounds (VOC), polycyclic aromatic hydrocarbons (PAH), and condensed particulates. VOCs include many toxic pollutants including formaldehyde, benzene, and methylene chloride. PAHs have been identified as carcinogenic, mutagenic and teratogenic.

Asphalt cement is petroleum, a mixture of hydrocarbons including naphtha which contribute to the vaporization of organic compounds at operating temperatures of 300-350 degrees F. Condensation of particulates occurs at ambient temperatures of 70 degrees F. These very fine particles carry polycyclic aromatic hydrocarbons which are a danger to public health. This pollution comes directly from heating the asphalt cement, not burning the fuel. Oil-fired, gas-fired and even electric-powered asphalt plants have these fugitive emissions, sometimes referred to as "blue smoke." See photo attached.

Specific Comments

The June 12 application states that the plant would use fuel oil No. 2 and fuel oil No. 4 to heat the asphalt mixture. No. 4 fuel oil is a mixture of No. 2 distillate oil and No. 6 residual oil. Distillate fuels burn much cleaner than residual fuels, emitting significantly lower emissions of NO_x, PM and SO₂. So, when burning No. 4 fuel oil, higher levels of pollution are created and released to the air.

The asphalt plant application requests a production limit of 300,000 tons of asphalt per year. Assuming this level of production, Table A Column 2 lists emissions using only #2 fuel oil (F.O. #2) and Column 3 shows the increased levels of some compounds using No. 4 fuel oil (F.O. #4). The cleaner burning No. 2 fuel oil is more expensive.

Table A. Air Pollution Emissions from an Asphalt Plant in Pounds/Year

Pollutant	Emissions, F.O. #2	Emissions, F.O. #4
CO	39,000	
NO _x	16,500	17,694
PM total	9,900	93,525
VOC	9,600	
PM-10	6,900	
SO ₂	3,300	10,099
Total HAP	2,610	
Formaldehyde	930	
Toluene	870	
Benzene	117	
Lead	4.5	
Chromium	1.6	

The emission factor data source is the US Environmental Protection Agency's AP-42

database based on actual plant operating experience.¹ The emission levels listed above are those emitted to the atmosphere; that is, after the exhaust has passed through the pollution control device, the baghouse filter. A fireproof baghouse fabric filter is the method of pollution control stated in the application. However, the pollution control device removal efficiency, stated in the application Form C1 as 99.9%, is exceedingly optimistic and not supported by the experts.

Baghouses typically are designed for particulate collection (removal) efficiencies of 99 percent to 99.9 percent. Actual operating removal efficiencies may differ slightly, down to the level of 95%.²

The pollution totals listed in Table A include only the emissions from the main smokestack. In addition to these pollutants, fugitive emissions pollution not emitted from the stack are also released to the atmosphere. Based on the annual consumption of asphalt cement, one can calculate the asphalt vapor fugitive emissions from any plant. Asphalt cement typically comprises 5% (0.05) of the total hot mix plant production. Fugitive air emissions equal 1.07% (0.0107) of the consumed asphalt cement.³

So, for an asphalt plant producing 300,000 tons of hot mix asphalt per year:

300,000 tons hot mix x 0.05 = 15,000 tons/year of asphalt cement consumed.

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

15,000 x 0.0107 = 161 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 total. Therefore, about 47 tons of VOC and 114 tons of particulates may be emitted by a 300,000 ton/year asphalt plant as fugitive emissions. To this must be added the total emitted from the smokestack itself.

The Maymead application lists recycled asphalt pavement, or RAP, as an air pollution emission source (ES-4). When a plant switches from one hot mix formula to another, emissions may increase. For example, a plant using recycled asphalt pavement (RAP) has a higher operating temperature to provide extra heat to evaporate water associated with RAP, since RAP is stored in the open. Switching to a formula without RAP, the plant load-out will emit a higher level of organics because of overheating.

The US EPA issued a report on asphalt plant fugitive emissions in 2001. Blue Ridge Environmental Defense League participated in this review and co-authored a stakeholders' dissenting opinion with a number of citizens' groups and independent

¹ US EPA AP 42, Fifth Edition, *Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Chapter 11, Mineral Products Industry, 2004*, available at: <http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s01.pdf>

² Mario G. Cora and Yung-Tse Hung, "Controlling Industrial Particulate Emissions: A Practical Overview of Baghouse Technology," *Environmental Quality Management*, Summer 2002, page 59.

³ Basis for this data is a mass balance analysis by Ravindra M. Nadkarni, Ph. D. in Metallurgy & Ceramic Engineering, University of Utah. Dr. Nadkarni authored or coauthored 70 professional papers or presentations on a variety of engineering subjects, including the economic impact of pollution control regulations, work which directly resulted in Section 119 of the Clean Air Act.

experts a minority report which was published with EPA's study.⁴ Examples of large fluctuations in emissions exist in the data gathered for this report by the EPA at a drum mix plant, where pollution increased by a factor of 2 to 3 over a 40 minute period. Episodes of high emissions caused by variations such as high temperatures are missed by the total reliance on averages of data collected under ideal test conditions. Table B shows the effect of different volatile contents and operating temperatures on emissions from the asphalt storage silo and load-out alone in pounds per year.

Table B. Changes in Emissions Caused by Asphalt Content and Temperature⁵

Load Out Emissions (a)	EPA (c)	CITIZENS (d)
Total Particulate Matter	104	515
Organic Particulate Matter	68	478
Total Organic Compounds (Method 25A)	832	5,836
Carbon Monoxide	270	1,893
Silo filling emissions (b)		
Total Particulate Matter	117	423
Organic Particulate Matter	51	356
Total Organic Compounds (Method 25A)	2,437	17,100
Carbon Monoxide	236	1,656

(a) Load-out emissions for both batch and drum plants - See AP-42, Table 11.1-14

(b) Load-out emissions for plants with silo storage- mainly, but not exclusively, drum plants. See AP-42, Table 11.1-14

(c) EPA estimates for drum plant in lb/200,000 tons of HMA. Volatility of 0.5%, 325 degrees-F

(d) Citizen estimates for drum plant in lb/200,000 tons of HMA. Volatility of 1.0%, 375 degrees-F

The Minority Report issued by citizens groups after the issuance of EPA's fugitive emissions test results states:

It can be seen that the emissions calculated by using EPA-derived equations, particularly emissions of noxious organic compounds, increase by over 600% under conditions of higher operating temperature and volatility contents. Both the EPA and the Citizen numbers would increase by another 20 to 30% to compensate for the low bias introduced by the "background correction" and "Method 204", discussed later in this report. Finally, it should be noted that although the numbers in Table 1 are shown on an annual basis to help compare them to Table 1 in the Executive Summary of the Emission Assessment Report, the citizens are aware that actual annual emissions will be lower since a plant will not always operate with an asphalt with a high volatiles content at high temperatures. On the other hand, the table clearly shows the type of variation in emissions that is likely to occur under such conditions with its acute effects on nearby

⁴ "Minority Report on Emissions from Asphalt Plants," *Hot Mix Asphalt Plants Stakeholders Opinions Report*, US Environmental Protection Agency Office of Air Quality Planning and Standards, Document #EPA-454/R-00-030, April 2001, page 49-67, Accessed 7/4/15 at <http://www.epa.gov/ttnchie1/ap42/ch11/related/stkhld-opn.pdf>

⁵ *Id.*, page 49-67 (9)

residents.⁶

Based on reports from residents in communities with operating asphalt plants, we believe that periods of high emissions are frequent. Further, the public health impacts of these emissions are more significant since asphalt plants in unzoned communities are located closer to residential areas and small operators, such as the proposed Highway 421 facility.

Finally, the DAQ's use of computerized screening models for toxic, ground level (fugitive) emissions remains troublesome because such dispersion models do not apply within the atmospheric boundary layer, a distance of 30 feet from the ground where frictional effects predominate. This means that the state's use of such models for fugitive emissions will predict more dispersion and lower pollutant levels than will actually occur.

No De-listing of Asphalt Plants as Major Sources for Criteria Pollutants by EPA.

Asphalt industry representatives may misconstrue the decision by the US Environmental Protection Agency which deleted asphalt concrete manufacturing as a major source of hazardous air pollutants. Industry spokesmen often say that asphalt was removed from the health hazard list in 2002. Such statements are incorrect or incomplete. The full statement in the Federal Register regarding asphalt plants reads:

National Emission Standards for Hazardous Air Pollutants: Revision of Source Category List Under Section 112 of the Clean Air Act

III.C.1. Asphalt Concrete Manufacturing

In today's notice, we are deleting the source category Asphalt Concrete Manufacturing because available data indicate that there are no major sources. This source category was initially listed in July 1992 because at the time, we believed there were major sources in the category. Emissions data, along with emission factors, were used to estimate HAP emissions from eleven asphalt concrete manufacturing plants employing various production processes and different fuels. Emissions of total HAP at individual plants range from 1.5 tons per year (tpy) to 6.4 tpy. In addition, emission factors were used to estimate HAP emissions from a plant with a high annual production of 1.2 million tons of asphalt concrete. We estimate total HAP emissions from that plant to be 6.2 tpy. Based on the above information, we have concluded that no asphalt concrete manufacturing facility has the potential to emit HAP approaching major source levels.⁷

It is important to note that under Section 112 of the federal Clean Air Act controls 188 *hazardous air pollutants* (HAP). Major source thresholds under Section 112 are 10 tons per year for any HAP and 25 tons per year of HAPs in the aggregate. The EPA deleted asphalt plants only because they found that the highest HAP emission from existing plants was 6.4 tons per year. However, asphalt plants are still considered potential major sources of *criteria pollutants*; that is, as air pollution sources with the potential to emit more than 100 tons per year of sulfur dioxide, nitrogen oxides, carbon monoxide, and/or particulate matter (PM-10). Ozone is also a criteria pollutant but it is not emitted from smokestacks; ozone is created in the atmosphere by the interaction of nitrogen oxides and volatile organic compounds. Volatile organic compounds are also emitted in large quantities by asphalt plants. Criteria pollutants are hazardous to human health, but are managed under other sections of the Clean Air Act. In fact, asphalt plants are typically

⁶ *Id.* page 49-67 (8)

⁷ Federal Register: February 12, 2002 (Volume 67, Number 29)] [Notices] [Page 6522]

required to limit their production rates, seeking synthetic minor status, in order to remain below 100 ton-per-year major source thresholds for sulfur dioxide, nitrogen oxides, or carbon monoxide. No de-listing of asphalt plants as major sources for criteria pollutants has been promulgated by EPA.

Local Governments Have Sole Responsibility for Locating Industrial Facilities

State environmental protection agencies rarely deny air pollution permits. The state often issues permits with conditions which stipulate that it is valid only if it complies with local regulations. It is up to local government planning and zoning agencies to determine which sites are suitable for industrial facilities which cause unpleasant noise or odors. Public statements by public hearing officers and by the Director of DAQ make this plain. Regarding protection of residential property, the state Supervisor of DAQ's Stationary Source Compliance Branch wrote,

“However, deciding where industrial facilities will go is entirely a matter of land use planning and zoning. These matters are usually left up to local governments and are totally outside the authority of the DAQ.”⁸

If the local government authority does not take steps to enact regulations sufficient to protect residential and commercial neighborhoods from pollution before it becomes a problem, citizens are left with few options. In a letter to a resident concerned about pollution and health problems in her community, Governor Jim Hunt wrote,

“It is unfortunate that this asphalt plant is located, as you noted in your letter, in a residential/tourist neighborhood. As recommended in the report by our recent Year of the Mountains commission, better land use planning could help avoid such problems. I urge you and your neighbors to consider supporting such planning in the future.”⁹

The NC Division of Air Quality with rare exception seems unable to prevent issuing asphalt plant permits in unsuitable areas.

Conclusion

An extended moratorium is necessary for the county to develop reasonable, reliable protections. This is something the state cannot do. The state permit, if granted, would allow a wide range of pollutants to be emitted from the asphalt plant, and the variations would be unpredictable because the operator of the plant would determine which fuel to use and when based on the price of fuel and the needs of the job. For this and other reasons stated above, the county must enact an ordinance which will protect its residents.

Thank you for the opportunity to express these concerns.

Respectfully,



Louis A. Zeller

Executive Director, Blue Ridge Environmental Defense League

⁸ Michael Aldridge, Hearing Officer's Report for the Public Hearing on December 16, 1998

⁹ Correspondence from Gov. James B. Hunt to Deborah Peck, March 14, 1997

ATTACHMENT



Rhodes Brothers Paving Co., asphalt plant in Macon County, NC, photo by Louis Zeller