

# Blue Ridge Environmental Defense League

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October 23, 2007

## NC Division of Air Quality Public Hearing on Draft Permit No. 09808R00

Young & McQueen Grading Co. Inc.—Spruce Pine Plant

Site No. 01/61/00107

Hot mix asphalt contains gravel and sand mixed with asphalt cement. Large volumes of hydrocarbons are released into the air as the hot asphalt is mixed, loaded into trucks and hauled from the plant site. These include volatile organic compounds, polycyclic aromatic hydrocarbons, and condensed particulates. This mixture of hydrocarbons includes naphtha which contributes to the vaporization of organic compounds at typical asphalt plant operating temperatures of 300-350 degrees F. Condensation of particulates occurs at ambient temperatures of 70 degrees F. These condensed particles carry a variety of compounds which are a danger to public health.

The draft air pollution permit proposed by the NC Division of Air Quality would allow the plant on Chalk Mountain to produce up to 225,000 tons of asphalt per year at a maximum of 160 tons per hour. If given final approval by the state, the plant would be allowed to emit the following air pollutants annually:

<b>Chronic toxicants</b>	<b>pounds</b>
carbon disulfide	682
methyl ethyl ketone	13,650
toluene	17,150
xylene	9,975
<b>Acute system toxicant</b>	
formaldehyde	617
styrene	3,780
<b>Carcinogens</b>	
benzene	64
trichloroethylene (TCE)	4,000
perchloroethylene (PCE)	13,000

*Annual totals based on production rate of 160 tons per hour for 1,406 hours per year or 175 days at 8 hours per day to produce 225,000 tons of asphalt.*

Certain pollution sources at the asphalt plant would be exempted from its state permit:

- 1) an Asphalt Tank Heater burning No. 2 fuel oil at 1.6 million BTU heat input and
- 2) a 10,000 gallon liquid asphalt storage tank. These units are known sources of toxic air pollution but are exempted by state statute; that is, they are listed in the permit but not included in the air pollution limits.

Asphalt plants are largely regulated as point sources of air pollution from the main smoke stack which carries emissions from the aggregate dryer through the baghouse filter. But in addition to the dryer stack, asphalt plants have many sources of fugitive emissions; i.e.,

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releases from other stacks, conveyor belts, flanges, hoppers and other equipment close to ground level. Because fugitive emissions occur close to ground level, wind velocity is reduced and air pollution is not subject to the dispersion which occurs at smokestack levels. Stagnant air conditions and inversions increase the level of exposure to the local community. The complex conditions found in the mountain ridges and valleys in Mitchell County and western North Carolina require that we use the most conservative, or worst case, methodology for predicting air pollution impacts.

The NC Division of Air Quality used a US EPA computer model SCREEN3 to derive its pollution estimates. In my analysis, I have employed a spreadsheet based on EPA SCREEN3 which calculates all emission modeling modes: point source, area source, and volume source. **Using this most conservative, worst-case calculation, we find that the point source mode is not the most conservative estimate and that the draft permit would not meet state standards for toxic air pollution (15A NCAC 2D .1104).**

For example, the NC DAQ Air Permit Review for the draft permit stipulates minimum setbacks from the asphalt plant property line for the main dryer stack of 18.29 meters (59 feet) and for the storage silos of 15 meters (49 feet) in order to comply with NC acceptable ambient levels (AALs). Oddly, this requirement is not specified in the draft permit; the omission must be corrected. But our calculations indicate that even this setback requirement will not meet AALs or provide adequate protection to the public.

At the maximum permitted production rate of 225,000 tons per year at 160 tons per hour, the Young & McQueen plant would emit 166 pounds of formaldehyde annually (0.00074 lb/ton x 225,000 tpy); it would emit 0.1315 pounds per hour (0.166 E-02 grams/second).<sup>1</sup> **The EPA worst-source computer modeling indicates that at 200 meters from the plant, NC AALs will be exceeded** (see Attachment A). Considering the emissions from the silo and load out alone (0.014 pounds of formaldehyde hourly, 1.7748 E-03 grams/second), North Carolina AALs would be exceeded near the 49 foot setback line called for by the permit review (Attachment B).

Formaldehyde is an acute irritant. Formaldehyde exposure is associated with eye, nose, and throat irritation, nausea, headaches, difficult breathing, and asthma. The U.S. EPA has classified formaldehyde as a probable human carcinogen.<sup>2</sup>

The draft permit would allow 64 pounds of benzene, a known human carcinogen, to be emitted annually. **The EPA Worst Source model predicts that the AALs would be exceeded 1.8 miles (3000 meters) from the plant** (Attachment C). **Arsenic, a toxic heavy metal, would exceed AALs 2.17 miles (3,500 meters) from the plant** (Attachment D).

These results are not surprising if we consider that 1,800 pounds of volatile organic compounds per year could be emitted from the proposed Young & McQueen asphalt plant.<sup>3</sup> Asphalt cement typically comprises 5% of hot mix asphalt. Fugitive air emissions equal 1.07% of the consumed asphalt cement.<sup>4</sup> The state's draft permit would allow the production of 225,000 tons of hot mix asphalt per year. If we factor these

percentages with the proposed plant output, we find the following:

$$225,000 \text{ tons hot mix} \times 0.05 = 11,250 \text{ tons/year of asphalt cement}$$

$$11,250 \times 0.0107 = 120.375 \text{ tons per year of asphalt vapor fugitive emissions}$$

The bulk of the above fugitive emissions are condensed particulates. Volatile organic compounds (VOC's) comprise about 29% of the total.<sup>4</sup> Therefore, about 35 tons of VOC and 85 tons of particulates may be emitted by a 225,000 ton/year asphalt plant as fugitive emissions. To this must be added the total emitted from the smokestack itself.

Respectfully,

A handwritten signature in black ink that reads "Louis A. Zeller". The signature is written in a cursive style and is followed by a horizontal line.

Louis Zeller  
Clean Air Campaign Coordinator

#### References

1. US EPA Emission Factors for Organic Pollutant Emissions from Batch Mix Hot Mix Asphalt Plants, AP-42, 3/04, Table 11.1-9
2. California Air Resources Board at <http://www.arb.ca.gov/toxics/tac/factshts/formald.pdf>
3. Young & McQueen Grading Company permit application, June 22, 2007, Form B
4. Data from calculations of Dr. R.M. Nadkarni

Attachments

## Attachment A

## FORMALDEHYDE

Enter the peak emission rate of the contaminant of concern

Peak (30 min) Emission Rate =	<b>0.017</b>	g/s	0.575	tons/yr
MW=	<b>30.0261</b>			
Concern level	<b>0.122</b>	ppm	149.8	ug/m3

Distance (M)	Point	Area	Volume	Worst	Recommendation
10	2.13E+02	2.85E+03	2.83E+02	<b>2.85E+03</b>	reduce emissions
100	1.22E+01	3.91E+02	1.28E+02	<b>3.91E+02</b>	reduce emissions
200	6.66E+00	1.55E+02	7.08E+01	<b>1.55E+02</b>	reduce emissions
300	4.59E+00	8.40E+01	4.56E+01	<b>8.40E+01</b>	its OK
400	3.52E+00	5.33E+01	3.21E+01	<b>5.33E+01</b>	its OK
500	2.86E+00	3.71E+01	2.40E+01	<b>3.71E+01</b>	its OK
600	2.42E+00	2.75E+01	1.92E+01	<b>2.75E+01</b>	its OK
700	2.05E+00	2.13E+01	1.56E+01	<b>2.13E+01</b>	its OK
800	1.79E+00	1.73E+01	1.30E+01	<b>1.73E+01</b>	its OK
900	1.79E+00	1.44E+01	1.11E+01	<b>1.44E+01</b>	its OK
1000	1.80E+00	1.22E+01	9.61E+00	<b>1.22E+01</b>	its OK
1100	1.77E+00	1.05E+01	8.41E+00	<b>1.05E+01</b>	its OK
1200	1.77E+00	9.21E+00	7.43E+00	<b>9.21E+00</b>	its OK
1300	1.77E+00	8.15E+00	6.63E+00	<b>8.15E+00</b>	its OK
1400	1.75E+00	7.28E+00	5.96E+00	<b>7.28E+00</b>	its OK
1500	1.73E+00	6.55E+00	5.40E+00	<b>6.55E+00</b>	its OK
1600	1.70E+00	5.93E+00	4.92E+00	<b>5.93E+00</b>	its OK
1700	1.67E+00	5.41E+00	4.51E+00	<b>5.41E+00</b>	its OK
1800	1.63E+00	4.95E+00	4.15E+00	<b>4.95E+00</b>	its OK
1900	1.59E+00	4.56E+00	3.83E+00	<b>4.56E+00</b>	its OK
2000	1.55E+00	4.22E+00	3.60E+00	<b>4.22E+00</b>	its OK
2100	1.50E+00	3.93E+00	3.37E+00	<b>3.93E+00</b>	its OK
2200	1.46E+00	3.68E+00	3.15E+00	<b>3.68E+00</b>	its OK
2300	1.42E+00	3.45E+00	2.96E+00	<b>3.45E+00</b>	its OK
2400	1.38E+00	3.24E+00	2.79E+00	<b>3.24E+00</b>	its OK
2500	1.34E+00	3.06E+00	2.64E+00	<b>3.06E+00</b>	its OK
2600	1.30E+00	2.89E+00	2.50E+00	<b>2.89E+00</b>	its OK
2700	1.26E+00	2.73E+00	2.37E+00	<b>2.73E+00</b>	its OK
2800	1.23E+00	2.59E+00	2.25E+00	<b>2.59E+00</b>	its OK
2900	1.19E+00	2.47E+00	2.14E+00	<b>2.47E+00</b>	its OK
3000	1.16E+00	2.35E+00	2.05E+00	<b>2.35E+00</b>	its OK
3500	1.01E+00	1.90E+00	1.67E+00	<b>1.90E+00</b>	its OK
4000	8.94E-01	1.59E+00	1.40E+00	<b>1.59E+00</b>	its OK
4500	7.97E-01	1.35E+00	1.19E+00	<b>1.35E+00</b>	its OK
5000	7.17E-01	1.17E+00	1.04E+00	<b>1.17E+00</b>	its OK
5500	6.50E-01	1.03E+00	9.11E-01	<b>1.03E+00</b>	its OK
6000	5.93E-01	9.13E-01	8.11E-01	<b>9.13E-01</b>	its OK
6500	5.44E-01	8.19E-01	7.28E-01	<b>8.19E-01</b>	its OK
7000	5.02E-01	7.41E-01	6.60E-01	<b>7.41E-01</b>	its OK

## Attachment B

Enter the peak emission rate of the contaminant of concern

FORMALDEHYDE  
Silo+L-O

Peak (30 min) Emission Rate =	<b>0.0017748</b>	g/s	0.062	tons/yr
MW=	<b>30.0261</b>			
Concern level	<b>0.122</b>	ppm	149.8	ug/m3

Distance (M)	Point	Area	Volume	Worst	Recommendation
10	2.28E+01	3.05E+02	3.03E+01	<b>3.05E+02</b>	reduce emissions
100	1.31E+00	4.19E+01	1.37E+01	<b>4.19E+01</b>	its OK
200	7.14E-01	1.66E+01	7.58E+00	<b>1.66E+01</b>	its OK
300	4.91E-01	9.00E+00	4.88E+00	<b>9.00E+00</b>	its OK
400	3.77E-01	5.70E+00	3.44E+00	<b>5.70E+00</b>	its OK
500	3.07E-01	3.97E+00	2.57E+00	<b>3.97E+00</b>	its OK
600	2.59E-01	2.95E+00	2.06E+00	<b>2.95E+00</b>	its OK
700	2.20E-01	2.28E+00	1.67E+00	<b>2.28E+00</b>	its OK
800	1.91E-01	1.85E+00	1.39E+00	<b>1.85E+00</b>	its OK
900	1.92E-01	1.54E+00	1.19E+00	<b>1.54E+00</b>	its OK
1000	1.93E-01	1.30E+00	1.03E+00	<b>1.30E+00</b>	its OK
1100	1.90E-01	1.13E+00	9.00E-01	<b>1.13E+00</b>	its OK
1200	1.90E-01	9.87E-01	7.96E-01	<b>9.87E-01</b>	its OK
1300	1.90E-01	8.73E-01	7.10E-01	<b>8.73E-01</b>	its OK
1400	1.88E-01	7.80E-01	6.39E-01	<b>7.80E-01</b>	its OK
1500	1.85E-01	7.02E-01	5.79E-01	<b>7.02E-01</b>	its OK
1600	1.82E-01	6.36E-01	5.27E-01	<b>6.36E-01</b>	its OK
1700	1.79E-01	5.79E-01	4.83E-01	<b>5.79E-01</b>	its OK
1800	1.75E-01	5.31E-01	4.44E-01	<b>5.31E-01</b>	its OK
1900	1.70E-01	4.89E-01	4.11E-01	<b>4.89E-01</b>	its OK
2000	1.66E-01	4.52E-01	3.86E-01	<b>4.52E-01</b>	its OK
2100	1.61E-01	4.21E-01	3.60E-01	<b>4.21E-01</b>	its OK
2200	1.56E-01	3.94E-01	3.38E-01	<b>3.94E-01</b>	its OK
2300	1.52E-01	3.69E-01	3.18E-01	<b>3.69E-01</b>	its OK
2400	1.47E-01	3.47E-01	2.99E-01	<b>3.47E-01</b>	its OK
2500	1.43E-01	3.27E-01	2.83E-01	<b>3.27E-01</b>	its OK
2600	1.39E-01	3.09E-01	2.67E-01	<b>3.09E-01</b>	its OK
2700	1.35E-01	2.93E-01	2.54E-01	<b>2.93E-01</b>	its OK
2800	1.31E-01	2.78E-01	2.41E-01	<b>2.78E-01</b>	its OK
2900	1.28E-01	2.64E-01	2.29E-01	<b>2.64E-01</b>	its OK
3000	1.24E-01	2.51E-01	2.20E-01	<b>2.51E-01</b>	its OK
3500	1.08E-01	2.04E-01	1.79E-01	<b>2.04E-01</b>	its OK
4000	9.57E-02	1.70E-01	1.50E-01	<b>1.70E-01</b>	its OK
4500	8.54E-02	1.45E-01	1.28E-01	<b>1.45E-01</b>	its OK
5000	7.68E-02	1.25E-01	1.11E-01	<b>1.25E-01</b>	its OK
5500	6.96E-02	1.10E-01	9.76E-02	<b>1.10E-01</b>	its OK
6000	6.35E-02	9.78E-02	8.69E-02	<b>9.78E-02</b>	its OK
6500	5.82E-02	8.77E-02	7.80E-02	<b>8.77E-02</b>	its OK
7000	5.37E-02	7.93E-02	7.07E-02	<b>7.93E-02</b>	its OK
7500	4.98E-02	7.25E-02	6.46E-02	<b>7.25E-02</b>	its OK

## Attachment C

## BENZENE

Enter the peak emission rate of the contaminant of concern

Peak (30 min) Emission Rate =	<b>0.0009</b> g/s	0.032 tons/yr
MW=	<b>78.1124</b>	
Concern level	<b>0.000038</b> ppm	0.121 ug/m3

Distance (M)	Point	Area	Volume	Worst	Recommendation
10	1.18E+01	1.58E+02	1.57E+01	<b>1.58E+02</b>	reduce emissions
100	6.78E-01	2.17E+01	7.08E+00	<b>2.17E+01</b>	reduce emissions
200	<b>3.70E-01</b>	<b>8.60E+00</b>	<b>3.93E+00</b>	<b>8.60E+00</b>	reduce emissions
300	2.55E-01	4.67E+00	2.53E+00	<b>4.67E+00</b>	reduce emissions
400	1.96E-01	2.96E+00	1.78E+00	<b>2.96E+00</b>	reduce emissions
500	1.59E-01	2.06E+00	1.33E+00	<b>2.06E+00</b>	reduce emissions
600	1.35E-01	1.53E+00	1.07E+00	<b>1.53E+00</b>	reduce emissions
700	1.14E-01	1.18E+00	8.67E-01	<b>1.18E+00</b>	reduce emissions
800	9.92E-02	9.60E-01	7.21E-01	<b>9.60E-01</b>	reduce emissions
900	9.95E-02	7.98E-01	6.18E-01	<b>7.98E-01</b>	reduce emissions
1000	9.98E-02	6.76E-01	5.34E-01	<b>6.76E-01</b>	reduce emissions
1100	9.83E-02	5.84E-01	4.67E-01	<b>5.84E-01</b>	reduce emissions
1200	9.84E-02	5.12E-01	4.13E-01	<b>5.12E-01</b>	reduce emissions
1300	9.83E-02	4.53E-01	3.68E-01	<b>4.53E-01</b>	reduce emissions
1400	9.74E-02	4.04E-01	3.31E-01	<b>4.04E-01</b>	reduce emissions
1500	9.61E-02	3.64E-01	3.00E-01	<b>3.64E-01</b>	reduce emissions
1600	9.45E-02	3.29E-01	2.73E-01	<b>3.29E-01</b>	reduce emissions
1700	9.26E-02	3.00E-01	2.50E-01	<b>3.00E-01</b>	reduce emissions
1800	9.05E-02	2.75E-01	2.30E-01	<b>2.75E-01</b>	reduce emissions
1900	8.83E-02	2.53E-01	2.13E-01	<b>2.53E-01</b>	reduce emissions
2000	8.60E-02	2.34E-01	2.00E-01	<b>2.34E-01</b>	reduce emissions
2100	8.35E-02	2.18E-01	1.87E-01	<b>2.18E-01</b>	reduce emissions
2200	8.11E-02	2.04E-01	1.75E-01	<b>2.04E-01</b>	reduce emissions
2300	7.87E-02	1.91E-01	1.65E-01	<b>1.91E-01</b>	reduce emissions
2400	7.65E-02	1.80E-01	1.55E-01	<b>1.80E-01</b>	reduce emissions
2500	7.42E-02	1.70E-01	1.46E-01	<b>1.70E-01</b>	reduce emissions
2600	7.21E-02	1.60E-01	1.39E-01	<b>1.60E-01</b>	reduce emissions
2700	7.00E-02	1.52E-01	1.31E-01	<b>1.52E-01</b>	reduce emissions
2800	6.81E-02	1.44E-01	1.25E-01	<b>1.44E-01</b>	reduce emissions
2900	6.62E-02	1.37E-01	1.19E-01	<b>1.37E-01</b>	reduce emissions
3000	6.43E-02	1.30E-01	1.14E-01	<b>1.30E-01</b>	reduce emissions
3500	5.62E-02	1.06E-01	9.27E-02	<b>1.06E-01</b>	its OK
4000	4.96E-02	8.80E-02	7.76E-02	<b>8.80E-02</b>	its OK
4500	4.43E-02	7.50E-02	6.62E-02	<b>7.50E-02</b>	its OK
5000	3.98E-02	6.50E-02	5.75E-02	<b>6.50E-02</b>	its OK
5500	3.61E-02	5.71E-02	5.06E-02	<b>5.71E-02</b>	its OK
6000	3.29E-02	5.07E-02	4.50E-02	<b>5.07E-02</b>	its OK
6500	3.02E-02	4.55E-02	4.04E-02	<b>4.55E-02</b>	its OK
7000	2.78E-02	4.11E-02	3.66E-02	<b>4.11E-02</b>	its OK
7500	2.58E-02	3.76E-02	3.35E-02	<b>3.76E-02</b>	its OK

Attachment D

ARSENIC

Enter the peak emission rate of the contaminant of concern

Peak (30 min) Emission Rate =	<b>0.0000227</b> g/s	8E-05 tons/yr
MW=	<b>74.9216</b>	
Concern level	<b>0.00000075</b> ppm	2E-04 ug/m3

Distance (M)	Point	Area	Volume	Worst	Recommendation
10	2.91E-02	3.90E-01	3.88E-02	<b>3.90E-01</b>	reduce emissions
100	1.67E-03	5.36E-02	1.75E-02	<b>5.36E-02</b>	reduce emissions
<b>200</b>	<b>9.13E-04</b>	<b>2.12E-02</b>	<b>9.70E-03</b>	<b>2.12E-02</b>	reduce emissions
300	6.28E-04	1.15E-02	6.25E-03	<b>1.15E-02</b>	reduce emissions
400	4.83E-04	7.30E-03	4.40E-03	<b>7.30E-03</b>	reduce emissions
500	3.92E-04	5.08E-03	3.28E-03	<b>5.08E-03</b>	reduce emissions
600	3.32E-04	3.77E-03	2.64E-03	<b>3.77E-03</b>	reduce emissions
700	2.81E-04	2.92E-03	2.14E-03	<b>2.92E-03</b>	reduce emissions
800	2.45E-04	2.37E-03	1.78E-03	<b>2.37E-03</b>	reduce emissions
900	2.46E-04	1.97E-03	1.52E-03	<b>1.97E-03</b>	reduce emissions
1000	2.46E-04	1.67E-03	1.32E-03	<b>1.67E-03</b>	reduce emissions
1100	2.43E-04	1.44E-03	1.15E-03	<b>1.44E-03</b>	reduce emissions
1200	2.43E-04	1.26E-03	1.02E-03	<b>1.26E-03</b>	reduce emissions
1300	2.42E-04	1.12E-03	9.09E-04	<b>1.12E-03</b>	reduce emissions
1400	2.40E-04	9.97E-04	8.17E-04	<b>9.97E-04</b>	reduce emissions
1500	2.37E-04	8.97E-04	7.40E-04	<b>8.97E-04</b>	reduce emissions
1600	2.33E-04	8.13E-04	6.74E-04	<b>8.13E-04</b>	reduce emissions
1700	2.28E-04	7.41E-04	6.17E-04	<b>7.41E-04</b>	reduce emissions
1800	2.23E-04	6.79E-04	5.68E-04	<b>6.79E-04</b>	reduce emissions
1900	2.18E-04	6.25E-04	5.25E-04	<b>6.25E-04</b>	reduce emissions
2000	2.12E-04	5.78E-04	4.93E-04	<b>5.78E-04</b>	reduce emissions
2100	2.06E-04	5.38E-04	4.61E-04	<b>5.38E-04</b>	reduce emissions
2200	2.00E-04	5.03E-04	4.32E-04	<b>5.03E-04</b>	reduce emissions
2300	1.94E-04	4.72E-04	4.06E-04	<b>4.72E-04</b>	reduce emissions
2400	1.89E-04	4.44E-04	3.82E-04	<b>4.44E-04</b>	reduce emissions
2500	1.83E-04	4.19E-04	3.61E-04	<b>4.19E-04</b>	reduce emissions
2600	1.78E-04	3.95E-04	3.42E-04	<b>3.95E-04</b>	reduce emissions
2700	1.73E-04	3.75E-04	3.24E-04	<b>3.75E-04</b>	reduce emissions
2800	1.68E-04	3.55E-04	3.08E-04	<b>3.55E-04</b>	reduce emissions
2900	1.63E-04	3.38E-04	2.93E-04	<b>3.38E-04</b>	reduce emissions
3000	1.59E-04	3.22E-04	2.81E-04	<b>3.22E-04</b>	reduce emissions
3500	1.39E-04	2.61E-04	2.29E-04	<b>2.61E-04</b>	reduce emissions
4000	1.22E-04	2.17E-04	1.91E-04	<b>2.17E-04</b>	its OK
4500	1.09E-04	1.85E-04	1.63E-04	<b>1.85E-04</b>	its OK
5000	9.82E-05	1.60E-04	1.42E-04	<b>1.60E-04</b>	its OK
5500	8.90E-05	1.41E-04	1.25E-04	<b>1.41E-04</b>	its OK
6000	8.12E-05	1.25E-04	1.11E-04	<b>1.25E-04</b>	its OK