

Air Permit Review

Permit Issue Date:

Region: Asheville Regional Office
County: Mitchell
NC Facility ID: 6100107
Inspector's Name: Chris Scott
Date of Last Inspection: N/A
Compliance Code: 4/In Compliance - Certification

Facility Data			Permit Applicability (this application only)		
Applicant (Facility's Name): Young & McQueen Grading Co. Inc. - Spruce Pine Plant Facility Address: Young & McQueen Grading Co. Inc. U.S. HWY 19 Spruce Pine, NC 28777 SIC: 2951 / Paving Mixtures And Blocks NAICS: 324121 / Asphalt Paving Mixture and Block Manufacturing Facility Classification: Before: N/A After: Synthetic Minor Fee Classification: Before: N/A After: Synthetic Minor			SIP: Yes NSPS: Yes, Subpart I NESHAP: No PSD: No PSD Avoidance: Yes, CO and SO ₂ NC Toxics: Yes 112(r): No Other: N/A		
Contact Data			Application Data		
Facility Contact	Authorized Contact	Technical Contact	Application Number: 6100107.07A Date Received: 06/25/2007 Application Type: Greenfield Facility Application Schedule: State Existing Permit Data Existing Permit Number: N/A Existing Permit Issue Date: N/A Existing Permit Expiration Date: N/A		
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Review Engineer: Christopher Scott		Comments / Recommendations:			
Review Engineer's Signature: _____		Issue: 09808/R00			
Date: _____		Permit Issue Date: _____			
		Permit Expiration Date: _____			

1. Purpose of Application

Application is made for a greenfield facility to be located in Spruce Pine, Mitchell County, off Highway 19, (UTM coordinates: 3973380 North, 400366 East). This site is adjacent to the Chalk Mountain Quarry, which is operated by The Feldspar Corporation. This facility has submitted an application to manufacture hot-mix asphalt and has requested to be permitted for the following equipment:

Emission Source ID	Emission Source Description	Control System ID	Control System Description
one batch-mix asphalt plant (160 tons per hour maximum capacity), consisting of:			
ES-1 NSPS	one virgin No. 2/recycled No. 2/virgin No. 4/recycled No. 4 fuel oil-fired hot mix asphalt batch plant aggregate dryer (56 million Btu per hour maximum heat input rate)	CD-1	one bagfilter (7,143 square feet of filter area)
ES-2, ES-3 and ES-4 NSPS	three, 150-ton asphalt silos	N/A	N/A
ES-5 NSPS	one truck load-out operation	N/A	N/A

2. Application Chronology

June 25, 2007 Air permit application was received by DAQ.

June 28, 2007 Dispersion modeling analysis received by DAQ.

July 10, 2007 Dispersion modeling analysis approved by DAQ. Memorandum from Tom Anderson received by ARO on July 16, 2007.

3. Regulatory Review

The Company must comply with the following EMC Regulations for this application:

15A NCAC 2D .0506,"Particulates from Hot Mix Asphalt Plants";
15A NCAC 2D .0516,"Sulfur Dioxide Emissions from Combustion Sources";
15A NCAC 2D .0524,"New Source Performance Standards";
15A NCAC 2D .0535,"Excess Emissions Reporting and Malfunctions";
15A NCAC 2D .0540,"Particulates from Fugitive Non-process Dust Emission Sources";
15A NCAC 2D .0611,"Monitoring Emissions from Other Sources";
15A NCAC 2D .1100,"Control of Toxic Air Pollutants";
15A NCAC 2D .1806,"Control and Prohibition of Odorous Emissions";
15A NCAC 2Q .0102,"Activities Exempted from Permit Requirements";
15A NCAC 2Q .0113 / 2Q .0304,"Public Notification in Areas Without Zoning";
15A NCAC 2Q .0315,"Synthetic Minor Facilities";
15A NCAC 2Q .0317,"Avoidance Conditions (PSD)"; and,
15A NCAC 2Q .0711,"Emission Rates Requiring a Permit".

4. Compliance Determination

2D .0506 - Particulates from Hot Mix Asphalt Plants - Section (a) of this regulation limits emission of particulate matter (PM) to the following:

$$E = 4.9445 * P^{0.4376} \quad \text{for } P < 300 \text{ tons/hr, or}$$
$$E = 60 \text{ lbs/hr} \quad \text{for } P \geq 300 \text{ tons/hr}$$

Where E is the allowable emission rate in pounds per hour and P equals the maximum process rate in tons per hour. Therefore at the maximum permitted process rate of 160 tons per hour the allowable emissions are 45.57 pounds per hour.

Using the AP-42 emission factor of 32 pounds of PM per ton of asphalt produced (ref. AP-42 Table 11.1-1), actual uncontrolled emissions are estimated to be 5,120 pounds per hour. Therefore, the required bagfilter efficiency to demonstrate compliance with this regulation is 99.375%. The permit application states that the overall efficiency is 99.8% and the estimated actual emissions are 10.24 pounds per hour. Compliance with this regulation is expected and will be verified through Methods 5 and 202 testing within the timeframe dictated by NSPS, Subpart I (not to exceed 180 days after startup).

Section (b) of this regulation requires that visible emissions for all hot mix asphalt plants shall have an opacity of less than 20% when averaged over a six-minute period. Compliance with this portion of the regulation will be confirmed by inspection and stack testing as required by NSPS, Subpart I.

Section (c) of this rule requires that all batch plants be equipped with a scavenger process dust control system which is maintained and operated in a manor that is compliant with Sections (a) and (b) of this rule.

Section (d) states that fugitive non-process dust emissions be regulated under Rule 2D. 0540.

Section (e) states that fugitive emissions from sources associated with the hot mix asphalt plant, not otherwise covered by Rule 2D .0506, are limited to an opacity of 20 percent.

Bagfilter Design: According to the application the bagfilter is designed to accommodate an air flow of 32,000 acfm. The filter area is 7,143 square feet, the filter material is Nomex and the cleaning mechanism is timed air pulse. This type of fabric is appropriate for the operating temperature (max. of 400 °F). The bagfilter I & M condition will be included in the permit. As indicated on the attached bagfilter information sheet, the system appears to be properly designed.

Professional Engineers Seal - In accordance with Rule 2Q .0112, the Permittee is required to submit technical analysis in support of the permit application (Air Permit Application Form D). The permit application include a valid seal from Linda M. Lamb of Trigon Engineering Consultants, Inc. Ms. Lamb is a Professional Engineer registered in North Carolina (Seal No. 18125).

2D .0516 - Sulfur Dioxide Emissions from Combustion Sources - Sulfur dioxide emissions are limited to 2.3 pounds per million Btu heat input. The burner on the aggregate dryer will be permitted to combust No. 2 fuel oil or recycled No. 2 or No. 4 fuel oil. No. 2 fuel oil is limited to a maximum sulfur content of 0.5 percent by weight and recycled No. 4 fuel oil shall not have a sulfur content greater than 2 percent by weight.

The AP-42 emission factor for SO₂ emissions from recycled or virgin No. 2 fuel oil is 142(S) pounds per 1000 gallons and the emission factor for SO₂ emissions from recycled No. 4 fuel oil combustion is 150(S) pounds per 1000 gallons (ref. AP-42 Table 1.3-1), where S represents the sulfur content of the fuel. According to AP-42, the heat content of No. 2 fuel oil is 140,000 Btu per gallon and 150,000 Btu per gallon for No. 4 fuel oil. Worst-case SO₂ emissions occur from recycled No. 4 fuel oil combustion and are calculated as follows:

$$150(S) \frac{\text{lb}}{1000 \text{ gal}} \left(\frac{1000 \text{ gal}}{150 \text{ MMBtu}} \right) = 2.00 \frac{\text{lb SO}_2}{\text{MMBtu}}$$

Compliance with 2D .0516 is indicated based on AP-42 emission factors. The sulfur content of fuel oils will be confirmed through inspection and by reporting and record keeping requirements.

2D .0524 - New Source Performance Standards - The application lists the manufacture date of the asphalt plant as "> 1973". Thus, the manufacture date will be assumed later than June 11, 1973 and the asphalt plant is subject to NSPS Subpart I, "Standards of Performance for Hot Mix Asphalt Facilities". Affected facilities (sources) are listed as any of the following: dryers; systems for screening, handling, storing and weighing hot aggregate; systems for loading, transferring, and storing mineral filler; systems for mixing hot mix asphalt; and the loading, transfer, and storage systems associated with emission control systems. The performance standards state that the following emissions limits apply:

- a. particulate matter emissions shall be less than 90 mg/dscm (0.04 gr/dscf); and
- b. visible emissions shall be less than 20% opacity.

Within 60 days of achieving maximum production, but no later than 180 days from initial startup, the facility will be required to demonstrate compliance with the above standards through Methods 5 and 9 stack testing. Proper operation and maintenance should ensure compliance with these standards. The NSPS construction and startup notification requirements will be included in the permit. The tests should be conducted while combusting worst case fuel (recycled No. 4 fuel oil). If the stack test is done while combusting virgin No. 2 fuel oil and the facility subsequently changes to recycled No. 2, virgin No. 4 or recycled No. 4 fuel oil, the facility is required to conduct another Method 5-Method 9-Method 202 test while combusting recycled No. 2, virgin No. 4 or recycled No. 4 fuel oil and submit the test results to this office within 90 days of the changeover.

2D .0535 - Excess Emissions Reporting and Malfunctions - This regulation requires timely reporting and appropriate actions during periods of excess emissions and malfunctions. The requirements of this regulation will be incorporated into the air permit.

2D .0540 - Particulates from Fugitive Non-process Dust Emission Sources - This is a complaint driven regulation designed to control fugitive particulate emissions from areas such as process areas, haul roads, and stockpiles. If two substantive complaints of fugitive particulate emissions are received within a 12-month period concerning the facility, the facility is required to write and implement a fugitive particulate emissions control plan. Compliance with 2D .0540 is expected. This is a new facility (not operated yet) and thus no complaints have been received.

2D .0611 - Monitoring Emissions from Other Sources - This regulation requires the Permittee to conduct, at a minimum, annual inspections of the bagfilter (ID No. CD-1) and maintain a logbook documenting inspections and any variance from the manufacture's recommendation. Compliance with 2D .0611 will be verified by inspection.

2D .1100 - Control of Toxic Air Pollutants - As shown in the attached spreadsheet (emissions estimated using AP-42 emission factors, estimated at a liquid asphalt cement storage temperature of 325 °F), at the synthetic minor limit of 225,000 tons per year, emissions would exceed the TPERs for arsenic, benzene and formaldehyde. Mr. Tom Anderson of the AQAB used SCREEN3 modeling to evaluate simple terrain, complex terrain and cavity impacts for emissions from the main bagfilter stack, silos, and the truck loadout, and demonstrated that the facility is expected to be in compliance with the AALs at the property boundaries.

The analysis assumed (based on the site plan submitted with the application) that the silo/surge bin and loadout operation sources would be at least 15 meters from the closest property boundary and the baghouse source would be at least 18 meters from the property boundary. The following table shows the percent of the AAL for each TAP (Ref. Dispersion Modeling Results dated July 10, 2007 from Tom Anderson).

Pollutant	Averaging Period	% of AAL
Arsenic	Annual	61
Benzene	Annual	67
Formaldehyde	1-hour	33

These results indicate that the facility is expected to be in compliance with the AALs at the property boundary, operating with a production limit of 225,000 tons per year (assuming the given stack parameters and distance to closest property boundary). Hourly modeled rates for the annual toxics, arsenic and benzene, were obtained by multiplying the hourly rates in the attached spreadsheet by 1,406.25 (225,000 TPY / 160 TPH = 1,406.25 hrs.) and then dividing the result by 8,760 hours per year. The following specifications were included in toxics modeling and must be adhered to as any changes could negatively impact AALs at the property line.

- a. The height of the main dryer stack (ID No. ES-1) shall not be less than 30 feet (9.14 meters) high.
- b. The main dryer stack (ID No. ES-1) shall not be closer than 59 feet (18.29 meters) from the nearest property boundary. The silos (ID No. ES-2, ES-3 and ES-4) shall not be closer than 49 feet (15 meters) from the nearest property boundary.
- c. The maximum hourly production rate for the facility is restricted to 160 tons per hour based on the above modeling. According to the permit application dated June 22, 2007, The facility is design rated at 160 tons per hour.

The recordkeeping and reporting requirements of the synthetic minor permit will serve to document compliance with toxics as well. The modeled emission rates will be listed in the permit.

RECYCLED No. 2 and No. 4 FUEL OIL: The facility has applied to burn recycled No. 2 and No. 4 fuel oils in the 56 million Btu per hour aggregate dryer. Recycled oil is considered to be equivalent to unadulterated fuel oil and does not trigger a toxics evaluation provided the following parameters are met:

Constituent/Property	Allowable Level
Arsenic	1 ppm maximum
Cadmium	2 ppm maximum
Chromium	5 ppm maximum
Lead	100 ppm maximum
Total Halogens	1000 ppm maximum
Flash Point	
No. 2	100°F minimum
No. 4	130°F minimum
Sulfur	
No. 2	0.5% maximum (by weight)
No. 4	2.0% maximum (by weight)
Ash	1.0% maximum

The facility will be required to track the amount of recycled fuel oil burned each year and maintain records of fuel properties and analytical testing results. The facility will also be required to submit an annual report of the analytical testing results and the quantity of fuel oil combusted.

2D .1806 - Control and Prohibition of Odorous Emissions - The purpose of this rule is to provide for the control and prohibition of objectionable odorous emissions. The permit condition will state, “the Permittee shall not operate the facility without implementing management practices or installing and operating odor control equipment sufficient to prevent odorous emissions from the facility from causing or contributing to objectionable odors beyond the facility's boundary.” Complaints have been received regarding odors from other asphalt plants, so it is possible that odors could present a problem at this facility. This will be handled through site investigation, including an odor evaluation if necessary.

2Q .0102 - Activities Exempted from Permit Requirements

- a. fuel oil storage tanks (ID No. IES-1; size and number yet to be determined) - Storage tanks are exempt under 2Q .0102 (c)(1)(D)(i) and will be listed as an insignificant activity on an attachment to the permit. NSPS Subpart Kb exempts liquid organic storage tanks with a volume equal to 75 cubic meters but less than 151 cubic meters if the vapor pressure is less than 15.0 kPa. Storage tanks with a volume greater than 151 cubic meters are exempt from the requirements of NSPS Subpart Kb if the vapor pressure is less than 3.5 kPa (Ref. 40 CFR 60.110b). The vapor pressure of No. 2 and No.4 fuel oil at typical usage is expected to be below these values.
- b. one No. 2 fuel oil fired asphalt heater (ID No. IES-3; 1.6 million Btu per hour maximum heat input rate) - This combustion source is exempt under 2Q .0102 (c)(2)(B)(i)(I) and will be listed as an insignificant activity on an attachment to the permit.
- c. one 10,000 gallon asphalt cement storage tank (ID No. IES-2) - According to the Asphalt Institute web site (<http://www.asphaltinstitute.org/faq/acbfaqs.htm>), the vapor pressure of liquid asphalt at 325 degrees F (typical storage temperature) is 1.5 E-03 kPa. NSPS Subpart Kb exempts liquid organic storage tanks of this size if the vapor pressure is less than 15.0 kPa (Ref. 40 CFR 60.110b(c)). This storage tank is not subject to the state toxics regulations in accordance with 2Q .0702(19)(B). Additionally, there are no AP-42 emission factors for emissions from liquid asphalt storage tanks, so it is exempt per 2Q .0102 (c)(1)(L)(xi) and will be listed as an insignificant activity on an attachment to the permit.

2Q .0315 - Synthetic Minor Facilities - Uncontrolled potential emissions from this facility are above the Title V thresholds for sulfur dioxide and carbon monoxide. Note, the PM emissions are limited to 0.04 gr/dscf per NSPS,

Subpart I. The air quality permit application indicates that the volumetric air flow rate from the baghouse stack is 32,000 ACFM. ACFM converts to DSCF/min as follows:

$$\text{DSCF/min} = \text{ACFM} \times \left(\frac{460 + 68}{460 + \text{StackTemp}} \right) \times (1 - \text{Moisture})$$

where Stack Temp is 225 (conservative estimate from application Form C1) and Moisture is equal to 12 percent (referenced from baghouse evaluation form).

$$\text{DSCF/min} = 32,000 \times \left(\frac{460 + 68}{460 + 225} \right) \times (1 - 0.12) = 21,705 \text{ DSCF/min}$$

Potential PM emissions are limited to:

$$21,705 \text{ DSCF/min} * 0.04 \text{ gr/dscf} * 60 \text{ min/hr} * 8760 \text{ hr/yr} * 1 \text{ lb/7000 gr} * 1 \text{ ton/2000 lb} = 32.59 \text{ tons/year}$$

This exhaust rate will be confirmed through Method 5 testing. The bagfilter is required to meet the NSPS, Subpart I limit. Thus, the bagfilter I & M requirement (required by 2D .0611) is listed as a separate condition. The facility requested a synthetic minor limit of 225,000 tons of asphalt produced per year to keep the modeled emission rate of Benzene to approximately 67% of the Acceptable Ambient Limit (AAL). These production rate limits also ensure that the emission rate of each criteria pollutant remains below 100 tons per year. Quarterly reporting of production rates will be required to ensure compliance with production limits is maintained. If the facility establishes a history of production rates less than 75% of this threshold, the reporting requirements may be reduced to annually.

2Q .0317 - Avoidance Conditions (PSD) - The facility has the potential to exceed 250 tons of CO and SO₂ per year. Compliance with this regulation is monitored through the Synthetic Minor limit, recordkeeping, and reporting.

2Q .0711 - Emission Rates Requiring a Permit - The Toxic Pollutant Emission Rates (TPERs) will be included for the following toxics.

Pollutant (CAS Number)	Carcinogens (lb/yr)	Chronic Toxicants (lb/day)	Acute Systemic Toxicants (lb/hr)	Acute Irritants (lb/hr)
Acetaldehyde (75-07-0)				6.8
Acrolein (107-02-8)				0.02
Benzo(a)pyrene (50-32-8)	2.2			
Beryllium (7440-41-7)	0.28			
CFC-11; Trichlorofluoromethane (75-69-4)			140	
Cadmium (7440-43-9)	0.37			
Carbon disulfide (75-15-0)		3.9		

Pollutant (CAS Number)	Carcinogens (lb/yr)	Chronic Toxicants (lb/day)	Acute Systemic Toxicants (lb/hr)	Acute Irritants (lb/hr)
Soluble Chromate Compounds as Chromium-VI equivalent (SolCR6)		0.013		
Hexachlorodibenzo-P-Dioxin (57653-85-7)	0.0051			
n-Hexane (110-54-3)		23		
Manganese & Compounds (MNC)		0.63		64
Methyl Chloroform (71-55-6)		250		
Methyl Ethyl Ketone (78-93-3)		78		22.4
Methylene Chloride (75-09-2)	1600		0.39	
Perchloroethylene (127-18-4)	13000			
Phenol (108-95-2)			0.24	
Styrene (100-42-5)			2.7	
Tetrachlorodibenzo-P-Dioxin (1746-01-6)	0.00020			
Toluene (108-88-3)		98		14.4
Trichloroethylene (79-01-6)	4000			
Xylene (1330-20-7)		57		16.4

To ensure compliance with these limits, the Permittee will be required to limit asphalt production to 225,00 tons per year and 160 tons per hour as well as properly operate and maintain bagfilter CD-1 to control particulate matter emissions. Compliance with 2Q .0711 is expected.

Public Notice in Areas Without Zoning - In accordance with the requirements of 2Q .0113, Young & McQueen Grading Company, Inc. submitted proof of compliance with the public notification requirements in a letter to DAQ dated July 2, 2007 and received by ARO on July 3, 2007. I visited the area of the proposed asphalt plant on June 26, 2007 and verified that the sign posted for public notice appeared to meet the requirements of this rule. A notice appeared in the Mitchell News-Journal (a newspaper of general circulation in Spruce Pine, NC) on June 6, 2007.

To comply with the requirements of the permit application procedure, Young & McQueen Grading Company Inc. requested a zoning consistency statement from the Mitchell County Commissioners in a letter dated June 29, 2007. Kathy Young, Clerk to the Board, of the Mitchell County Board of Commissioners responded to the request, stating that "...the proposed facility is consistent with all zoning or subdivision ordinances administered by (the) local government." in a letter dated July 2, 2007.

5. NSPS, NESHAPS, PSD, Toxics and 112(r) and Attainment Status

The facility is not subject to the requirements of NESHAPS, PSD, or 112(r). The facility is subject to NSPS, Subparts I, and the state Toxics regulations, as referenced below and discussed in detail above. Synthetic Minor limitations prevent emissions from exceeding PSD thresholds.

- a. **NSPS** - This facility is subject to NSPS Subpart I, “Standards of Performance for Hot Mix Asphalt Facilities”. This facility is not subject to NSPS Subpart Kb, “Standards of Performance for Volatile Organic Liquid Storage Vessels”, as discussed above in discussion of Rule 2Q .0102.
- b. **Toxics** - The facility triggered a toxics review with emissions exceeding the TPERs for several pollutants, as discussed above. Compliance was demonstrated at modeled emissions rates, using the 160 tons per hour and 225,000 tons per year production limits (ref. July 10, 2007 memorandum from Tom Anderson, Meteorologist with AQAB).
- c. **112(r)** - The permit application for this facility indicates that it is not subject to the requirements of 112(r).

6. Facility Compliance Status

This is a greenfield facility and has no inspection history.

7. Facility-wide Emissions Review

Emissions estimates are shown on the attached spreadsheets. Based on the potential emissions shown below, this facility is classified as a synthetic minor facility:

Pollutant	Projected Actual Emissions	Controlled Potential Emissions	Uncontrolled Potential Emissions
TSP	(No estimates available)	5.01 tons	32.59 tons*
PM ₁₀		3.33 tons	32.59 tons*
SO ₂		74.73 tons	250 tons**
NO _x		14.50 tons	85.10 tons
VOCs		5.88 tons	36.53 tons
CO		45.53 tons	250 tons**
Formaldehyde		617 lbs.	3,843 lbs.
Total HAPs		1,790 lbs.	11,200 lbs.

* NSPS, Subpart I limits PM emissions to 0.04 gr/dscf, or 32.59 tons/year in this case (see above discussion for Rule 2Q .0315)

** Rule 2Q .0317 sets PSD avoidance limitations such that CO and SO₂ emissions may not exceed 250 tons per year. Compliance with this condition is assured through compliance with the synthetic minor limit.

8. Stipulation Review

This review describes a new permit for the proposed facility. No additional comments are made at this time.

9. Conclusions, Comments, and Recommendations

I checked the NC Secretary of State Webpage on August 30, 2007 and verified that Young & McQueen Grading Company, Inc. is registered as a North Carolina corporate entity.