**NORTH CAROLINA DIVISION OF AIR QUALITY**

# Air Permit Review

**Permit Issue Date:**

**Region:**
**County:**
**NC Facility ID:**
**Inspector's Name:**
**Date of Last Inspection:**
**Compliance Code:**

| Facility Data | Permit Applicability (this application only) |
|---|---|
| **Applicant (Facility's Name):**<br><br>**Facility Address:**<br><br>**SIC:**<br>**NAICS:**<br><br>**Facility Classification: Before:** Small **After:** Small<br>**Fee Classification: Before:** General Small **After:** General Small | **SIP:** 2D .0515, .0521, .0535, .0611 and 2Q .0310<br>**NSPS:** N/A<br>**NESHAP:** N/A<br>**PSD:** N/A<br>**PSD Avoidance:** N/A<br>**NC Toxics:** 2D .1100 (Arsenic)<br>**112(r):** N/A<br>**Other:** N/A |

**Contact Data**

| Facility Contact | Authorized Contact | Technical Contact |
|---|---|---|
| | | |

**Application Data**

**Application Number:**
**Date Received:**
**Application Type:** General Small
**Application Schedule:** State

**Existing Permit Data**

**Existing Permit Number:**
**Existing Permit Issue Date:**
**Existing Permit Expiration Date:**

**Review Engineer:**

**Review Engineer's Signature: Date:**

**Comments / Recommendations:**

**Issue**
**Permit Issue Date:**
**Permit Expiration Date:**

## I. Introduction and Purpose of Application:

*This section has been crafted for existing facilities. Revise as appropriate for Greenfield applications.*

<Enter Company Name> operates a truck mix/central mix concrete batch plant with central emissions control located in <Enter City>, <Enter County>, North Carolina.

<Enter facility-specific information, including but not limited to:

a. Minimum distance of property line to the cement mixing weigh hopper,
b. Maximum hourly concrete loading rate;
c. Number of cement silos; and,
d. Number flyash silos.>

<Enter Company Name> submitted Application No. <Enter Application No.>, received by DAQ on <Enter Date of Receipt>, for a general permit pursuant to 15A NCAC 2Q .0301.

<Enter any additional application events, including communications with the Permittee.>

## II. Statement of Compliance

<Enter information on facility compliance status/history. This may include a description of the most recent compliance inspection. For Greenfield applications, reference the Regulatory Review, as follows, "The DAQ anticipates that the new emission sources and control devices authorized for construction in this permit will be in compliance with all applicable requirements upon commencement of operation, as detailed in the following regulatory review.">

## III. Regulatory Review

1. Particulate Control Requirement – Particulate matter (PM) standards are provided in 15A NCAC 2D .0515, which is applicable to potential PM emissions from any stack, vent, or outlet for which no other emission control standards are applicable. Pursuant to the standard, emissions of filterable PM from the affected emission sources, including the weigh hopper, cement silo(s), and/or flyash silos(s), shall not exceed an allowable emission rate as calculated by the following equations:

For $P \leq 30$ tons per hour:

$$E = 4.10 \times P^{0.67}$$

For $P > 30$ tons per hour:

$$E = 55.0 \times P^{0.11} - 40$$

Where E = allowable emission rate in pounds per hour; and,
P = process weight in tons per hour

Generally, truck mix concrete batch plants have a maximum production rate of approximately 120 cubic yards per hour ($yd^3$/hr). A cubic yard of concrete varies in density, but is typically weighs about 2 tons. Therefore, the maximum process weight ("P") is about 240 tons per hour (tpy). Therefore, the maximum allowable emission rate is approximately 60.5 pounds per hour (lb/hr), as shown in the following calculation:

If the process weight rate ("P") is 240 tph, then:

$$E = 55.0 \times P^{0.11} - 40$$
$$E = 55.0 \times 240^{0.11} - 40$$
$$\mathbf{E = 60.5\ lb/hr}$$

Based on the same maximum production rate (i.e., 120 $yd^3$/hr), maximum PM emissions are estimated to be 4.84 lb/hr using the Emissions Spreadsheet for Concrete Batching provided on DAQ's website (Revision A, http://daq.state.nc.us/permits/files/cb.xls).[1] The estimated maximum emission rate (4.84 lb/hr) is *well below* the maximum allowable emission rate (60.5 lb/hr).

Based on the calculations provided above, the DAQ anticipates that truck mix concrete batch plants with central control will be in compliance with the PM standards pursuant to 15A NCAC 2D .0515. No further compliance demonstration is required in the general permit.

2. Visible Emissions Control Requirement – VE standards are provided in 15A NCAC 2D .0521, which is applicable to potential VE emissions from any stack, vent, or outlet for which no other emission control standards are applicable. This regulation limits visible emissions as follows:

   - For sources manufactured prior to July 1, 1971, visible emissions may not exceed 40 percent opacity when averaged over a 6-minute period, except that 6-minute periods averaging more than 90 percent opacity may occur not more than once in any hour not more than four times in any 24-hour period.
   - For sources manufactured after July 1, 1971, visible emissions may not exceed 20 percent opacity when averaged over a 6-minute period, except that 6-minute periods averaging more than 87 percent opacity may occur not more than once in any hour not more than four times in any 24-hour period.

   Visible emissions from this facility would be controlled at this facility through the use of a fabric filter(s) on the storage silos, weigh hopper, and loading operations. The permit also includes inspection and maintenance requirements for the fabric filter(s) pursuant to 15A NCAC 2D .0611 to ensure proper operation of the control device(s). The DAQ anticipates that proper inspection/maintenance of the fabric

[1] DAQ issued a Memorandum on June 8, 2005 ("Emission Factors for Ready-Mixed Concrete Facilities") recommending PM, $PM_{10}$, and Arsenic (As) emission factors to be used in place of the emission factors presented in the previous version of AP-42's Chapter 11.12 (Published October 2001). USEPA has since issued an updated version of Chapter 11.12 (Published June 2006) with revised $PM/PM_{10}$ factors for truck and central mix concrete batch plants. DAQ will re-evaluate the $PM/PM_{10}$ factors recommended in the memorandum based on the updated AP-42 as stated in the memorandum; however, currently DAQ is utilizing emission factors provided in the memorandum to evaluate $PM/PM_{10}$/As emissions from concrete batch plants.

filter(s) in accordance with 15A NCAC 2D .0611 will be sufficient to meet the visible emission standards pursuant to 15A NCAC 2D .0515. No further compliance demonstration is required in the general permit.

3. Fabric Filter Requirements – This General Permit requires that potential particulate matter emissions from all emissions sources, including the weigh hopper and loading operations, cement silo(s) and flyash silo(s), be controlled by fabric filters. Pursuant to the monitoring requirements of 15A NCAC 2D .0611, DAQ has included the requirement to conduct annual internal inspections of the fabric filter systems, in addition to any periodic inspection and maintenance procedures that are recommended by the equipment manufacturer. This requirement is added to ensure proper operation of the fabric filter(s), which control potential emissions from the batching and storage operations to comply the various particulate matter, visible emission, and toxic air pollutant emission limitations.

   To demonstrate compliance with the fabric filter requirements, the permit also requires that the Permittee retain results of all inspections in a logbook, including any variance from manufacturer's recommendations or from those given in this permit. Any variance shall be investigated with corrections made and dates of actions recorded in the logbook. The logbook (in written or electronic form) shall be kept on-site and made available to DAQ personnel upon request.

4. Toxic Air Pollutant Control Requirements – Pursuant to 15A NCAC 2D .1100, DAQ requires any facility that emits a regulated Toxic Air Pollutant (TAP) at a rate greater than the TAP Permitting Emission Rate (TPER), as listed in the 15A NCAC 2Q .0711, demonstrate through air dispersion modeling that emissions from the facility are not resulting in the exceedance of the Acceptable Ambient Level (AAL) for that pollutant, as listed in 15A NCAC 2D .1104.

   Past stack tests have shown that concrete batch plants may emit arsenic, a regulated TAP, at an emission rate greater than the TPER (i.e., 0.053 lb/hr). By modeling multiple air dispersion models of "typical" truck mix concrete facilities with central control, DAQ determined that facilities that limit annual concrete production rates as provided below are NOT causing an exceedance of the AAL for arsenic, and are therefore qualified to apply for the General Permit for concrete batching.

   The results of the most recently conducted modeling, using the updated TPER for arsenic, were included in a memo titled "Concrete Production Modeling Exemption Rates" dated February 12, 2015 from Mark Cuilla. The maximum concrete production rates resulting from this modeling are listed below:

   For Truck Mix Facilities:

| Minimum Distance to Property Line meters/feet | Maximum Concrete Production Rate * $yd^3$/year |
|---|---|
| 10 m / 32.8 ft | 233,500 |
| 15 m / 49.2 ft | 284,500 |
| 20 m / 65.6 ft | 340,500 |
| 25 m / 82.0 ft | 392,500 |
| 30 m / 98.4 ft | 438,500 |
| 35 m / 114.8 ft | 508,500 |
| 40 m / 131.2 ft | 615,500 |
| 45 m / 147.6 ft | 680,500 |
| 50 m / 164.0 ft | 742,500 |
| 55 m / 180.4 ft | 815,500 |
| 60 m / 196.8 ft | 896,000 |

For Central Mix Facilities:

| Minimum Distance to Property Line meters/feet | Maximum Concrete Production Rate * $yd^3$/year |
|---|---|
| 10 m / 32.8 ft | 327,000 |
| 15 m / 49.2 ft | 417,000 |
| 20 m / 65.6 ft | 581,000 |
| 25 m / 82.0 ft | 766,500 |
| 30 m / 98.4 ft | 1,002,500 |
| 35 m / 114.8 ft | 1,358,000 |
| 40 m / 131.2 ft | 1,358,000 |
| 45 m / 147.6 ft | 1,358,000 |
| 50 m / 164.0 ft | 1,358,000 |
| 55 m / 180.4 ft | 1,358,000 |
| 60 m / 196.8 ft | 1,358,000 |

*The "Maximum Concrete Production Rate" may not be interpolated for property line distances falling between two values listed above. (For example, a truck mix facility with a "Minimum Distance to Property Line" of less than 60 meters but greater than or equal to 55 meters would be subject to a "Maximum Concrete Production Rate" of 815,500 $yd^3$/yr.)

The General Permit requires that the Permittee maintain a physical marker at the point on the property line used to establish the "Minimum Distance to Property Line". The physical marker may consist of any fixture, including a property line fence or a pole/stake installed at the point for the specific purpose of meeting this requirements. This "Physical Marker" requirement is included in the permit to insure that DAQ representatives can verify compliance with the standard during on-site inspections.

In addition, the Permittee is required to demonstrate compliance with the applicable annual production limit (based on its "Distance to Property Line") by maintaining records of concrete production for each calendar month (in $yd^3$/month) and for each calendar year (in $yd^3$/year). All recorded monthly and annual production data for a single calendar year must be submitted to the Regional Supervisor by **March 1st** of the following year.

Finally, the Permittee is required to notify the Regional Supervisor within 15 days of installing an additional cement silo and/or flyash silo. This notification is intended to assure the Regional Office that the permitted facility will continue to qualify for the General Permit, as specified in Specific Condition 2, following installation of the new silo(s).

Note that all modeling performed by the DAQ for the development of this General Permit utilizes "simple terrain" (i.e., flat topography) versus "complex terrain" (i.e., mountainous topography). Terrain can greatly impact off-site ambient impacts of emitted pollutants, and simple terrain models are not considered adequate for estimating off-site impacts in mountainous topographies. Currently, the DAQ is *excluding* concrete batch plants in mountainous counties from qualifying for the General Permit.[2] A list of counties that may qualify for the General Permit are listed in Section A, Condition 2.c. of the General Permit.

5. TOXIC AIR POLLUTANT EMISSION LIMITATIONS – Ready-mix concrete batch plants have the potential to emit state-regulated toxic air pollutants (TAP) in addition to arsenic, including beryllium, cadmium, chromium[3], manganese and compounds, and nickel metal. Pursuant to 15A NCAC 2Q .0711 "Emission Rates Requirement a Permit," the actual emission rate of regulated TAP shall not exceed the Toxic Permitting Emission Rate (TPER), as listed in the rule, PRIOR TO obtaining a permit in accordance with the requirement of 15A NCAC 2D .1100.

   Based on current emission factors, as provided in the Emissions Spreadsheet for Concrete Batching provided on DAQ's website (Revision A, http://daq.state.nc.us/permits/files/cb.xls), TAP emissions from

[2] DAQ delineated "mountainous" counties as those counties identified in DAQ's most recent "NC Air Toxic Guidance" document as requiring site-specific metrological data based on terrain features. See Appendix B of the document for a list of counties (http://daq.state.nc.us/permits/mets/Guidance.pdf).
[3] "Chromium" includes all soluble chromate compounds, as chromium (VI) equivalent.)

facilities meeting the annual production limitations provided in this permit should not exceed the listed TPERs. A summary of TPERs and estimated emissions are provided in the following table:

| Pollutant | TPER | Maximum Emission Rate* |
|---|---|---|
| Beryllium | 0.28 lb/yr | 0.005 lb/yr |
| Cadmium | 0.37 lb/yr | <0.001 lb/yr |
| Chromium* | 0.013 lb/day | 0.009 lb/day |
| Manganese and compounds | 0.63 lb/day | 0.047 lb/day |
| Nickel metal | 0.13 lb/day | 0.010 lb/day |

* Maximum *annual* emission rates (for beryllium and cadmium) are estimated assuming a maximum annual throughput of 150,000 $yd^3$. Maximum *daily* emission rates (for chromium, manganese, and nickel) are estimated assuming a maximum daily throughput of 2,880 $yd^3$/day (i.e., 120 $yd^3$/hr continuously for 24 hours)

The Permittee shall be responsible for obtaining a permit to emit TAPs and for demonstrating compliance with the requirements of 15A NCAC 2D .1100 "Control of Toxic Air Pollutants" PRIOR to exceeding any of the listed TPERs.

## IV. Title V Applicability

This General Permit is only available to "true small" sources with facility-wide potentials-to-emit (PTEs) of less than Title V major source thresholds for all regulated air pollutants. Facilities whose production throughputs are less than the amounts listed in the table in Section 4 above would have facility-wide PTEs of less than Title V thresholds for all regulated air pollutants and would not be subject to Title V permitting requirements.

## V. Maximum Facility-Wide Emissions

Maximum facility-wide emissions are estimated using the Concrete Batch Emission Calculation spreadsheet provided on the NC DAQ website (http://daq.state.nc.us/permits/files/cb.xls). A completed calculation spreadsheet for this facility is attached to this permit review document.
<Attach a completed calculation spreadsheet to this document. Use estimated facility-wide emissions to complete the PYD Screen in the IBEAMs Fee Module.>

## VI. Recommendations

This permit modification application for the <Enter Company Name>, located in <Enter City>, <Enter County>, North Carolina, has been reviewed by NC DAQ to determine compliance with all procedures and requirements. NC DAQ has determined that this facility is complying or will achieve compliance as specified in the permit with all applicable requirements.

**Issue Permit No. <Enter Permit No.>**