



Air Quality
ENVIRONMENTAL QUALITY

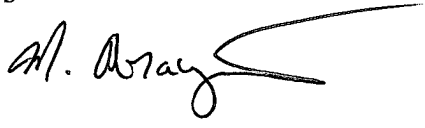
ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

MICHAEL A. ABRACZINSKAS
Director

MEMORANDUM:

To: Regional Supervisors

From: Mike Abraczinskas 

Date: May 31, 2018

Subject: Procedures for Rock Quarry Permitting

The Division of Air Quality (DAQ) has reviewed the procedures used to permit rock quarries¹. The review has included a re-examination of the history related to quarry permitting and modeling. Process data related to specific quarry operations and process operations documented in permits were analyzed. Permitting actions, ambient air quality standard (AAQS) modeling for the past 15 years, and compliance status of the facilities have informed the review. As a result of the review, the DAQ is modifying the procedures for permitting and modeling at quarries.

- The DAQ has the authority to require particulate modeling for any exempt, registered, or permitted quarry should the Division have an AAQS or any other air quality standard compliance concern.
- NC DAQ will no longer require mandatory particulate matter modeling analysis for all new or expanded rock quarries.
- References in rock quarry permits to requirements/restrictions on installing and operating additional initial (primary) crushers and conditions related to AAQS demonstrations or operating restrictions including 15A NCAC 2D .0540(e)(1)² should be removed from the permit the next time the permit is opened. In the interim, the Permittee must comply with all conditions in the permit. The Permittee may apply for an administrative amendment related to this point.
- All quarries that qualify per 15A NCAC 2Q .0102(d), are eligible for permit exemption. The exemption letter shall indicate that the facility needs to maintain an equipment list and plant diagram on-site, which must be provided to the state representative during a compliance assurance visit.

¹ See January 18, 2018 Jennifer Womick memo "Quarry Exemption/Registration Analysis and Recommendation"

² 2D .0540(e)(1) should only be removed if it was added as a result of triggering an AAQS demonstration and not due to excessive fugitive dust emissions beyond the property boundary.

- Quarries qualifying for exemption may “opt-in” to registration upon request even though they may have sources subject to NSPS. Registration documents will require facilities with NSPS equipment to remain under exemption thresholds rather than registration thresholds. In addition, the registration document will include a condition requiring the facility to maintain an equipment list.


The following memos referencing requirements for rock quarries to demonstrate compliance with the AAQS are superseded by this memorandum:


- Letter dated March 23, 1990 to the North American Aggregates Association
- June 24, 2009 Memo: Fugitive Dust Control Plans for Rock Quarries Pursuant to 15A NCAC 2D .0540(e)(1)
- January 24, 2012 Memo: Trigger for NAAQS and SAAQS Modeling at Existing Rock Quarries
- May 3, 2012 Memo: NAAQS/SAAQS Modeling Exemption Criteria for Rock Quarries: Maximum out of Pit Engine Capacity
- May 25, 2017 Memo: Trigger for NAAQS and SAAQS Modeling at Existing Rock Quarries

**DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY (DAQ)
January 18, 2018**

MEMORANDUM

TO: Michael Pjetraj, Deputy Director

THROUGH: Bruce Ingle, MRO Regional Supervisor 

FROM: Jennifer Womick, MRO Permit Coordinator 

SUBJECT: Quarry Exemption/Registration Analysis and Recommendation

On October 3, 2017, Denise Hayes, Bruce Ingle and I met with representatives of the North Carolina Aggregate Association (NCAA) to discuss their request to obtain exemption or registration status for facilities that have triggered a demonstration of the particulate National Ambient Air Quality Standards (NAAQS) and State Ambient Air Quality Standards (SAAQS), which will be referred to herein as the Ambient Air Quality Standards (AAQS). This memo will address the following areas: 1) historical policies/procedures regarding modeling for these facilities, 2) current emission levels, 3) protection of the AAQS and 4) summary/recommendations for policy changes.

Historical Policies/Procedures Regarding Modeling

On February 1, 1976, the DAQ promulgated rule 15A NCAC 02D .0510 "Particulates: Sand, Gravel, Crushed Stone Operations" requiring operational conditions "to reduce to a minimum any particulate matter from becoming airborne, and in no case shall the established ambient air quality standards be exceeded at the property line." This rule was amended effective January 1, 1985 for minor administrative changes.

On March 1, 1985, the DAQ issued a Greenfield permit to Martin Marietta – Rocky River Quarry (called Allen Quarry in the Greenfield permit only), in Cabarrus County (1300038). A resident living in close proximity to the quarry had severe respiratory problems documented by his physician. Modeling was performed primarily to determine the impacts on the resident's property, but it was also used to verify that the PSD increment was not exceeded since Cabarrus County was triggered for particulates and to verify compliance with the AAQS. The facility demonstrated compliance with all requirements, but the model predicted a 24-hour impact of 33.6 ug/m³, which is 91% of the available increment (37 ug/m³). The high percent of the available increment played a major role in subsequent modeling requirements for quarries.

Effective February 5, 1988, the EPA amended the modeling guidance per supplement A that is associated with the prevention of significant deterioration (PSD) rules, which was anticipated to significantly increase the number of DAQ applications requiring a modeling analysis. A March 30, 1988 letter (attached) was sent from EPA to N. Ogden Gerald, Air Quality Chief, indicating that North Carolina needed to amend our PSD regulations to include supplement A of the modeling guidelines. A July 8, 1988 DAQ memo (attached) from N.O. Gerald, Chief, to Regional Air Quality Supervisors called "Interim Air Quality Modeling Guidance" lists a number of emission source types for which modeling should NOT automatically be performed as these sources were not expected to be of concern with regard to AAQS. This list includes "fugitive emissions at mineral processing plants" indicating recognition that these types of facilities were not expected to exceed the AAQS. Although I cannot find a follow up to the "interim" modeling guidance in this document, at some point, the DAQ stopped modeling all sources not excluded in the memo.

On September 8, 1989, Lee Daniel, Acting Chief of DAQ, sent a letter to Mr. Fred Allen, Executive Director of the NCAA, informing the NCAA of dispersion modeling requirements for any “new or additional crushing facility with a crushing capacity of 200 TPH in areas where the PSD baseline date has been triggered or a capacity of 600 TPH in any county.” The former limit was to address concerns regarding the 24-hour PSD increment of 37 ug/m³. The latter addressed concerns with the AAQS of 150 ug/m³. These production rates were later revised in a letter dated March 3, 1990 to 400 TPH and 1,000 TPH, respectively. The limit for counties with the PSD baseline date triggered comes from modeling performed at the Martin Marietta – Rocky River Quarry for both letters. As will be discussed further, by 1994 (and published in the Fifth edition of AP-42 in January 1995) the emission factors used to establish these rates for particulate modeling will be deemed “obsolete” but not superseded by DAQ personnel.

On July 1, 1998, the rule amendment for 15A NCAC 02D .0510 “Particulates from Sand Gravel, or Crushed Stone Operations” became effective, which was prompted by a case brought against the State by Indusmin Co. The company asserted that it “did not know when it had done enough to comply with the rule” to control fugitive dust emissions. The result of this case was the development of the 2D .0540 rule and amendments to rules with particulate emissions standards (2D .0506 - .0511 and 2D .0513 - .0515). For 2D .0510 specifically, the rule making agenda published in the NC Register dated December 15, 1995 states, “The rule does not describe or provide any guidance as to what these measures are to be other than state that the measure shall prevent the ambient air quality standards from being exceeded. More definitions need to be added as to what control levels may be suitable.” As we know from the final rule, requirements of 2D .0540 and the opacity standards in 2D .0521 and 2D .0524 were included as the specific parameters to indicate compliance. In addition, the language was changed to indicate the facility needed to take measures to “prevent” ambient air quality standards from being exceeded rather than indicating that “in no case shall” they be exceeded. As such, the language in this rule inherently asserts that if operational requirements are met, then the AAQS has been protected.

On December 14, 2001, the DAQ issued a permit to Greenfield quarry Martin Marietta – Richmond Quarry, Richmond County (7700074). A group of citizens challenged the permit, including the legality of the quarry “special” permit established in 1998, specifically questioning how the 5,000 tons per hour limit was determined. This was adjudicated to the OAH, but the facility requested that the permit be rescinded and reissued rather than go to the EMC for review. As a result of the case, DAQ re-evaluated the permitting process for quarries and reformatted the permits issued to quarries which were changed to “flexible” rather than “special” permits. A new permit for the Richmond Quarry was issued on December 6, 2004, and the 09151R01 permit review explains the consequences of the challenge and details of the modeling requirements. The review discusses that “one of our 1980s policy memos referenced modeling” which is presumably a reference to the letter to Mr. Fred Allen mentioned above, and it describes the emission factor changes. In addition, the Additional Permit Guidance for Flexible Quarry Permits dated September 15, 2003, further explains flexible quarry permits and modeling requirements. Both documents indicate that new and expanding quarries will have to model particulates to demonstrate compliance with the AAQS on an **interim basis only** while the division collects data on the impact.

DAQ finalized modeling exemption levels in 2009 and the following memos have been issued:

- June 24, 2009: Fugitive Dust Control Plans for Rock Quarries Pursuant to 15A NCAC 2D .0540(e)(1)
- January 24, 2012: Trigger for NAAQS and SAAQS Modeling at Existing Rock Quarries
- May 3, 2012: NAAQS/SAAQS Modeling Exemption Criteria for Rock Quarries: Maximum out of Pit Engine Capacity
- May 25, 2017: Trigger for NAAQS and SAAQS Modeling at Existing Rock Quarries

However, it does not appear that DAQ has reviewed the modeling data collected to “complete a modeling study” as intended in the referenced guidance.

Current Emissions Data

During the meeting held on October 3, 2017, much discussion was aimed at operational assumptions and spreadsheet inputs for various facilities which affected actual emissions reported in the emission inventory and modeled rates. In some cases, facilities assumed an operational worse-case scenario which is overly conservative to the point of presenting situations that would never occur. Facilities have gone beyond worse-case to present theoretical emission rates in a desire to be 100% in compliance with all DAQ rules. In their efforts to be good environmental stewards, this situation has created a database of emissions estimates that hinder the industry and DAQ in making any changes in light of the new exemption and registration procedures.

For example, in a few cases the process throughput was not being distributed to the downstream equipment using mass balance, but was being fully applied at 100% for each downstream process resulting in emission rates many times higher than could be achieved in actual operation. In other cases, emissions from conveyor drop points were included when they should not be (i.e. conveyors into a crusher or screen), which is, in fact, double counting of emissions as such points are accounted for in the crusher or screen emissions. Modeling emissions often assumed worst-case for factors such as silt content or control efficiency of the wet suppression on haul roads, which were far more conservative than the factors DAQ used to determine the limits for quarry modeling exemption.

As a result of the meeting with the NCAA, Vulcan Construction Materials, LLC reviewed the previous emissions inventories for their Cabarrus Quarry (1300058) and Rockingham Quarry (7700031) and submitted revised emissions without the overly conservative assumptions. In addition, the facility representatives submitted production data for 2015 and 2016, which were good years economically, so that a better picture of actual production could be established. The result of this effort is a higher confidence level so that subsequent policy decisions are based upon the best available information. Several tables are attached that include this data as well as the number of quarries with Air Quality Permits in North Carolina and their emissions based on the most recent emissions inventory.

Protection of the Ambient Air Quality Standards

Protecting the Ambient Air Quality Standards is the primary concern when considering procedural changes to the permit status of quarries. I gathered information on all facilities with current permits known to have performed site specific modeling since 2003. Many facilities modeled at the maximum (some typical and some theoretical) hourly operating rate and therefore daily and annual "limits" were calculated by multiplying by 24 and 8760, respectively, if specific limits were not provided in the permit. The production rates established by modeling to be under the AAQS have been compared to the actual facility production rates. For all facilities, the actual operational annual throughput is well below the modeled annual amount for compliance with the AAQS, and notably, the facility that came the closest was only 16.5% of the modeled rate (see attached table). It is easy to compare annual production, but daily (24-hour) AAQS requirements must also be considered. The hours needed to achieve the modeled 24-hour rate for each facility was calculated based on the typical operating rate of the primary crusher (see attached table). The majority of facilities modeled into compliance with the AAQS assuming the primary crusher operated at its typical setting for 24 hours. In addition, since the maximum daylight in North Carolina is about 17 hours including nautical twilight time, all facilities that modeled at typical process rate for 18 or more hours should always be in compliance with the 24-hour AAQS because it is not typical for quarries to bring in lights to operate outside of daylight. This leaves five facilities, which were investigated. Please note that none of these facilities have exceeded their allowable rates.

Also, it is important to note that modeling for AAQS provides a general picture of a source's impact, but if one 24-hour actual emissions exceeds the allowable rate from a model, it does NOT mean that there is a AAQS violation. Models are tools to demonstrate compliance, but a facility could use a more refined model and/or recalculate emissions with less conservative assumptions. However, models are expensive and not necessary since the data collected since the Richmond Quarry was issued their second permit establishes that quarries are in compliance with the AAQS at normal operation, even with conservative factors. Requiring quarries to model all Greenfields and when the primary crushing capacity is increased is more stringent than the PSD/NSR requirements for major sources. Collected data does not support the idea that these facilities will exceed the AAQS, assuming that they are in compliance with 2D .0510.

Summary/Recommendations for policy changes

As discovered while researching the history of modeling requirements at quarries, the policy requiring new and expanding quarries to model particulates to demonstrate compliance with the AAQS was only intended to be on an interim basis while the division collects data to complete a modeling study. During the meeting held on October 3, 2017, industry representatives stated they had not made any operational, production, or equipment changes based on modeling results. This statement plus the information discussed above confirms that current modeling results do not indicate an exceedance of the AAQS when modeling parameters and emission rates accurately reflect "real world" quarry operation rather than the "theoretical maximums" that many have used to define permit limits. In addition, the current language in 2D .0510 is intended to provide a framework for compliance with the AAQS.

Therefore, the Division can use the information collected and compiled in this memo to serve as the modeling study required as discussed above and supersede previous policy memos. The collected data indicates that rock quarries in North Carolina are extremely unlikely to exceed the AAQS when they are operating as required in 2D .0510. In addition, even if a facility that has performed site specific modeling were to operate at or above the production that demonstrated compliance with the AAQS, best engineering judgment indicates it is unlikely that the AAQS would actually be exceeded since the inputs and assumptions used in models are extremely conservative. Therefore, I recommend that the following become DAQ policy:

- 1) NC DAQ will no longer require new or expanded rock quarries to demonstrate compliance with the AAQS for particulate matter.
- 2) References in rock quarry permits to requirements/restrictions on installing and operating additional initial (primary) crushers and conditions related to AAQS demonstrations or operating restrictions including 2D .0540(e)(1)* should be removed from the permit the next time it is opened for any reason. The Permittee must comply with all conditions in the permit until they are removed. However, the Permittee may apply for an administrative amendment to have the changes made sooner.
- 3) All quarries that qualify per 2Q .0102(d), are eligible for permit exemption. The exemption letter will indicate that the facility needs to maintain an equipment list and plant diagram on-site, which must be provided to the state representative during a compliance assurance visit.
- 4) Quarries qualifying for exemption may "opt-in" to registration upon request even though they have sources subject to NSPS. However, registration documents will include language for the facility to remain under exemption thresholds rather than typical registration thresholds. In addition, the registration document will include a condition requiring the facility to maintain an equipment list. Attached is a portion of the proposed registration document for quarry facilities.

- 5) The Division reserves the right to require particulate modeling for any exempt, registered, or permitted quarry should the Division have a concern with compliance with the AAQS or any other air quality standard.

*2D .0540(e)(1) should only be removed if it was added as a result of triggering an AAQS demonstration and not due to excessive fugitive dust emissions beyond the property boundary.

Previous letters and memos referencing requirements for rock quarries to demonstrate compliance with the AAQS will be superseded or made irrelevant by this recommendation including but not limited to the following:

- Letter dated March 23, 1990 to the North American Aggregates Association
- June 24, 2009 Memo: Fugitive Dust Control Plans for Rock Quarries Pursuant to 15A NCAC 2D .0540(e)(1)
- May 3, 2012 Memo: NAAQS/SAAQS Modeling Exemption Criteria for Rock Quarries: Maximum out of Pit Engine Capacity
- May 25, 2017 Memo: Trigger for NAAQS and SAAQS Modeling at Existing Rock Quarries

All versions of the 2D .0510 regulation.

**2D .0510 PARTICULATES: SAND, GRAVEL, CRUSHED STONE OPERATIONS
(Effective 2/1/1976)**

- (a) No person shall cause, suffer, allow, or permit any material to be produced, handled, transported or stock-piled without taking measures to reduce to a minimum any particulate matter from becoming airborne, and in no case shall established ambient air quality standards be exceeded at the property line.
- (b) The owner or operator of the plant shall maintain dust control of the plant premises and access roads which he controls by paving, oil treatment, or other suitable measures.
- (c) All stone crushing operations shall employ a water spray over the crusher.

**2D .0510 PARTICULATES: SAND, GRAVEL, CRUSHED STONE OPERATIONS
(Amended Effective 1/1/1985)**

- (a) A person shall not cause, allow, or permit any material to be produced, handled, transported or stock-piled without taking measures to reduce to a minimum any particulate matter from becoming airborne, and in no case shall established ambient air quality standards be exceeded beyond the property line.
- (b) The owner or operator of the plant shall maintain dust control of the plant premises and access roads which he controls by paving, oil treatment, or other suitable measures.
- (c) All stone crushing operations shall employ a water spray over the crusher.

**02D .0510 PARTICULATES FROM SAND, GRAVEL, OR CRUSHED STONE OPERATIONS
(Amended Effective 7/1/1998)**

- (a) The owner or operator of a sand, gravel, or crushed stone operation shall not cause, allow, or permit any material to be produced, handled, transported or stockpiled without taking measures to reduce to a minimum any particulate matter from becoming airborne to prevent exceeding the ambient air quality standards beyond the property line for particulate matter, both PM10 and total suspended particulates.
- (b) Fugitive non-process dust emissions from sand, gravel, or crushed stone operations shall be controlled by Rule .0540 of this Section.
- (c) The owner or operator of any sand, gravel, or crushed stone operation shall control process-generated emissions:
 - (1) from crushers with wet suppression, and
 - (2) from conveyors, screens, and transfer points,

such that the applicable opacity standards in Rule .0521 or .0524, of this Section are not exceeded.