synTerra
Science & Engineering Consultants
148 River St., Suite 220, Greenville, SC 29601 | 864.421.9999

October 18, 2023

Mr. Steve McCaslin
Director, Engineering Services Division
Bureau of Air Quality
SC DHEC
2600 Bull Street
Columbia, South Carolina, 29201

SUBJECT: **Vulcan Construction Materials, LLC - Orangeburg Quarry**
Eutawville, SC
Construction Permit Application Air Permit # 1860-0165

Dear Mr. McCaslin:

Vulcan Materials Company, Orangeburg Quarry located in Eutawville, SC plans to install a portable plant that will include truck unloading, 3 crushers, 2 screens, and four conveyors that will be powered by a previously exempt CAT C9 248kW, 300hp Tier 3/Stage IIIA engine. Applicable construction permit application forms are provided in Appendix A, process flow is presented in Appendix B, emission calculations and air quality modeling analysis are presented in Appendix C. The proposed equipment is discussed in detail below.

Proposed Equipment:

Equipment Description	Equipment ID	Capacity (TPH)	Emission Control System
Truck Unloading	TU-1	600	Wet Suppression (WS)
Crusher #1	PC1-P	600	WS
Crusher #2	PC2-P	350	WS
Crusher #3	PC3-P	125	WS
Screen #1	S1-P	600	WS
Screen #2	S2-P	350	WS
Conveyor #1	C1-P	225	WS
Conveyor #2	C2-P	175	WS
Conveyor #3	C3-P	350	WS
Conveyor #4	C4-P	100	WS

Emissions factors and calculations for all equipment to be installed are shown in Appendix C.

As shown in Tables 1-2 (Appendix C), the emissions at the facility are as follows:

Pollutant	Proposed Potential Uncontrolled		Proposed Potential Controlled	
	(PPH)	(TPY)	(PPH)	(TPY)
TSP	32.13	140.71	3.50	15.33
PM_{10}	11.79	51.64	1.32	5.80
$PM_{2.5}$	1.31	5.72	0.17	0.73

Regulatory Discussion:

- **Regulation 61-62.1 Section II(E) Synthetic Minor Construction Permits**
  The facility will be in compliance with the enforceable limits set forth by this standard with the proposed facility modifications.

- **Regulations 61-62.5 Standard No. 1 - Emissions from Fuel Burning Operations**
  There are no fuel burning operations at the subject facility.

- **Regulation 61-62.5 Standard No. 2 Ambient Air Quality Standards**
  The estimated particulate emission rates after control for each emission point are less than 1.14 lb/hr, and are therefore exempt from the modeling demonstration as shown in Appendix C, Table 6. The Vulcan facility is in compliance with Standard No. 2.

- **Regulation 61-62.5 Standard No. 3 - Waste Combustion and Reduction (State Only)**
  There are no waste combustion or reduction sources at the subject facility.

- **Regulation 61-62.5 Standard No. 4 Emissions from Process Industries**
  The facility will be in compliance with the limits set forth by this standard with the proposed facility modifications.

- **Regulation 61-62.5 Standard No. 5 Volatile Organic Compounds**
  The facility does not contain one of the processes subject to this standard.

- **Regulation 61-62.5 Standard No. 5.2 Nitrogen Oxides Lowest Achievable Emission Rate**
  There are no fuel burning operations at the subject facility. The exempt engine is not a stationary source.

- **Regulation 61-62.5 Standard No. 7 Prevention of Significant Deterioration**
  This facility is not specified as one of the 28 specific industry types and is in the other industry type category. PSD applicability is pollutant specific and is based on the potential to emit considering federally enforceable air pollution controls and/ or federally enforceable operating conditions (i.e., emission limits, production limits, etc.). With modifications, the Orangeburg Quarry has the potential to emit less than 250 tpy of PSD pollutants. Because the potential to emit of any PSD pollutant is less than 250 tpy this regulation does not apply.

  The facility will be located in Orangeburg County, which has a Minor Source Baseline Date for PM_{10} of 05/23/1980 and a Minor Source Baseline Date for $PM_{2.5}$ of 03/28/2012. Where the minor source baseline date has been set for a pollutant, any increase in emissions from a new or modified emission source must comply with the Standard 7 increment(s) for that pollutant and the facility must submit an analysis that demonstrates emissions increases caused by the facility will not cause an increase in pollutant concentration above the Standard 7 increment(s). SCDHEC's "Guidance Concerning Prevention of Significant Deterioration (PSD) Ambient Air Increments" document available on SCDHEC's website released 2/27/2017 states that; SCDHEC will no longer require that facilities include an air quality analysis for PSD increments in permit applications for those pollutants that do not trigger PSD permit action. Since the facility does not trigger PSD permit action, a Standard 7 increment modeling analysis has not been submitted.

- **Regulation 61-62.5 Standard No. 7.1 Nonattainment New Source Review**
  The facility is not located in a non-attainment area, so this standard does not apply.

- **Regulation 61-62.5, Standard 8 - Toxic Air Pollutants (TAPs) (State Only)**
  No Standard 8 pollutants requiring a compliance demonstration will be emitted.

- **Regulation 61-62.63 - National Emission Standards for Hazardous Air Pollutants: 112(g) (June 28, 1998)**
  This regulation is an interim standard that applies to any owner or operator who constructs or reconstructs a major source of hazardous air pollutants (HAP) where the EPA has not promulgated a MACT standard. The engine is not a stationary source; therefore not subject to Subpart ZZZZ.

- **40 CFR Part 60 subpart IIII and JJJJ**
  The exempt engine does not meet the definition of a stationary source therefore it is not subject to Subpart IIII or JJJJ.

- **40 CFR Part 60 subpart OOO**
  Sources which commenced construction, reconstruction, or modification after August 31, 1983 are subject to all applicable requirements of Federal New Source Performance Standards (NSPS) 40 CFR 60, Subpart OOO. The requirements for inspections, testing, reporting, monitoring, etc. listed in 40 CFR 60 Subparts A and OOO for the new crushers, screens, and conveyors will be completed and reported as specified.

Summary:

Vulcan Materials will be in compliance with applicable State and Federal air pollution control regulations and is requesting a Minor Source Construction Permit for the addition of equipment related to the portable plant as documented. The Orangeburg Quarry will accept federally enforceable administrative limits to operate as a Conditional Major Source.

Please contact Salley Lewis at (864) 894-9203 if you have any further questions or concerns with regards to this matter.

Sincerely,

SynTerra

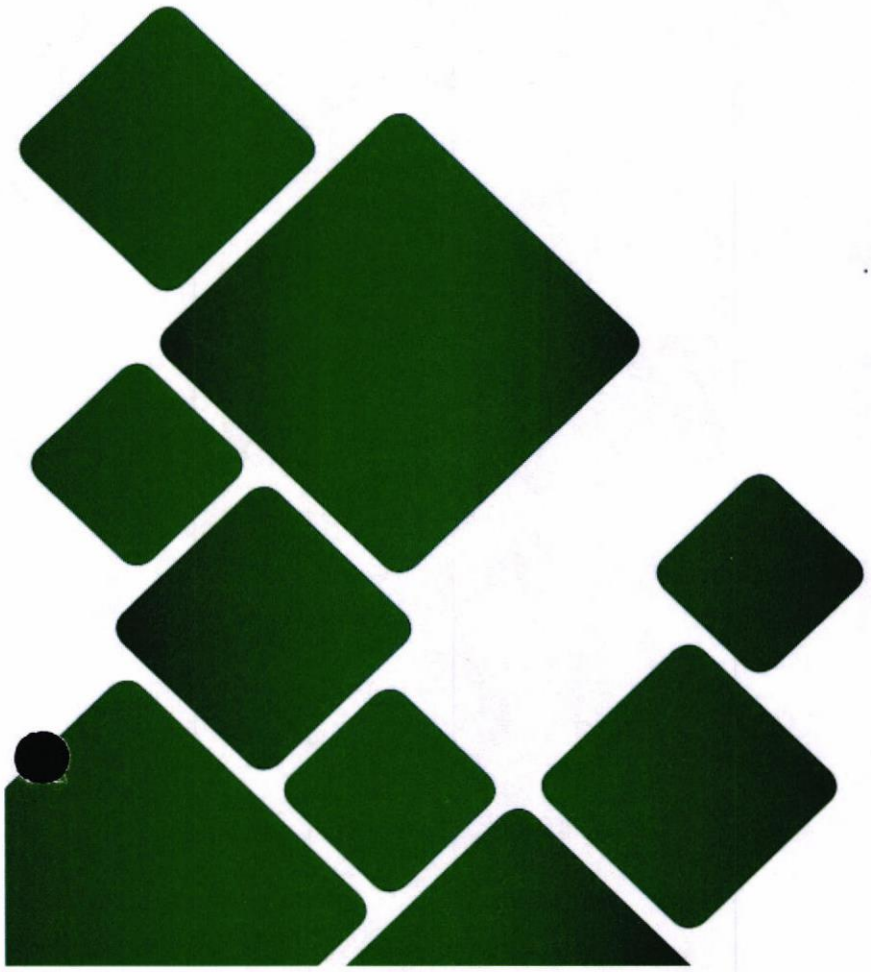
Andrea Kehn

Andrea Kehn, P.E.
Project Engineer

Cc: Salley Lewis, Vulcan Construction Materials

Attachments: Appendix A: Application Forms
Appendix B: Figure
Appendix C: Emissions Calculations and Modeling Determination

APPENDIX A
APPLICATION FORMS



synTerra

Science & Engineering Consultants

SECTION 1 - FACILITY IDENTIFICATION

SC Air Permit Number (8-digits only) *(Leave blank if one has never been assigned)*	Application Date
1860-0165	10/8/2023

Facility Name/Legal Identity *(This should be the official legal name under which the facility is owned/operated and should be consistent with the name registered with the S.C. Secretary of State's office, as applicable.)*
Vulcan Construction Materials, LLC - Orangeburg Quarry

Facility Site Name (Optional) *(Please provide any alternative or additional identifier of the facility, such as a specific plant identifier (e.g., Columbia plant) or any applicable "doing business as" (DBA) identity. This name will be listed on the permit and used to identify the facility at the physical address listed below.)*

Facility Federal Tax Identification Number *(Established by the U.S. Internal Revenue Service to identify a business entity)*
-

REQUEST TYPE (Check all that apply)

Exemption Request: ☐
Complete Section 1 and attach documentation to support exemption request.

Construction Application:
☒ Minor New Source Review Project
☐ Synthetic Minor Project
☐ Prevention of Significant Deterioration Project
☐ 112(g) Project

Expedited Review Request: ☐
If checked, include Expedited Form D-2212 in the construction application package.

Construction Permit Modification: ☐
Provide the construction permit ID (e.g. CA, CB, etc.) for which modification is requested:

Application Revision: ☐

CONSTRUCTION PERMIT APPLICATION FORMS BEING REVISED
(Amended construction permit forms must be filled out completely and attached to this modification request.)

Form #	Date of Original Submittal	Brief Description of Revision
D-2566		
D-2573		

FACILITY PHYSICAL ADDRESS

Physical Address: 1095-1135 Addidas Street		County: Orangeburg
City: Eutawville	State: SC	Zip Code: 29048

Facility Coordinates *(Facility coordinates should be based at the front door or main entrance of the facility)*
Latitude: 33.35 Longitude: -80.29

FACILITY'S PRODUCTS / SERVICES	
Primary Products / Services *(List the primary product and/or service)* Crushed and broken granite mining and quarrying	
Primary SIC Code *(Standard Industrial Classification Codes)* 1423	Primary NAICS Code *(North American Industry Classification System)* 212313
Other Products / Services *(List other products and/or services)*	
Other SIC Code(s):	Other NAICS Code(s):

PROJECT DESCRIPTION
Project Description (What, why, how, etc.): Installing a portable plant that will include one grizzly feeder, 3 crushers, 2 screens, and four conveyors.

AIR PERMIT FACILITY CONTACT *(Person listed will be in our files as the point of contact for all air permitting related questions and will receive all air permitting notifications.)*			
Title/Position: Environmental Specialist	Salutation: Ms.	First Name: Salley	Last Name: Lewis
Mailing Address: 202 Brown Road			
City: Piedmont		State: SC	Zip Code: 29673
E-mail Address: lewiss@vmcmail.com		Primary Phone No.: (864) 894-9203	Alternate Phone No.:

The signed permit will be e-mailed to the designated Air Permit Contact. If additional individuals need copies of the permit, please provide their names and e-mail addresses.	
Name	**E-mail Address**
Andrea Kehn	akehn@synterracorp.com
Heather Ponce	hponce@synterracorp.com

CONFIDENTIAL INFORMATION / DATA
Is confidential information or data being submitted under separate cover? ☒ No ☐ Yes*

If yes, submit **ONLY ONE COMPLETE CONFIDENTIAL APPLICATION, with original signature, along with the public version of the application.*

CO-LOCATION DETERMINATION
Are there other facilities in close proximity that could be considered collocated? ☒ No ☐ Yes*
If yes, list potential collocated facilities, including air permit numbers if applicable:

**If yes, please submit collocation applicability determination details in an attachment to this application.*

**If yes, please submit collocation applicability determination details in an attachment to this application.*

OWNER OR OPERATOR			
Title/Position: Environmental Specialist	Salutation: Ms.	First Name: Salley	Last Name: Lewis
Mailing Address: 202 Brown Road			
City: Piedmont		State: SC	Zip Code: 29673
E-mail Address: lewiss@vmcmail.com		Primary Phone No.: (864) 894-9203	Alternate Phone No.:

OWNER OR OPERATOR SIGNATURE

I certify, to the best of my knowledge and belief, that no applicable standards and/or regulations will be contravened or violated. I certify that any application form, supporting documentation, report, or compliance certification submitted in this permit application is true, accurate, and complete based on information and belief formed after reasonable inquiry. I understand that any statements and/or descriptions, which are found to be incorrect, may result in the immediate revocation of any permit issued for this application.

Signature of Owner or Operator — Date: 10/3/23

APPLICATION PREPARER (if other than Professional Engineer below)			
Title/Position: Senior Engineer	Salutation: Ms.	First Name: Heather	Last Name: Ponce
Mailing Address: 148 River Street, Suite 220			
City: Greenville		State: SC	Zip Code: 29601
E-mail Address: hponce@synterracorp.com		Phone No.: (813) 598-4049	Cell No.:

PROFESSIONAL ENGINEER INFORMATION			
Consulting Firm Name: SynTerra Corporation		SC Certificate of Authority License No.: C00623	
Title/Position: Project Engineer	Salutation: Ms.	First Name: Andrea	Last Name: Kehn
Mailing Address: 148 River Street, Suite 220			
City: Greenville		State: SC	Zip Code: 29601
E-mail Address: akehn@synterracorp.com		Phone No.: (864) 527-4636	Cell No.:
SC License/Registration No.: 26552			

PROFESSIONAL ENGINEER SIGNATURE

I have placed my signature and seal on the engineering documents submitted, signifying that I have reviewed this construction permit application as it pertains to the requirements of *South Carolina Regulation 61-62, Air Pollution Control Regulations and Standards*.

Signature of Professional Engineer — Date: 10/3/2023

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 26552 ANDREA KEHN 10/3/23

SOUTH CAROLINA SynTerra Corporation No. C00623 CERTIFICATE OF AUTHORIZATION

This form is subject to Retention Schedule 16303.

SECTION 2- EQUIPMENT / PROCESS INFORMATION INSTRUCTIONS

The information provided in tables in this section will identify the equipment and processes that will be added, removed or modified at the facility, including the size and type along with the make and model, and any associated control devices and/or emission points.

As an attachment to this form include a narrative with the following information:

- Description of the facility's proposed new or altered processes;
- Physical and chemical properties and feed rate(s) of the raw materials used and products made from which the facility determined potential emissions;
- Process flow diagram / production process layout of all new or altered sources changed showing the flow of materials and intermediate and final products.

Equipment / Process Information Table:
Please identify the equipment and processes that are being added, removed, modified, or are existing and provide the information requested in this table. Additional information required to complete the review of this permit application should be submitted as attachments.

Control Device Information Table:
Identify the control devices being added, removed, modified, or existing in the proposed construction project and provide the information requested in this table. Additional information required to complete the review of this permit application should be submitted as attachments.

EQUIPMENT / PROCESS INFORMATION
Be as detailed as possible when filling out "Equipment/Process Description." The following includes examples of source types and relevant information associated with that source: ***External Combustion Sources:*** Equipment type and usage (e.g. steam generation, process heat, drying, curing, etc.), maximum heat capacity (MMBTU/hr), primary and backup fuel type (e.g. natural gas, fuel oil, coal, etc.), fuel sulfur content, Low NO_x burners, direct or indirect heating ***Stationary Internal Combustion Sources:*** Equipment type and usage (e.g. emergency generator, fire pump, etc.), output brake/electrical power (hp/kW), fuel type ***Liquid Storage Tanks***: Tank type (e.g. fixed roof, floating roof, variable vapor pressure, etc.), materials stored, material density, vapor pressure, maximum average storage temperature, loading source (e.g. pipeline, rail car, process, etc.) ***Incinerators***: Incinerator type (e.g. rotary kiln, air curtain, single chamber, etc.), primary and secondary waste types (e.g. municipal waste, yard waste, clean wood, etc.), waste charge rate (tons/day or lb/hr), burner capacity (BTU/hr), minimum chamber temperature ***Surface Coating Sources*:** Coating operation type (e.g. large appliances, auto and light duty trucks, paper and other webs, publication printing inks, etc.), transfer efficiency, coating density, percent Volatile Organic Compound (VOC)/Hazardous Air Pollutants (HAPs)/Toxic Air Pollutants (TAPs), Safety Data Sheets (SDS) Please review applicable regulations to determine additional information that may be required for permitting.

EQUIPMENT / PROCESS INFORMATION					
Equipment ID/ Process ID	**Action**	**Equipment / Process Description**	**Maximum Design Capacity (Units)**	**Control Device ID(s)**	**Emission Point ID(s)**
TU-1	☒ Add ☐ Remove ☐ Modify ☐ Existing	Truck Unloading	600	Wet Suppression (WS)	TU-1
PC1-P	☒ Add ☐ Remove ☐ Modify ☐ Existing	Crusher #1	600	WS	PC1-P
PC2-P	☒ Add ☐ Remove ☐ Modify ☐ Existing	Crusher #2	350	WS	PC2-P
PC3-P	☒ Add ☐ Remove ☐ Modify ☐ Existing	Crusher #3	125	WS	PC3-P
S1-P	☒ Add ☐ Remove ☐ Modify ☐ Existing	Screen #1	600	WS	S1-P
S2-P	☒ Add ☐ Remove ☐ Modify ☐ Existing	Screen #2	350	WS	S2-P
C1-P	☒ Add ☐ Remove ☐ Modify ☐ Existing	Conveyor #1	225	WS	C1-P
C2-P	☒ Add ☐ Remove ☐ Modify ☐ Existing	Conveyor #2	175	WS	C2-P
C3-P	☒ Add ☐ Remove ☐ Modify ☐ Existing	Conveyor #3	350	WS	C3-P

C4-P	☒ Add ☐ Remove ☐ Modify ☐ Existing	Conveyor #4	100	WS	C4-P

CONTROL DEVICE INFORMATION

Inherent, required and voluntary control devices, as used in the table below, are defined as:

Inherent: Consult EPA Guidance "Criteria for Determining Whether Equipment is Air Pollution Control Equipment or Process Equipment." When a control device is deemd "Inherent", a detailed explanation of the determination must be included as an attachment.

Required: Control device is relied-upon or required by regulation, and controlled emissions are used to show compliance with applicable standards and regulations.

Voluntary: Control device is not relied-upon and uncontrolled emissions are used to show compliance with applicable standards and regulations.

CONTROL DEVICE INFORMATION

Control Device ID	Action	Control Device Description	Maximum Design Capacity (Units)	Inherent/ Required/ Voluntary	Pollutants Controlled (Include CAS #)	Capture Efficiency	Destruction/ Removal Efficiency	Emission Point ID(s)
WS	☐ Add ☐ Remove ☐ Modify ☒ Existing	Wet Suppression	600	Required	PM10 / PM2.5	100%	Varies according to AP-42	GF1-P, PC1-P, C1-P to C4-P
	☐ Add ☐ Remove ☐ Modify ☐ Existing							
	☐ Add ☐ Remove ☐ Modify ☐ Existing							

SECTION 3 – SOURCE IDENTIFICATION AND EMISSIONS CHECKLIST INSTRUCTIONS

Definitions for completing the information in the tables below:

Uncontrolled emissions: Maximum emission rate at full design capacity without consideration of control devices or emission limitations.

Controlled emissions: Maximum emission rate at full design capacity taking into consideration control devices. Controlled emissions only apply if there are associated control equipment and should be based on uncontrolled emissions and capture/control efficiencies. Controlled emissions do not take into consideration emission limitations.

Potential to Emit (PTE): The maximum capacity of a source to emit a regulated pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a regulated pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design only if the limitation or the effect it would haveon emissions is federally enforceable. Secondary emissions as defined in S.C. Regulation 61-62.1, Section I(81), do not count in determining the potential to emit of a source.

Check Box for information addressed	Required Information
	Source identification and emissions:
☒	• Name of each source, process, and control device.
☒	• Assign each source an Equipment ID. The IDs must match the IDs listed in Section 2 of this application.
☒	• Assign an Emission Point ID for each source.
☒	• Assign a Control Device ID for each control device.
☒	• List each pollutant the source will emit.
☒	• List the Uncontrolled, Controlled, and PTE emissions for each source or equipment in lb/hr and tons/year.
☒	• Emission rates for each pollutant should be totaled and listed in lb/hr and tons/year.
☒	• Provide the CAS# for each Hazardous Air Pollutant (HAP) and/or Toxic Air Pollutant (TAP).
	Information to support emission rates:
☒	• Sample calculations.
☒	• Emission factors. Include the source, revision date, specific table and/or chapters. Include source test data if factors were derived from source testing.
☐	• Explanation of assumptions, bottlenecks, etc.
☒	• Source test information: A copy of the source test results may be requested. If the test results are not included in the application, the application should cite whether this was a DHEC approved test, and if not, explain where the test was conducted and other identifying information.

Check Box for information addressed	Required Information
☐	• Manufacturer's data.
☐	• Vendor guarantees that support control device efficiencies.
☐	• New Source Review (NSR) analysis.
☐	• Other (e.g. example particle size analysis)

Existing (Permitted) Facilities		
Check Box	**Required Information**	**Location in Application**
☒	Facility-wide emissions prior to construction/modification: • Include an explanation if these emissions do not match the facility-wide emissions submitted in the last application.	Cover Letter, Tables 1, 2
☐	Facility-wide emissions after construction/modification: • Include net change, if applicable.	
	As applicable for the construction/ modification:	
☒	• Name of each source.	Cover Letter, Tables, Figures
☒	• Assign each source an Equipment ID. The IDs must match the IDs listed in Section 2 of this application or on your current construction / operating permit.	Cover Letter, Tables
☒	• Assign a Control Device ID for each control device.	Tables
☒	• Assign an Emission Point ID for each source.	Tables
☒	• List each pollutant the source will emit.	Tables
☒	• List the Uncontrolled, Controlled, and PTE (if applicable) emissions for each source or equipment.	Tables
☒	• Emission rates for each pollutant should be totaled and listed in lb/hr and tons/year.	Tables
☐	• Provide the CAS# for each HAP and/or TAP.	N/A
	Information to support facility-wide emission rates:	
☐	• Sample calculations.	
☒	• Emission factors. Include the source, revision date, specific table and/or chapters. Include source test data if factors were derived from source testing.	Tables 1 and 2
☐	• Explanation of assumptions, bottlenecks, etc.	
☐	• Source test information: A copy of source the test results may be requested. If the results are not included in the application, the application should cite whether this was a DHEC approved test and if not, explain where the test was conducted and other identifying information.	

Existing (Permitted) Facilities		
Check Box	**Required Information**	**Location in Application**
☐	• Manufacturer's data.	
☐	• Vendor guarantees that support control device efficiencies.	
☐	• NSR analysis.	
☐	• Other (please explain)	

Section 4 Completeness Checklist for Regulatory Review

State and Federal Air Pollution Control Regulations and Standards

Perform a review of all State and Federal Air Pollution Control Regulations and Standards for applicability and attach a detailed narrative from the regulatory review to the permit application. If the standard or regulation is not applicable, state the reason. Check all regulations and standards that have been reviewed and addressed in the narrative.

Check Box	State and Federal Air Pollution Control Regulations and Standards
☒	S.C. Regulation 61-62.1 Section II.E Synthetic Minor Construction Permits
☒	S.C. Regulation 61-62.5 Air Pollution Control Standards
☒	• Standard No. 1 Emissions from Fuel Combustion
☒	• Standard No. 2 Ambient Air Quality
☒	• Standard No. 3 Waste Combustion and Reduction (state only)
☒	• Standard No. 4 Emissions from Process Industries *(Note: If Section VIII of this Standard applies, include the process weight rate (PWR) in ton per hour for each applicable source or process.)*
☒	• Standard No. 5 Volatile Organic Compounds
☒	• Standard No. 5.2 Nitrogen Oxides Lowest Achievable Emission Rate
☒	• Standard No. 7 Prevention of Significant Deterioration (PSD)
☒	• Standard No. 7.1 Nonattainment New Source Review (NSR)
☒	• Standard No. 8 Toxic Air Pollutants (TAPs) (state only)
☒	S.C. Regulation 61-62.6 Control of Fugitive Particulate Matter
☒	S.C. Regulation 61-62.60 and 40 CFR Part 60 New Source Performance Standards (NSPS)
☒	S.C. Regulation 61-62.61 and 40 CFR Part 61 National Emission Standards for Hazardous Air Pollutants (NESHAP)
☒	S.C. Regulation 61-62.63 and 40 CFR Part 63 National Emission Standards for Hazardous Air Pollutants (NESHAP) for Source Categories
☐	40 CFR Part 64 Compliance Assurance Monitoring (CAM)
☐	S.C. Regulation 61-62.68 and 40 CFR Part 68 Chemical Accident Prevention Provisions
☐	S.C. Regulation 61-62.70 and 40 CFR Part 70 Title V Operating Program
☐	Other S.C. Air Pollution Control Regulations, as applicable.
☐	Other Federal Air Pollution Control Regulations, as applicable.
☐	40 CFR 98 Green House Gas (GHG) emissions *(Note: Quantify GHG emissions, if S.C. Regulation 61-62.5, Standard No. 7 or S.C. Regulation 61-62.5, Standard No. 7.1 is triggered.)*

Completeness Checklist:
For applicable federal and state regulations, the narrative should address the specific limitations, monitoring, recordkeeping, and reporting requirements associated with the new or altered source(s). Include the specific regulatory citations. Check all that have been reviewed and addressed in the narrative.

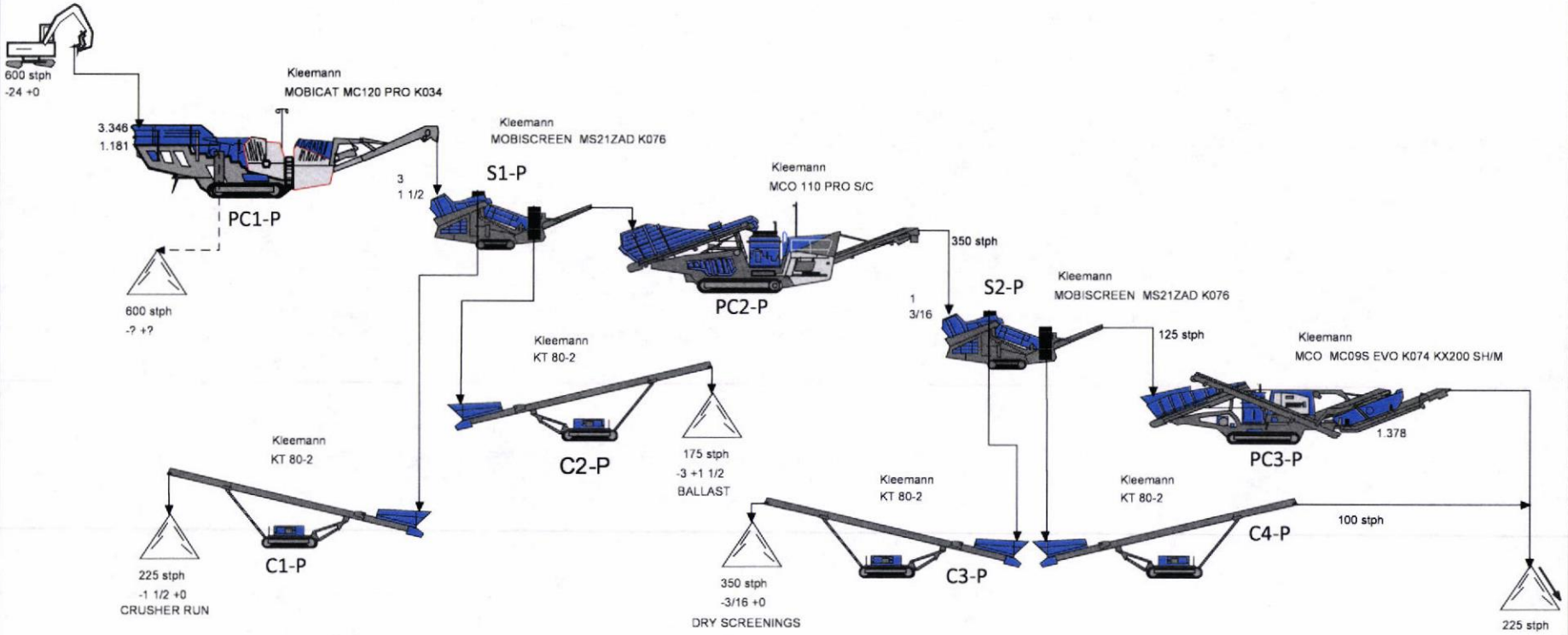
Check Box	Completeness Checklist:
	Applicability Determination:
☒	• Is this regulation *applicable, reasonably applicable, potentially applicable,* or *not applicable?*
☒	• Is the basis for the applicability determination explained?
	Affected Sources:
☒	• Is the name and identification of each emission source or process included?
	Compliance Demonstration:
☒	• How will compliance be demonstrated?
☒	• Are specific methods or activities to be utilized by the facility to demonstrate compliance with each specific limitation and/or requirement provided?
☒	• Are control devices and control device requirements included?
☒	• Are monitoring, recordkeeping, and reporting requirements necessary to demonstrate compliance included?
	Regulatory Citations:
☒	• Are the regulatory citations identified?

APPENDIX B
FIGURE

synTerra

Science & Engineering Consultants

Orangeburg_Co_Kleeman_plant_10042023_ENV



Calculation results may differ due to variations in operating conditions and application of crushing and screening equipment. This information does not constitute an express or implied warranty, but shows results of calculations based on information provided by customers or equipment manufacturers. Use this information for estimating purposes only.

All calculations performed by AggFlow. http://www.AggFlow.com

VMCSED

Kleeman plant Orangeburg County.agzx

Brady Sterchi

Plant Stage #1: Kleemann Plant

Project #: 127670 Revision #: 616127 Date: Oct/10/2023

Table 1 - Controlled Emissions Calculations

Vulcan Construction Materials, LLC - Orangeburg Quarry

CONTROLLED EMISSIONS

Emission Unit Description	Equipment ID	Description	Subject to NSPS OOO	Capacity (TPH)	Emission Factor (PM10) (lb/ton)	Emission Factor (PM2.5) (lb/ton)	Emission Factor (TSP) (lb/ton)	Emission Control System	Emissions					
									PM10 (lb/hr)	PM2.5 (lb/hr)	TSP (lb/hr)	PM10 (tpy)	PM2.5 (tpy)	TSP (tpy)
PORTABLE PLANT														
TRUCK UNLOADING	TU-1	-	NO	600	0.000001344	0.00000009	0.0000028	WS	0.00081	0.000055	0.00169	0.0035	0.00024	0.0074
PORTABLE CRUSHER 1	PC1-P	Kleeman - Mobicat MC 120(i) PRO	YES	600	0.00054	0.00010	0.0012	WS	0.32400	0.060000	0.72000	1.4191	0.26280	3.1536
PORTABLE CRUSHER 2	PC2-P	Kleeman - Mobicone MCO 110i PRO	YES	350	0.00054	0.00010	0.0012	WS	0.18900	0.035000	0.42000	0.8278	0.15330	1.8396
PORTABLE CRUSHER 3	PC3-P	Kleeman - Mobicone MCO 90i EVO2	YES	125	0.00054	0.00010	0.0012	WS	0.06750	0.012500	0.15000	0.2957	0.05475	0.6570
PORTABLE SCREEN 1	S1-P	Kleeman - Mobiscreen MS 21 Z	YES	600	0.00074	0.000050	0.0022	WS	0.44400	0.030000	1.32000	1.9447	0.13140	5.7816
PORTABLE SCREEN 2	S2-P	Kleeman - Mobiscreen MS 21 Z	YES	350	0.00074	0.000050	0.0022	WS	0.25900	0.017500	0.77000	1.1344	0.07665	3.3726
CONVEYOR STACKER #1	C1-P	Kleeman - Mobibelt KW 80-2	YES	225	0.000046	0.000013	0.00014	WS	0.01035	0.002925	0.03150	0.0453	0.01281	0.1380
CONVEYOR STACKER #2	C2-P	Kleeman - Mobibelt KW 80-2	YES	175	0.000046	0.000013	0.00014	WS	0.00805	0.002275	0.02450	0.0353	0.00996	0.1073
CONVEYOR STACKER #3	C3-P	Kleeman - Mobibelt KW 80-2	YES	350	0.000046	0.000013	0.00014	WS	0.01610	0.004550	0.04900	0.0705	0.01993	0.2146
CONVEYOR STACKER #4	C4-P	Kleeman - Mobibelt KW 80-2	YES	100	0.000046	0.000013	0.00014	WS	0.00460	0.001300	0.01400	0.0201	0.00569	0.0613

NOTES:

WS = WET SUPRESSION

WP = WET PROCESS

WCO = CARRY OVER MOISTURE

New Equipment

TOTAL POTENTIAL PM-10 EMISSIONS	**1.32**	**Lb/Hr**	
TOTAL POTENTIAL CONTROLLED PM-10 EMISSIONS	**5.80**	**Tons/Year**	**@ (8760 Hours/Year)**
TOTAL POTENTIAL PM-2.5 EMISSIONS	**0.17**	**Lb/Hr**	
TOTAL POTENTIAL CONTROLLED PM-2.5 EMISSIONS	**0.73**	**Tons/Year**	**@ (8760 Hours/Year)**
TOTAL POTENTIAL TSP EMISSIONS	**3.50**	**Lb/Hr**	
TOTAL POTENTIAL CONTROLLED TSP EMISSIONS	**15.33**	**Tons/Year**	**@ (8760 Hours/Year)**

AP-42 Table 11.19.2-2 Emission Factors Controlled

Equipment	TSP (lb/ton)	PM 10 (lb/ton)	AP42 PM10 efficiency	PM 2.5 (lb/ton)
Controlled Grizzly&Truck Unloading	0.0000028	0.000001344	91.6%	0.0000001
Controlled Crushers	0.0012	0.00054	77.7%	0.00010
Controlled Screens	0.0022	0.00074	91.6%	0.000050
Controlled Conveyors and Bins	0.00014	0.000046	95.9%	0.000013

Assume same efficiency as a screen for Grizzly and Truck Unloading

TSP Controlled for Grizzly estimated at 2.1 x PM10 for Grizzly

Assume PM2.5 factor for Grizzly & Truck unloading is propotional to PM2.5/PM10 screen factor, 6.76% (0.000001344 x 0.000050/0.00074).

i.e. PM10 x 0.0676

Table 2 - Uncontrolled Emissions Calculations

Vulcan Construction Materials, LLC - Orangeburg Quarry

UNCONTROLLED EMISSIONS

Emission Unit Description	Equipment ID	Description	Subject to NSPS OOO	Capacity (TPH)	Emission Factor (PM10) (lb/ton)	Emission Factor (PM2.5) (lb/ton)	Emission Factor (TSP) (lb/ton)	Emission Control System	Emissions					
									PM10 (lb/hr)	PM2.5 (lb/hr)	TSP (lb/hr)	PM10 (tpy)	PM2.5 (tpy)	TSP (tpy)
PORTABLE PLANT														
TRUCK UNLOADING	TU-1	-	NO	600	0.000016	0.0000011	0.000034	WS	0.010	0.001	0.020	0.042	0.003	0.088
PORTABLE CRUSHER 1	PC1-P	Kleeman - Mobicat MC 120(i) PRO	YES	600	0.0024	0.00044	0.0054	WS	1.440	0.267	3.240	6.307	1.168	14.191
PORTABLE CRUSHER 2	PC2-P	Kleeman - Mobicone MCO 110i PRO	YES	350	0.0024	0.00044	0.0054	WS	0.840	0.156	1.890	3.679	0.681	8.278
PORTABLE CRUSHER 3	PC3-P	Kleeman - Mobicone MCO 90i EVO2	YES	125	0.0024	0.00044	0.0054	WS	0.300	0.056	0.675	1.314	0.243	2.957
PORTABLE SCREEN 1	S1-P	Kleeman - Mobiscreen MS 21 Z	YES	600	0.0087	0.00059	0.0250	WS	5.220	0.353	15.000	22.864	1.545	65.700
PORTABLE SCREEN 2	S2-P	Kleeman - Mobiscreen MS 21 Z	YES	350	0.0087	0.00059	0.0250	WS	3.045	0.206	8.750	13.337	0.901	38.325
CONVEYOR STACKER #1	C1-P	Kleeman - Mobibelt KW 80-2	YES	225	0.0011	0.0003	0.0030	WS	0.248	0.071	0.675	1.084	0.312	2.957
CONVEYOR STACKER #2	C2-P	Kleeman - Mobibelt KW 80-2	YES	175	0.0011	0.0003	0.0030	WS	0.193	0.055	0.525	0.843	0.243	2.300
CONVEYOR STACKER #3	C3-P	Kleeman - Mobibelt KW 80-2	YES	350	0.0011	0.0003	0.0030	WS	0.385	0.111	1.050	1.686	0.486	4.599
CONVEYOR STACKER #4	C4-P	Kleeman - Mobibelt KW 80-2	YES	100	0.0011	0.0003	0.0030	WS	0.110	0.032	0.300	0.482	0.139	1.314

NOTES:

WS = WET SUPRESSION

WP = WET PROCESS

WCO = CARRY OVER MOISTURE

$$\text{Uncontrolled lb/ton} = \frac{\text{Controlled lb/ton}}{(1 - \text{efficiency})}$$

New Equipment

TOTAL POTENTIAL PM-10 EMISSIONS	**11.79**	**Lb/Hr**	
TOTAL POTENTIAL UN-CONTROLLED PM-10 EMISSIONS	**51.64**	**Tons/Year**	**@ (8760 Hours/Year)**
TOTAL POTENTIAL PM-2.5 EMISSIONS	**1.31**	**Lb/Hr**	
TOTAL POTENTIAL UN-CONTROLLED PM-2.5 EMISSIONS	**5.72**	**Tons/Year**	**@ (8760 Hours/Year)**
TOTAL POTENTIAL TSP EMISSIONS	**32.13**	**Lb/Hr**	
TOTAL POTENTIAL UN-CONTROLLED TSP EMISSIONS	**140.71**	**Tons/Year**	**@ (8760 Hours/Year)**

AP-42 Table 11.19.2-2 Emission Factors Uncontrolled

Equipment	TSP (lb/ton)	PM 10 (lb/ton)	PM 2.5 (lb/ton)
UNcontrolled Grizzly&Truck Unloading	0.000034	0.000016	0.0000011
UNcontrolled Crushers	0.0054	0.0024	0.0004444
UNcontrolled Screens	0.025	0.0087	0.0005878
UNcontrolled Conveyors and Bins	0.003	0.0011	0.0003171

TSP Uncontrolled Grizzly feeder and truck unloading factor per 1995 AP-42 Table 11.19.2-2; i.e. 2.1 x PM10
Assume PM2.5 factor for Grizzly & Truck unloading is propotional to PM2.5/PM10 screen factor, i.e. 0.0676 x PM10
For PM 2.5 Uncontrolled factors, used the control efficiency of AP42 PM10, back-calculate from PM 2.5 controlled:

Table 3 - Standard 4 Allowable Emission Rate Calculation
Vulcan Construction Materials, LLC - Orangeburg Quarry
Construction Permit Application

Facility Maximum operating rate 600 tons per hour

Because the hourly production rate is greater than 30 tons per hour, the following equation for the allowable emission rate is used: E = F*(55.0*P^0.11-40), where F is 1 and P is the hourly production rate.

F	=	1 from Table B
P	=	600 tons/hr
E	=	F *(55.0 * P^0.11 -40)
E	=	71.16 lbs/hr

Calculated uncontrolled TSP emissions		
TSP	27.436	lb/hr

Calculated controlled TSP emissions		
TSP	3.047	lb/hr

TABLE 4 - MODELING DETERMINATION

Vulcan Construction Materials, LLC - Orangeburg Quarry

Source ID	Source Description	Description	Controlled Emission Rate PM 10 (lbs/hr)	Controlled Emission Rate PM 2.5 (lbs/hr)	STD 2 Exempt Rate (lbs/hr)	PM 10 Modeling Required?	PM 2.5 Modeling Required?
PORTABLE PLANT							
TU-1	TRUCK UNLOADING	-	0.00081	0.000055	0.14	no	no
PC1-P	PORTABLE CRUSHER 1	Kleeman - Mobicat MC 120(i) PRO	0.32400	0.060000	1.14	no	no
PC2-P	PORTABLE CRUSHER 2	Kleeman - Mobicone MCO 110i PRO	0.18900	0.035000	1.14	no	no
PC3-P	PORTABLE CRUSHER 3	Kleeman - Mobicone MCO 90i EVO2	0.06750	0.012500	1.14	no	no
S1-P	PORTABLE SCREEN 1	Kleeman - Mobiscreen MS 21 Z	0.44400	0.030000	1.14	no	no
S2-P	PORTABLE SCREEN 2	Kleeman - Mobiscreen MS 21 Z	0.25900	0.017500	1.14	no	no
C1-P	CONVEYOR STACKER #1	Kleeman - Mobibelt KW 80-2	0.01035	0.002925	1.14	no	no
C2-P	CONVEYOR STACKER #2	Kleeman - Mobibelt KW 80-2	0.00805	0.002275	1.14	no	no
C3-P	CONVEYOR STACKER #3	Kleeman - Mobibelt KW 80-2	0.01610	0.004550	1.14	no	no
C4-P	CONVEYOR STACKER #4	Kleeman - Mobibelt KW 80-2	0.00460	0.001300	1.14	no	no

New Equipment

Table 5 - Exemption List
Vulcan Construction Materials, LLC - Orangeburg Quarry

Equipment	Description	Regulation
Portable Engine	CAT C9 248 kW, 300hp Tier 3/Stage IIIA engine	Section B.2.ii.a of Bureau of Air Quality Permitting Exemption List (Updated December 29, 2022)

Emission Factors
AP-42 Table 11.19.2-2 Emission Factors

Equipment	AP-42 Source Name	Controlled			Un-Controlled			Calculated % control based on AP-42 Factors		
		TSP (lb/ton)	PM 10 (lb/ton)	PM2.5 (lb/ton)	TSP (lb/ton)	PM 10 (lb/ton)	PM2.5 [b] (lb/ton)	TSP	PM 10	PM2.5
Crushers	Tertiary Crushing	0.0012	0.00054	0.00010	0.0054	0.0024	0.00044	77.8%	77.5%	77.5%
Screens	Screening	0.0022	0.00074	0.00005	0.025	0.0087	0.00059	91.2%	91.5%	91.5%
Conveyors and Bins	Conveyor Transfer Point	0.00014	0.000046	0.000013	0.003	0.0011	0.00032	95.3%	95.8%	95.8%
Grizzly & Truck Unloading	Grizzly Feeder and Truck Unloading [a]	0.000003	0.000001344	0.0000001	0.000034	0.000016	0.0000011	91.6%	91.6%	91.6%

from AP-42 table
estimated

[a] The uncontrolled PM10 emission factor for the Grizzly Feeder and Truck Unloading is from the 1995 AP-42 Table 11.19.2-2.
Uncontrolled TSP for the Grizzly Feeder is estimated to be 2.1 x PM10
Controlled Grizzly Feeder emission factors are calculated assuming the same control efficiency as a screen.
PM2.5 uncontrolled emissions factor is calculated assuming it is proportional to PM2.5/PM10 screen factor,
for example- 0.000001344 * (0.000050/0.00074) = 0.000000

[b] PM 2.5 uncontrolled factors were calculated assuming the same control efficiency as the PM10
for example Crushers = 0.00010 * (100-77.5%) = 0.0004444