

Technical and Regulatory Comments

Submitted by:

**Granby Hill Alliance, Whaley Street Neighborhood
Association and We Are Olympia**

Concerning:

**Draft Conditional Major Operating and Construction Permits
Proposed for the
Vulcan Materials Corporation Columbia Quarry
by the S.C. Department of Health and Environmental Control ,
Bureau of Air Quality**

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1 Introduction

This document constitutes the comments of the Granby Hill Alliance, Whaley Street Neighborhood Association and We Are Olympia, concerning the draft Conditional Major Operating Permit and the two Construction Permits proposed for issuance by the South Carolina Department of Health and Environmental Control for the Vulcan Materials Corporation Columbia Quarry. This document also addresses adverse air quality conditions that occur in the Olympia area of the City of Columbia and the Cayce area. Consideration of air quality problems that occur in these areas is integral to review of the potential requirements to be imposed on operations and emission control equipment at the Columbia Quarry.

Although the primary focus of Commentor's articulations in this document are directed at the language of the Conditional Major air quality operating permit, all comments contained in this document are intended to also apply to the same or similar provisions and problem contained in the two proposed construction permits up for hearing as well.

2 Review of Air Quality Data for the Olympia-Cayce Area Provides Compelling Evidence of Air Pollution Health Hazards, the Probability of Negative Effects on the Comfortable Enjoyment of Life and Property and an Overall Regional Particulate Problem in the Area

2.1 Discussion of PM-10 Ambient Air Quality Monitoring Data

Air quality monitoring data was obtained from EPA AIRSWEB for air quality monitoring sites at Olympia and Cayce. The health-related National Ambient Air Quality Primary Standard for PM-10 is 150 micrograms per cubic meter, not to be exceeded more than once per year on a 3 year average, and 50 micrograms per cubic meter, annual average. The air quality monitoring data is shown below:

Olympia-Cayce Particulate Matter - 10 Microns Air Quality (micrograms/cubic meter)						
Year	1 st 24hr Max	2 nd 24hr Max	3 rd 24hr Max	4 th 24hr Max	No. of 24 hr. Accedences	Annual Mean
Olympia, Site 450790018-1 PM-10 Data in micrograms/cubic meter						
1996	140	115	108	97	0	35.5
1997	143	130	129	123	0	42.8
1998	168	145	141	135	1	46.4
1999	147	122	105	102	0	39.5
2000	157	109	95	87	1	36.0
2001	145	118	107	99	0	38.7
Cayce Site , 450630009-1 PM-10 Data in micrograms/cubic meter						
1996	133	117	112	106	0	42.2
1997	124	122	117	111	0	42.7
1998	218	188	170	163	5	50.8
1999	148	148	148	131	0	55.1
2000	148	132	123	123	0	45.6
2001	139	131	126	117	0	43.2

As can be seen from the table, the Cayce site is showing violations of both the 24 hour primary standard of 150 micrograms per cubic meter in 1998 and the annual primary standard in 1998-1999. Annual arithmetic means remain high, but just marginally under the 50 microgram per cubic meter annual standard.

Although the Olympia site generally has lower concentrations of measured PM-10 concentrations, the air monitoring results at this site still show some relatively high annual mean concentrations which, in the case of the year 1998, were just marginally under the current annual health standard for PM-10.

The Olympia and Cayce air quality monitoring results show ambient concentrations at both sites that have been shown in national studies to be associated with premature and excess deaths, hospitalizations for pulmonary and cardiac conditions and increased aggravation and causation of respiratory diseases. A recently released epidemiological study in 90 U.S. cities by the Health Effects Institute indicates that a 0.5% increase in overall mortality can be expected for every 10 microgram per cubic meter increase in PM10 measured on the prior day. The same study also shows an approximate 1% increase in hospital admissions for cardiovascular disease and about a 2 % increase in hospital admissions for pneumonia and chronic obstructive

pulmonary disease for each 10 microgram per cubic meter increase in 24 hour PM-10 measurements.¹

Year 2001 annual mean PM-10 for the Cayce and Olympia monitors is the second and third worst, respectively, for all of EPA Region 4, the entire Southeastern United States. Year 2001 first highest 24 average results for the Olympia and Cayce monitors is the fourth and fifth worst, respectively, in EPA Region 4; the fourth highest 24 hour average results in year 2001 for Cayce and Olympia are the worst and second worst, respectively, in EPA Region 4. EPA Region 4 includes the states of KY, TN, NC, SC, MS, AL, GA, FL.

Although there are no air quality standards for 1 hour PM-10 exposures, review of available air quality data on peak one hour ambient air quality data shows that the Olympia site is subjected to extraordinarily high exposures.

¹ The National Morbidity, Mortality, and Air Pollution Study, Jonathan Samet, et. al, Health Effects Institute, July, 2000; See <http://www.healtheffects.org> for access to this recent epidemiological study on PM-10 health effects.

Olympia and Cayce Monitoring Site 1 Hour Maximum PM-10 Values						
Year	1st Max.	2nd Max	3rd Max	4th Max	5th Max	
Olympia Monitor, #450790018811021						
1991	500	499	482	466	463	
1992	825	495	457	427	416	
1993	777	695	522	519	499	
1994	701	592	575	564	521	
1995	706	437	422	414	410	
1996	1092	612	577	467	438	
1997	737	603	495	475	450	
1998	960	894	672	615	582	
1999	774	521	502	485	452	
2000	906	795	636	623	592	
2001	835	550	449	420	370	
Cayce Monitor, #450630009811021						
1991	484	312	254	250	241	
1992	412	337	336	333	317	
1993	437	373	372	369	350	
1994	442	377	365	359	352	
1995	504	447	397	394	385	
1996	1062	528	524	518	428	
1997	535	402	395	384	380	
1998	841	785	701	674	651	
1999	682	649	566	501	501	
2000	637	551	537	415	405	
2001	500	438	415	378	329	

This table shows that both the Olympia and the Cayce monitoring sites are subjected to extraordinarily high 1 hour PM-10 exposure events. No existing air quality standards protect against such one hour exposures.

To give a better comparison of just how extraordinarily high these measured 1 hour concentrations are, the year 2000 fifth highest maximum for the Olympia site is higher, sometimes by far, than analogous data for the first highest 1 hour average for all PM-10 monitors reporting such averages in all of Pennsylvania, Ohio and Indiana.

It is highly likely that the intense 1 hour PM-10 events shown above can precipitate severe exacerbation of respiratory illness in those with serious asthmatic or chronic obstructive pulmonary conditions.

2.2 Ambient Air Quality Monitoring Data for PM-2.5 Microns Will Likely Show National Health Standard Violations

In 1997, the U.S. Environmental Protection Agency published a new National Ambient Air Quality Standard covering inhalable particulate matter with a diameter of 2.5 microns or less. The standard is 65 micrograms/cubic meter for the 3 year average of the annual 98th percentile measured 24 hour PM-2.5 values; there is also an annual standard of 15 micrograms per cubic meter for the 3 year average of the measured annual mean PM-2.5 concentration.

The table below shows available PM 2.5 annual average ambient air quality monitoring results for the Olympia and Cayce monitors (24 hour results not readily available at this writing):

PM 2.5 Annual Averages for Olympia and Cayce Monitors					
Olympia Monitor			Cayce Monitor		
Year	Annual Average	# of 1hr Readings	Year	Annual Average	# of 1hr Readings
1999	17.6	1863	1997	19.71	4013
2000	19.85	6648	1998	21.46	6007
2001	15.95	3755	1999	19.75	4788

It appears that both the Olympia and the Cayce site will ultimately show violations of the new PM-2.5 3 year average of the annual mean health standard of 15.0 micrograms per cubic meter. Although the Cayce monitor showed high, unhealthy annual average PM-2.5, it was shut down in 1999 and moved to the Olympia site. Commentors do not have an explanation why the Olympia monitor did not recover nearly a full year's worth of PM-2.5 hourly data for year 2001.

Commentors evaluation of this data is that the Olympia PM-2.5 monitor be restored to a high proportion of data retrieval during year 2002 and that this facility be maintained for both PM-10 and PM-2.5 monitoring for the next several years until ambient air quality monitoring results shows continuous compliance with ambient air quality standards. Commentors assert that PM-2.5 monitoring should once again be established in Cayce as a result of detection of serious annual average PM-2.5 concentrations previously measured in that location.

2.3 Summary

Existing ambient air quality data for the Olympia/Cayce area shows continuing problems with either marginal air quality and potentially unhealthy exposure to air pollution in these communities as well as measured ambient air quality concentrations that will ultimately be shown to violate new PM 2.5 ambient health-related standards.

3 Review of the Emissions Characterization, Emission Limitations and the Consequences for Predicted Ambient Air Quality and Regulatory Treatment of Emission Sources

3.1 Summary Information

Vulcan Materials Corporation has submitted an inventory of emissions sources and an air quality modeling demonstration which has been accepted by SC DHEC. Fugitive emissions from roads and other area sources were quantified for the first time for modeling purposes. In addition, the new emission characterization recognizes that the five crushers emit considerably more than was previously predicted.

For background and understanding purposes, the table below compares the previous and new emission characterizations and some site characteristics for the facility.

	Year 2000 Characterization (from E. Basil spreadsheet)	Current Vulcan Submittal/DHEC Review
Total Emissions from Crushers (controlled)	0.52 tons PM10/yr	7.18 tons PM10/yr
Primary Crushing Capacity	1800 tons per hour	2400 tons/hr listed max. 2000 t/hr in emission calc.
Total point source PM (control)	48.36 tons/year; 15.46 lbs/hr	66.57 tons/year
Total point source PM-10(control)	22.03 tons/year; 7.04 lbs/hr	37.22 tons/year
Uncontrolled PM	1500 tons/year; 342 lbs/hr	1416 tons/year
Uncontrolled PM-10	714 tons/year; 163 lbs/hr	749 tons/year
Emission units	included block plant	excluded block plant; 3 conveyors removed; 5 new screens; 15 new conveyors; 7 new feeders;

Given the predicted production rate and predicted emission increases together with evidence of existing ambient particulate air pollution problems in the Olympia area it is essential that the permit ensure sufficient compliance measures to limit emissions and that all required limitations on the potential to emit are adequately stated in the permit text.

3.2 SC DHEC and Vulcan Have Used AP-42 Emission Factors in a Way that is Likely to Cause Erroneous Estimation of Quarry Emissions

Both SC DHEC and Vulcan have relied on AP-42 emission factors for stone mining and quarrying operations. However, the introductory section of the AP-42 document series provides the following warning:

“Emission factors in AP-42 are neither EPA-recommended emission limits (e. g., best available control technology or BACT, or lowest achievable emission rate or LAER) nor standards (e. g., National Emission Standard for Hazardous Air Pollutants or NESHAP, or New Source Performance Standards or NSPS). **Use of these factors as source-specific permit limits and/or as emission regulation compliance determinations is not recommended by EPA.** Because emission factors essentially represent an average of a range of emission rates, approximately half of the subject sources will have emission rates greater than the emission factor and the other half will have emission rates less than the factor. **As such, a permit limit using an AP-42 emission factor would result in half of the sources being in noncompliance.**”² (Emphasis added).

The Vulcan Application and the SC DHEC air quality calculations relied solely on AP-42 review for modeling study inputs without considering other factors that might lead to estimation of greater emissions or use of higher emission predictions based on underlying AP-42 emission test data in the AP-42 background document. Some factors which may increase emissions include the effects of wind and high ambient temperatures that increase evaporation. These factors can be important when calculating maximum emissions on a pound per hour basis and when using these results as air quality modeling input factors to determine whether there will be compliance with 24 hour ambient air quality standards for PM-10.

No quantitative effort was made by either Vulcan or SC DHEC to evaluate specific conditions found at Vulcan and to compare such Columbia Quarry site specific factors to the underlying emission test information in the AP-42 background document.

There can be no valid and believable demonstration of ambient air quality standard compliance through a modeling study when the underlying emission estimates used as a basis of the air quality modeling study is subject to such a wide range of potential error.

² Introduction to AP-42 Emission Factors, January, 1995, Page 2; available at <http://www.epa.gov/ttn/chief/ap42pdf/c00s00.pdf>

3.3 Authorization of Vulcan to Operate at an Aggregate Primary Crusher Capacity of up to 2400 Tons Per Hour Renders the Air Quality Modeling Analysis as an Understatement of Ambient Impact; Issuance of the Permit Will Jeopardize Attainment and Maintenance of the 24 Hour Average PM-10 National Ambient Air Quality Standards

Attachment A provides limitations on hourly emissions (lb/hr of PM-10) and annual hours of operation for each piece of process equipment on the site. The pound per hour limitations are based on the PM-10 emission spreadsheet calculations in tons/year divided by 6812 hours per year of permissible operation.

However, other conditions of the permit suggest that these hourly emission limitations may not be achieved in practice. The permit contains a condition:

“Facility wide production is limited to 16,348,800 tons per year.” (Permit condition 6.0(B)(1), also specified in table at 6.0(A))

This condition is open to interpretation. Does this mean primary crusher production or finished products production? The condition must be made determinant with no room for interpretation.

A stated limitation on annual production rate of 16,348,800 tons per year at the stated limitation of 6812 annual hours of operation is equivalent to a maximum hourly production rate of 2400 lbs per hour, assumed for argument to be on the basis of primary crusher production. Condition 5.0(E)(6) provides:

“(SC Standard 4 Section VIII) Emissions of plantwide particulate matter shall not exceed 89.47 lb/hr. This limit is based on an annual raw material rate of **2400 tons per hour** as fed to Primary Crusher #1 (PCR1) and Primary Crusher #2 (PCR2) which are the starting points for the entire process.” (Emphasis supplied)

Accordingly, it appears that the proposed permit explicitly and implicitly recognizes that the maximum source operation will be at 2400 tons per hour primary crusher capacity. This fact, however, raises several issues.

All of the emission calculations and inputs to the model are based on maximum primary crusher capacity of 1400 tons/hour from Primary Crusher #1 and 600 tons/hour for Primary Crusher #2. The proposed permit explicitly authorizes operation of the primary crushers at 2400 tons per hour. As a result, assuming that primary crusher capacity is the plant bottleneck, then all other plant process emissions will increase with corresponding increases in throughput if the equipment is capable of running at a greater rate.

Under these circumstances, all of the calculated emission rates to the ambient air quality model presented will be understated and the model output ambient predictions will also be understated.

For example, although the Primary Crusher #1 is limited to 0.827 lbs per hour, this hourly emission limitation based on 1400 tons per hour operation by itself is not sufficient to actually ensure emissions will be limited to this amount. Such a limit is not practically enforceable in the absence of an hourly production rate limit that is federally enforceable. Nothing in the conditional major permit or the two construction permits limit the maximum individual production rates of the stated processes as an effective limitation on the potential to emit. Such hourly limits cannot be enforced by stack testing because of the nature of the process and such testing is not provided. In the absence of a maximum hourly limitation and record keeping on the hourly production rate for all of the process permitted, the emission hourly limitation cannot be enforced and the failure to have an enforceable emission limitation means that there is no assurance that ambient air quality will be protected for a short term averages (i.e. 24 hour averages of interest to NAAQS compliance).

All of the pound per hour emission limitations are subject to the same criticism for enforcement of short term, pound per hour emission limitations and protection of ambient air quality for 24 hour averaging times on the PM-10 NAAQS. The predicted 6th highest 24 average concentration is 149 ug/m³ by modeling emissions at 2000 ton per hour for primary crusher capacity. The proposed permit's authorization to operate at a short term production rate up to 20% higher primary crusher capacity means that the plant was not modeled at the maximum potential emission rate and that operations authorized by the permit jeopardize attainment and maintenance of the PM-10 health standards for National Ambient Air Quality Standards in violation of 42 USC Sec 7410(a)(2)(C) and applicable federal regulations.

The permit should not be granted until the facility is modeled at the maximum potential emission rate as required by modeling guidance. As noted in guidance that is binding on DHEC:

“For point source applications the load or operating condition that causes maximum ground-level concentrations should be established. As a minimum, the source should be modeled using the design capacity (100 percent load). If a source operates at greater than design capacity for periods that could result in violations of the standards or PSD increments, this load should be modeled.” (40 CFR Part 51, Appendix W, Section 9.1.2(a), p. 409)

3.4 The Emissions Calculation Spreadsheets Contain Anomalous Results for PM-10/PM Emissions from Two Process Units

A review of the emission calculation spreadsheets shows the following selected results with anomalous indications discussed below:

Process	Descriptor	PM-10 Emission	PM Emission
Primary Crusher #1 (uncontrolled)	PCR1	14.717	4.292
Primary Crusher #1 (controlled)	PCR1	2.815	0.821
Primary Feeder (uncontrolled)	F2	65.700	12.877
Primary Feeder (controlled)	F2	2.861	0.561

These reported emission characterizations are anomalous because the PM-10 emission totals exceed the total PM emission totals, which is a physically impossible result. It is quite likely that the PM emission characterizations in the table are in error and should be corrected for final permit review.

3.5 Failure to Identify and Quantify All Emissions

Neither the Vulcan Application, Vulcan’s air quality modeling studies, nor the SC DHEC technical review consider emissions from drilling, truck unloading, truck loading and conveyor bin loading. These are substantial deficiencies in the emission characterization.

Failure to include the above fugitive emission sources in the permit application and failure of the proposed permit to properly regulate all such fugitive emission sources violates 40 CFR §70.3(d).

4 Issues of Fugitive Dust Emission Control

4.1 DHEC Must Specifically Declare that the Columbia Quarry is a “Problem Area” for Fugitive Dust Emissions Within the Meaning of DHEC Rule 62.6

Complaints from citizens of dust emissions from this facility and high ambient PM-10 and PM-2.5 monitoring results seen at the Olympia monitor ensure that the Vulcan Columbia Quarry factually meets the definition of a problem facility:

“...problem areas are defined as areas in which ambient levels of particulate matter are at or near primary standards; areas where an undesirable level of air pollution exists; areas in which excessive levels of fugitive particulate matter result in complaints from the general public; areas in which fugitive particulate matter is determined to be impacting upon a non-attainment area.”³

³ SC Regulation 62.6, section II(a)

Under the plain meaning of the text of this rule, Commentors assert that any one condition of the above definition provides for a mandatory designation by SC DHEC under the rule as a “problem area” and that not all of the conditions are required for inclusion. At present, only the last condition is absent for the Vulcan Columbia Quarry (from the standpoint of a formally designated non-attainment area⁴).

Commentors assert that a determination by SC DHEC that the Vulcan Columbia Quarry is not a “problem area” under the rule 62.6 or a failure by SC DHEC to properly consider this issue constitute clear legal and factual agency errors and abuse of discretion by SC DHEC.

Commentors assert that DHEC must make a finding on the record concerning the existence of the Columbia Quarry as a problem area under Regulation 62.6 and that finding should be incorporated into staff engineering reports and permit documents in order to trigger the applicability of the required corresponding fugitive dust control measures that must be imposed after such a designation. At this writing, DHEC has not clearly and unambiguously made a finding that the Columbia Quarry is a “problem area” and this failure constitutes a defect in an issuance of construction and operating permits for the Vulcan Materials Columbia Quarry.

Finally, Commentors also note that SC Regulation 62.6 is part of the South Carolina State Implementation Plan (SIP). As such, the SIP requirements are federally enforceable. As federally enforceable SIP requirements, such provisions must be included in the proposed operating permit and the failure of the application to identify this requirement is demonstrable error under Title V regulations.

4.2 Given the Applicability of the Rule 62.6 “Problem Area” Designation to the Vulcan Columbia Quarry, More Stringent Fugitive Emission Requirements Must be Imposed in Submitted Applications/Plans and Issued Construction and Operating Permits

Several elements of Rule 62.6 refer to “Reasonably Available Control Technology,” “reasonable controls,” “feasibility,” “economic reasonableness,” “seriousness of dust conditions and anticipated benefits,” etc. These are all elements of a necessary process of application/plan submittal of information, DHEC review of such information and DHEC findings concerning the required controls. The current permit proceeding does not contain these elements, neither on the part of DHEC, nor on the part of Vulcan Materials.

The Vulcan Materials submittal contains no detailed and specific fugitive dust RACT plan that lays out a list of all fugitive emission sources, considers technically available and feasible

⁴ Although it can be argued that measured air quality violations for PM-10 at the Cayce site and measured excessive PM-25 ambient readings at both the Olympia and Cayce air quality monitors meet this last requirement also for all practical purposes in the absence of a formal designation of non-attainment under the Clean Air Act regulations.

fugitive dust controls for these sources, provides information on the economic reasonableness of such technically feasible measures and shows why the final mix of fugitive emission measures should be adopted under the standards of Rule 62.6. Nothing in DHEC's staff reports or proposed permits makes any of the require findings on any of these matters or otherwise makes final determinations necessary under Rule 62.6.

When there is no detailed exposition of a list of fugitive emissions affected by Rule 62.6, when all technically feasible controls are not discussed, when no economic information is provided about technically feasible controls and no finding are made on the record by DHEC, there can be no principled decisions made under Rule 62.6 that are not otherwise subject to attack as arbitrary, reflecting an abuse of discretion and failing to provide the community relief from the present excessive fugitive emissions.

Moreover, there can be no principled decision that "reasonably available" controls are being provided through "case by case basis" consideration of the Vulcan Materials Columbia Quarry.

Notwithstanding comments above, we do note that DHEC has responded to some of Commentors prior submissions with changes in the proposed operating and construction permits. However, these changes are not sufficient to meet the requirements of Rule 62.6.

4.3 The Proposed Permit Should be Amended to Require Compliance with Rule 62.6 Through Adoption and Approval of a Comprehensive Enforceable Vulcan Quarry Fugitive Dust Control Plan with Enforceable Stipulated Work Practices, Specific Performance and Record keeping Requirements

As part of Rule 62.6 compliance, SC DHEC should require Vulcan to amend its application by submitting a comprehensive site fugitive dust control plan that employs Reasonably Available Control Technology and elements of enhanced control technology measures found in Rule 62.6, Section I which are applicable to "problem areas" under the provisions of Rule 62.6, Section II(b)(1).

Given the importance of fugitive dust control to public health and community well being, the required fugitive dust control plan should be available for public comment in the present proceeding or it should be subjected to a separate public hearing and public comment proceeding. Commentors prefer that such a fugitive dust control plan be made available in the present proceeding for public notice and comment.

4.4 Maintenance, Monitoring and Operation of Site Fugitive Emission Control Equipment

The permit should be written in such a manner to ensure that failure to maintain water spray equipment, pumps and nozzles must be considered alone as violations without the need to show that such failures cause violations of visible emission requirements. For example, DHEC must be able to issue a notice of violation upon finding a non-functioning pump/nozzle system in the system for controlling fugitive emissions. It should not be necessary that such a pump/nozzle failure actually cause an opacity violation in order to incur a notice of violation.

4.5 Scope of DHEC's Rule on 10% Opacity Requirement from Conveyor Transfer Points

Given the fact that the Vulcan Materials Columbia Quarry is a "Problem Area" under Rule 62.6, Section II, and recognizing that Rule 62.6, Section I control requirements apply to "problem areas" under Rule 62.6, Section II(b)(1), SC DHEC must revise all of the 40% and 20% opacity restrictions contained in Table 5.9 down to 10% opacity for conveyor transfer points under the applicable provisions of Rule 62.6:

"(b) No visible dust in excess of 10% opacity will be allowed to come from transfer points of any conveyor system for raw material or finished product unless the source/plant owner can demonstrate to the satisfaction of the Department that such control is not feasible."⁵

No such demonstration has been submitted by the Vulcan Columbia Quarry. Commentors assert that the existence of the NSPS Subpart OOO requirements for 10% opacity visible emissions from conveyor equipment mitigates against any valid demonstration that achieving 10% opacity from conveyor transfer points is technically infeasible.

In response to past comments, DHEC has designated several conveyors as being subject to the 10% rule. However, it appears that DHEC has limited these designations to conveyor to conveyor transfer points. DHEC should have included feeder to conveyor, conveyor to bin transfers and conveyor to overhead stacking of stockpiles as well. Under the plain meaning of the rule, these are also "transfer points of any conveyor system" and they also should have been included in sources subject to the 10% opacity rule. Several SB and F sources that transfer to and from conveyors remain listed as subject to 20% and 40% opacity requirements. Such designations constitute technical and regulatory error.

⁵ SC Regulation 62.6, Section I(b)

4.6 Issues Associated with Installation of High Pressure Nozzle Sprayers

Vulcan has discussed its plans to use high pressure nozzle sprayers at the facility as proposed. Commentors had thought based on statements by the company that this technology was to be imposed site-wide. However, a white paper submitted by Vulcan indicates that this technology will only be installed on the new equipment in the finishing area. Commentors wonder whether the primary motivation for changing to such a system is to reduce water inputs to and silt contamination of finished products, rather than enhancing air pollution control.

There is no information submitted by Vulcan that indicates in writing the technical specifications, air pollution control efficacy and reliability of the high pressure water spray system. As a threshold concern, Commentors assert that information of such detail be submitted before such an emission control system is approved for site use. For example, even river water sometimes has excessive turbidity and could potentially have a negative impact on the reliability of a high pressure system. Applicant has not discussed whether they intend to use any kind of water treatment or filtering to increase reliability of high pressure water spray systems by reducing total suspended solids that may lead to clogging. Given the higher pressures, reduced water volume and the likely small orifice size probably associated with high pressure nozzles, no details have been provided about reliability of operation of such high pressure equipment.

Vulcan's white paper indicates that less water will be used by the high pressure system.. While production of fine water aerosol in a high pressure water sprayer system will probably have significant effect on particle capture and agglomeration at a transfer point where such a sprayer is used, Commentors have questions about the effect of less water volume in sprays on downstream fugitive emission control. Many emission points at the site rely on carryover water control (i.e. maintaining a relatively high moisture content in downstream rock in order to control emissions at downstream transfer points by water carryover from upstream water sprays). Nothing in the white paper or Applicant's submittal provides any details on typical gallon per minute flows or other information that might shed light on the effects of reduced water flow from high pressure nozzle systems on down-conveyor carry over moisture fugitive emission control at subsequent, downstream transfer points.

No information has been submitted on droplet size for high pressure spray systems. However, the system has been described as having "fog type spray nozzles producing a mist cloud" around potential emissions points. If the aerosols are very fine, such a system has the potential to produce emissions of solid particulate from evaporation and solidification of inherent dissolved solids in the River water from calcium and magnesium hardness. These emissions would happen in the same way that cooling towers produce particulate emissions from evaporations of aerosols. Any such particulate emission potential should be evaluated and such emissions should be included in any air quality modeling exercises. .

Finally, if use of existing quarry drainage and process water will be significantly reduced with the advent of a high pressure nozzle system, Commentors wonder about the consequences of transferring suspended solids pollution to quarry wastewater discharges to the river.

4.7 Drop Height Controls on Overhead Stocking of Storage Piles

During January, 2002 observations at the quarry Commentors noted that none of the overhead stacking conveyor drop points for stocking of storage piles had any drop height shrouding or other controls, other than inherent water carryover. Drop-height controls to limit wind incursion in overhead stocking of storage piles is common, off-the-shelf fugitive emissions control technology. DHEC should require such controls or otherwise show on the record why such controls should be considered unreasonable and uneconomic. Our fundamental concern is that drop height controls may actually be necessary to control fugitive emissions during the summertime and as a backup when spray nozzle/wet carryover controls either fail or become ineffective.

4.8 Fugitive Emissions from Onsite Roads

The Vulcan white paper on plant changes describes a completely revamped system for roads serving customer trucks.

Commentors strongly support the cessation of all use of the Williams Street entrance through the Granby and Olympia neighborhoods by trucks and the Vulcan Materials Corporation commitment to re-route customer trucks to a road sited along the River levy. Commentors also support the commitment to site speed limits contained in provision 6.0(B)(8)(e) of the proposed operating permit and the requirement for loading and roads management contained in provision 6.0(B)(8)(c) & (d).

Commentors also strongly support the commitment made by Vulcan to pave all of the customer truck roadways. However, provision 6.0(B)(8)(a) allows Vulcan to take 3 years from entry of the construction permits to accomplish this paving program. Three years is an excessive amount of time to take to accomplish this goal. DHEC should require Vulcan to show why such a paving program could not be accomplished in a shorter time, such as within a one year construction period.

While commentors are pleased to hear about a water spray system for the future paved roads, we still question the lack of any commitment to sweeping and cleaning of such paved roads and the failure to commit to truck tire washing for interfaces between unpaved quarry roads and the newly paved customer roads. One goal of effective fugitive dust control is to keep mud, soils and silt from being deposited and tracked on paved roads. Failure to commit to paved road cleaning/sweeping means again that Vulcan is not

being required to commit to reasonably available, technologically feasible controls. In addition, such sweeping/cleaning is necessary to control wind-scouring of fugitive dust from roads during times the sprayer is not in operation.

Mandatory record-keeping requirements must be required in the permit to ensure enforceability for cleaning of paved roads and treatment of unpaved roads. In addition, fugitive emissions from roads should be subjected to a 5% opacity requirement.

Vulcan had previously discussed installing a new loadout system which allows customer trucks to be filled from an overhead hopper/chute system. Such a system has the potential to help eliminate spills and emissions associated with front end loader operations to fill trucks. However, Vulcan's white paper contains no written mention of this system which was previously promised.

The permit should require that customer trucks must be tarped in order to either enter or leave the site. Finally, Vulcan should use its influence with its customers to ask that diesel trucks not be idled for extended periods of time while waiting to enter the site during the morning as part of an emphasis on good neighbor community environmental protection ethics.

4.9 Vulcan's "Voluntary" Off-site Fugitive Dust "Control" Activities Must be Modified

Review of SC DHEC staff reports indicates that Vulcan is using its watering truck on a "voluntary" basis to dump highly turbid, silt-laden quarry water on off-site city and county streets under the guise of limiting off-site public road fugitive dust emissions.

These activities should be revised to ensure that only clean, non-turbid water is used. Use of turbid, silt-containing water will only increase transfer of finely divided particles to city and county streets. This will have the effect of increasing potential street-related fugitive dust emissions after such streets dry out or on days when the quarry is not operating. The present "voluntary" program is just a transfer of waste from the water media to air media in an attempt to dispose of wastewater generated by this facility.

To any extent that turbid Vulcan Quarry wastewater used for off-site fugitive dust "control" enters a storm drain or man-made ditch leading to the waters of the United States, such a practice would constitute a violation of the Federal Clean Water Act requirements as an unpermitted discharge of wastewaters from the quarry.

Vulcan should instead focus on limiting trackout of material from its facility onto public streets through use of a truck tire wash, external truck cleaning and spill control. Trackout not only increases neighborhood fugitive dust and soiling, it will also contribute to clogging area catch basins and sewers.

5 The Application, the Proposed Permit and the Historic Regulatory Treatment of the Facility Have Failed to Properly Consider New Source Performance Standard Applicability for Several Process Equipment Units

The DHEC review appears to consider that the following emission units are not subject to federal NSPS Subpart OOO:

Crushers	Screens	Conveyors	Feeders	Bins
PCR1, CR1, CR2, CR3	S2, S3, S5, S6	C2, C2A, C3, C4, C6-C13	F4, F5, F6	SB2, SB3, SB4, B1-B6,

As a result of DHEC's current view, some or most of these units escape requirements, such as significantly more stringent opacity requirements, that NSPS would require. It is the concern of Commentors that DHEC's failure to consider some of these units as affected NSPS Subpart OOO units constitutes likely error under applicable federal regulations and that there is a basis to consider that DHEC's current position on some of these units is subject to question.

5.1 Citation to Historical Production Rate Information at the Facility

A review of file materials indicates that the Vulcan Columbia Quarry had a significant increase in its production rate capability in the late 1980's. The available file materials and related production rate indications are shown in the table below:

Cited Ton Per Hour Production Rate	Cited Annual Production in Tons	Source of Citation
400		12/23/82 Inspection by Robert Hudson, DHEC
500	1.3 E6 (pro.)	12/13/83 Inspection by Robert Hudson, DHEC
500	1.7 E6 (pro.)	11/27/84 Inspection by Robert Hudson, DHEC
1,000		9/6/88 Inspection Report by Robert Hudson, DHEC
1,000		9/29/88 Operating Permit
	2.5 E6	1989 annual throughput...undated report
1,000	1.882 E6	2/14/92 Point Source Data Report submitted by Tarmac
1,000		9/23/94 Inspection Report by Robert Hudson, DHEC
1,000	4.5E6	8/8/96 Revised Dispersion Model/Part 70 Application
1,200		8/16/99 Proposed Operating permit, Process Wt. Basis
	5.4 E6	7/23/96 amended Part 70 application, Primary Crusher
2000 t/h in emission calc; 2400 t/h in permit limits	16.3488 E6	Current (2001-2) Vulcan Permit Application and proposed operating permit

The chart indicates that significant production rate increases occurred at this plant over the years. It appears that hourly production rates doubled from 1984 to 1988. Annual production outputs show continued growth through a 14 year period. It simply strains credulity to assume that no changes were made to process equipment associated with the basic crushing capacity of the facility while such large increases in the both the hourly production rate and the annual tonnage production rate took place over the years.

5.2 Federal NSPS Modification Provisions

Under federal rules, NSPS applicability is triggered by modifications are associated with:

“Except as provided under paragraphs (e) and (f) of this section, any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies shall be considered a modification within the meaning of section 111 of the Act..... Upon modification, an existing facility shall become an affected facility for each pollutant to which a standard applies and for which there is an increase in the emission rate to the atmosphere.” 40 CFR Sec 60.14(a)

Under the rule, an increase in emission rate means a short term increase in the hourly emission rate and such rates are calculated with AP-42 emission factors. 40 CFR Sec 60.14(b)

The exception from the rule about production increases that are operational changes that result in increased emissions are stated in a subsequent subsection:

“(e) The following shall not, by themselves, be considered modifications under this part:

(1) Maintenance, repair, and replacement which the Administrator determines to be routine for a source category, subject to the provisions of paragraph ©) of this section and sec. 60.15.

(2) An increase in production rate of an existing facility, if that increase can be accomplished without a capital expenditure on that facility.

(3) An increase in the hours of operation.” 40 CFR sec. 60.14(e)

5.3 Review of Certain Facts Concerning the Late 1980's Construction and Expansion of the Vulcan Columbia Quarry

A 1986 inspection report⁶ indicated SC DHEC observations of plant renovation and construction, which included a new conveyor to carry stone out of the quarry. A 1989 Inspection Report indicates the following:

“We determined that the **new primary crusher and main conveyer** were started up on July 13, 1987. The secondary crusher was started up on September 16, 1987. **The tertiary crusher and screens were started up on October 1, 1987.** This construction resulting in an increase in capacity from 600 tons per hour to 1000 tons per hour..... **this is now considered to be covered by NSPS.**”⁷ (Emphasis added)

This cannot be a more explicit and determinative prior finding by DHEC inspectors that the primary crusher (PCR1), main conveyor, tertiary crusher and screens have all been modified and subjected to capitol investments. Some of these units, particularly including the primary crusher, are operating at significantly higher production rates and thus significantly higher lb per hour emission rates within the meaning of the NSPS emission increase applicability provisions.

A September 29, 1988 operating permit authorized Vulcan to emit 339 tpy of PM from the main quarry process. In referring to the 339 tpy allowable emission rate for the main rock quarry production process and the 115 tpy allowable emission rate for the block production process, the permit stated:

⁶ September 4, 1986 Inspection Report by Robert W. Hudson, DHEC Central Midlands District

⁷ March 2, 1989 Inspection Report by Robert W. Hudson, DHEC Central Midlands District

“The above emission limitations are based on operation at rated capacity. Operation at other than rated capacity must meet emission limits specified in the applicable regulations based on that operating rate. The actual pollutant emissions are less than or equal to the emission limitations indicated above. If the Department determines at a later date that the actual emissions have increased to a degree that PSD might apply, then resubmittal of applications and additional controls might be required.”⁸

The permit quotation is further troubling because it seems to indicate that SC DHEC did not properly evaluate all “potential to emit” issues associated with the late 1980’s Columbia Quarry expansion during permitting for this modification.

Significant aspects of the Vulcan permit application and the proposed DHEC permit for the Vulcan Columbia Quarry do not appear to properly consider the prior NSPS applicability determination made in 1989.

Prior applications for the Columbia Quarry Operating Permit indicate an install date of 1972 with “not applicable” marked for a modification date for the primary, secondary and tertiary crushers, as well as the tertiary screens. The “no modification” designation after the 1972 install date cannot be supported on the record based on these field staff determinations and admissions that construction took place that increased the hourly and annual production rate and thus the hourly emission rates.

The proposed permit goes on to indicate a permissible 40% opacity for many of the units claimed as non-NSPS cited above. Implicit with the designation of a permissible 40% opacity for all of these process units is the erroneous reliance (except for primary and secondary screens) of the proposed DHEC permit on an assumption that all of these process units are not subject to New Source Performance Standard Subpart OOO.

At a minimum, the permit must be revised to ensure that opacity at all crushers is limited to 15%⁹ and 0% from tertiary screening operations¹⁰ in order to comply with the Federal New Source Performance Standard, Subpart OOO.

All of the other conveyors, bins and feeders in the table at the beginning of this part should be similarly re-evaluated for applicability of NSPS Subpart OOO.

⁸ September 29, 1988 permit for Vulcan Columbia Quarry, page 2

⁹ 40 CFR §60.672(c)

¹⁰ 40 CFR §60.672(h)

6 Federal Enforceability and Public Participation Procedure

6.1 Failures and Ambiguities of the Proposed Permit in the Matter of Providing Required Federal Enforceability of Permit Conditions

Provisions 2.A and 2.B.2 of the proposed conditional major operating permit recognize federal enforceability for permit conditions on limiting the potential of the facility to emit below all applicable major source thresholds. However, these provisions should also be amended to recognize federally enforceable conditions incorporating new source performance standards, federally enforceable construction permit requirements, federally enforceable South Carolina State Implementation Plan requirements and other federal regulation of the facility.

Provision 4.A provides, in part:

“Unless otherwise noted, all emission standards are federally enforceable.”¹¹

However, provision 4.0(B)(3) provides:

:”The owner/operator shall maintain this facility in compliance with the pollutant limitations in Part 4.0, Part 5.0, Part 6.0, Part 7.0, and/or as listed in Attachment A of this operating permit, whichever is more restrictive. **This is a State Only enforceable requirement.**”¹² (Emphasis added)

Read literally, the effect of Provision 4.0(B)(3) is to completely undermine all assurances of federal enforceability provided in prior provisions by disallowing federal enforcement on all Facility-Wide Requirements, Emission Unit Requirements, Monitoring and Reporting Requirements and emission limitations contained in Parts 4.0, 5.0, 6.0, 7.0 and Attachment A. In effect, Provision 4.0(B)(3) is the exception that “swallows the whole” that disallows federal enforcement of all emission limitations and conditions in the proposed permit, including the limits on hours of operation. This provision violates S.C. 62.1, Section II, G rules on conditional major permits, as well as federal requirements at 40 CFR §70.6(b) and at 42 USC §7661b(a).

Both pound per hour PM10 emission limitations and limitations on the hours of operation are designed to limit potential to emit. The pound per hour limitations and the limitation on the hours of operation are both designed to ensure compliance with National Ambient Air Quality Standards for PM-10. As a result, they are, in effect, part of the South Carolina State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. Without such emission limitations and conditions limiting the potential to emit,

¹¹ Proposed permit at Page 8, Section 4.A

¹² Proposed permit at Page 9, Section 4.B.2

there can be no assurances that the facility's emissions will not jeopardize attainment and maintenance of the PM-10 ambient primary standards. Merely providing a federally enforceable requirement of 100 tons of PM-10 per year will not guarantee compliance with either the annual PM-10 standard or with the 24 hour average PM-10 primary national standards. The applicant admits that mass per unit time emission limitations in the permit together with the limitation on operating hours, together with the effects of PM-10 background concentrations, barely allow the facility to comply with national standards, if the modeling exercise is to be believed:

Applicant's air quality modeling exercise stated:

"The results from the NAAQS model are attached as a summary form. The results were added to background concentrations provided by Ms. Anna Campbell of the BAQ staff (44 ug/m³ for the 24 hour average and 19 ug/m³ for the annual average) to determine if they were compliant with the NAAQS. In the case of this model, the highest concentrations added to background were 104.98 ug/m³ (6th highest 24-hour high) and 29.88 ug/m³ (annual), resulting in 148.98 ug/m³ (24-hour) and 48.88 ug/m³ (annual)."¹³

"Our "Controlled Emissions" spreadsheet total is based on limiting the hours to 6812. The air dispersion model dictated that number to us."¹⁴

DHEC cannot claim that an annual limit of 100 tons of PM-10 that is federally enforceable will protect attainment and maintenance of the PM-10 ambient standards since the total of emission limitations that bumps up just against the annual standard under the permit is 66.6 tons per year. Similarly, an annual 100 ton PM-10 limit cannot be used to enforce a total source-wide emission limitation of 37.3 that alleges to have impacts just marginally below the 24 hour ambient air quality standard. Either the permit is not approvable because federally enforceable requirements are not available to ensure attainment or maintenance or DHEC and Vulcan agree that all emission limitations and conditions limiting potential to emit in Attachment A are federally enforceable.

As a result there is an inescapable conclusion that the emission limitations in Attachment A are absolutely necessary for attainment and maintenance of the national ambient air quality standards. Based on emission factors considered and Applicant's ambient modeling, a limit of 6812 hour of operation per year is also necessary to ensure attainment and maintenance of the PM-10 emission standards. Emission limits granted in association with delegations to or authorization of EPA's authority under the Clean Air Act must guarantee attainment and maintenance of the national ambient air quality standards under 42 U.S.C. Sec 7410(a)(2)(C) and

¹³ July 30, 2001 letter from Lee Rogers, Vulcan Materials Corporation, to Tracey Stewart, SC DHEC Engineering Services Division, Bureau of Air Quality

¹⁴ September 18, 2001 electronic mail from Lee Rogers, Vulcan Materials Corporation to Joanna Cunningham, DHEC Permit Engineer

must be enforceable under 42 U.S.C. 7410(a)(2)(A) and pursuant to applicable federal regulations and approved state permitting programs.

6.2 The Proposed Permit Allows Unacceptable Operation of Wet Suppression Systems When Capture Efficiencies Drop as Low as 70%

Table 5.2 of the proposed permit is a legally enforceable emission limitation that allows wet suppression PM control systems to operate with capture efficiencies as low as 70%. This provision is unacceptable as it would allow permissible PM-10 emissions to significantly exceed 100 tons per year, which is the threshold criteria for a conditional major permit. No detailed process by process emission characterization or air quality demonstration has been completed which assumes wet suppression control efficiencies as low as 70% control. However, 70% rollback estimation on DHEC's predicted uncontrolled emission rate for PM-10 from the main quarry process units alone would show PM-10 emissions of 224.7 tons per year, an unacceptable result that exceeds the 100 ton/year PM-10 threshold for a full Title V permit under federal and state rules..

The legally enforceable minimum capture efficiencies for wet suppression systems should be set no lower than a percentage at which all process emissions have been demonstrated and quantified and the resulting emission characterization has been used in an air quality modeling demonstration showing attainment and maintenance of the National Ambient Air Quality Standards for PM-10.

6.3 Prohibition on Operation When Wet Suppression is Down

Vulcan explicitly relies on its wet suppression system to achieve control efficiencies as demonstrated in the emission characterization in the 90-97 percent range. If the wet suppression system is inoperative for any reason in any emission unit, large emissions can result. Because air quality modeling shows that predicted 24 hour and annual average concentrations plus background are just under legally permitted and health-related ambient air quality standards, it can be expected that any breach of the Vulcan wet suppression systems can cause health standard violations.

As a result, the proposed permit should be amended to add a provision requiring that Vulcan shut down an emission unit in which the wet suppression system is not operable if uncontrolled emissions would occur for a period of time greater than one hour.

6.4 The Fugitive Dust Section of the Proposed Permit Contains Unenforceable and Vague Standards

The preamble of provision 6.0(B)(8) of the proposed permit provides:

The owner/operator shall not allow the release of excessive fugitive emissions into the atmosphere that are generated from any on-site emission source, including but not limited to, vehicular movement and the transportation, loading, unloading, and handling of materials. The release of excessive fugitive emissions may, in addition to any other action the Department may take, result in a permit modification to require a compliance schedule to control fugitive emissions.”

This vague, non-specific language does not provide effective assurances of good fugitive dust control and cannot be enforced. No one will be able to agree about what “the release of excessive fugitive emissions into the atmosphere” means. Although the specificity of the work practices set forth below the preamble is good, not all significant fugitive dust problems may necessarily be addressed by these required work practices.

The enforceability and specificity of the regulatory standard in the preamble should be made whole by adding objective language that can be measured, such as a site requirement on visible emissions.

6.5 The Proposed Permit Should Not be Issued with Provisions Allowing Increased Permissible Emissions Under Attachment A Without Public Notice, Comment and Public Decisionmaking and Without Prevention of Significant Deterioration Review

The proposed permit contains an objectionable provision allowing SC DHEC to administratively authorize increased permissible emissions over the limits provided in Attachment A without public notice, comment and public decisionmaking. Provision 4.B.2 of the permit provides in part:

Provision 4.B.1 provides in part:

“Air dispersion modeling (or other method) has demonstrated that this facility’s operation will not interfere with the attainment and maintenance of any state or federal standard.....The emission rates used in the determination are listed in Attachment A of this permit..... Higher emission rates may be administratively incorporated into Attachment A of this permit provided a demonstration using these high emission rates shows the attainment and maintenance of any state or federal standard or with any other applicable requirement. Variations from the input parameters in the demonstration shall

not constitute a violation unless the maximum allowable ambient concentrations identified in the standard are exceeded.”

The language of the two related sections are objectionable on a number of grounds.

The proposed permit language cited above allows Vulcan to seek [and SC DHEC to grant] an administrative change allowing increased emissions over limitations found in Attachment A from the facility without formal permit modification procedures, including public notice and the opportunity for public comment. This provision violates public notice and permitting requirements generally found at S.C. 62.1, Section II, G(5) generally and S.C. 62.1, Section II, G(5)(e) specifically. Moreover, this type of change doesn't meet the definition of “administrative permit amendments” found at 40 CFR 70.7(d) or the definition of “minor permit modification” found at 40 CFR 70.7(e)(2). Modifications of the type envisioned in the language allowing increases in permissible emissions under Attachment A are, by definition, “significant modifications” requiring an application, public notice and an opportunity for public comment.

Even more important is the public sensitivity to matters involving air pollution from this quarry operation. Columbia Quarry air pollution is a matter of proven and substantial public controversy and debate. Many individuals are very concerned about emissions from the Quarry and it can be fairly stated that quarry air pollution has threatened the public's right to be free from unreasonable interference in the comfortable enjoyment of life and property and the Granby Whaley and Olympia neighborhoods' quality of life. The public is highly entitled to be concerned about existing health hazards from PM 2.5 at the Olympia monitoring site and any potential contributions the Quarry makes to such emissions. Finally, a fair review of both PM-10 ambient air quality data and PM-10 modeling indicates that emissions from this quarry have made the neighborhoods' air quality highly marginal. In the present situation air quality modeling has been employed to predict ambient concentrations just slightly under health standards, but such models were never intended to have the kind of accuracy for which they have been employed in this situation to “ensure” that PM-10 health standards are protected.

For all of these reasons, permit provisions allowing higher emissions from this facility without public notice and comment should be struck from the draft as proposed.

In addition to the matter of public decisionmaking, the administrative relaxation provision and the last sentence of provision 4.B.1 can be interpreted as potentially allowing significant deterioration of air quality from a major modification without the required permitting and reviews of best available control technology and ambient increment consumption review. Given past reporting of this facility as a major stationary source of PM (at 290 tons per year) under a similar type of operating schedule as the proposed permit provides and the error to which the SC DHEC PM emission characterization is potentially subject, consideration of the source as a potential major stationary source cannot be immediately discounted.

Finally, emission limitations under this permit must be interpreted as parts of the South Carolina State Implementation Plan that must be subjected to public hearing and comment.

7 Air Quality Modeling Studies at the Columbia Quarry Site

7.1 Final Air Quality Modeling Study Submitted by Vulcan Materials Corporation

In July 2001, Vulcan Materials Corporation submitted a final air quality modeling study on the effects of Columbia Quarry emissions on ambient air quality around the quarry. S.C. DHEC asked Vulcan to quantify and model emissions from quarry roads and stockpiles in what would be their final configuration in addition to discreet process equipment point sources at the site.

According to a DHEC evaluation of the Vulcan modeling effort, the following emissions were modeled:

Criteria Source Group	PM-10 (lbs/hr)	PM-10 (tons/year)
Primary and Finish Equipment	10.90	37.13
Stockpiles and Roads	37.70	165.10
Facility Totals	48.6	202.23

The large prediction of emissions from the future quarry roads compared to the controlled emission of the quarry process equipment raises significant questions about what current and historic quarry emissions would be if all of the fugitive emissions from the many current unpaved roads would be also quantified and modeled. This is not an academic concern for protection of air quality in the near term, however, given that the proposed permit allows up to three years for the facility to pave its customer roads. Given this prospect, Vulcan's air quality model and DHEC's current emissions review cannot possibly be an adequate description of the emissions and expected ambient impacts from the quarry from the present and up to a time prior to completion of the quarry paving roads. Commentors hold that current and intervening emissions cannot be ignored, and that such interim emissions be quantified and modeled to ensure attainment and maintenance of health-related PM-10 ambient air quality standards.

One wonders also whether the operators of the Columbia Quarry have been understating annual emission reports and/or whether DHEC's emission inventory system is substantially subpar for failure to collect, consider and evaluate fugitive emissions information.

A final concern raised about this information is the question of whether current conditions and recent history dictate that the Columbia Quarry must be considered as a major stationary source as potentially being over 250 tons per year. However, EPA new source review regulations at 40 CFR Sec 52.21(b)(1)(iii)(aa) would preclude the inclusion of fugitive emissions in the major source calculus for the Columbia Quarry because applicable New Source Performance Standards were not promulgated on or before August 7, 1980.

Vulcan's air quality modeling did not consider the effects of ventricle terrain elevation on either the emission sources or the receptors. For example, many emission sources that were in the quarry pit were modeled as though they were standing at grade instead of being in the pit. This type of physical treatment has the potential to underestimate the effects of the emissions on close in receptor locations. Of primary concern are fence line and receptor locations to the north and northeast of the combined influence of both the main process equipment in the pit and roads between the pit and the facility property boundary. These receptors are the closest to the pit-related process emission sources.

It has been suggested by Vulcan that retention of emissions in the pit might be a physical phenomena which would reduce the effects of pit-related emissions on downwind ambient air quality. However, it would seem that "pit retention" would be minimized during higher wind speeds and turbulent conditions that would also exacerbate other site fugitive emissions. However, EPA air quality modeling guidance discounts any techniques that would allow systematic review of this issue apart from a specific site technical study which has not been done at the Columbia Quarry:

"In response to your request, the Model Clearinghouse has reviewed the approach for quantifying the effects of pit retention, prepared by Illinois EPA that was attached to your memorandum. The pit retention report you referenced contains five analytical techniques for predicting the escape fraction of particles from surface coal mine pits. The report suggests that while the simplest of these predictive techniques appears to perform best, none of the techniques predict escape fraction reliably over the range of meteorological conditions measured at the surface coal mines. An independent data collection and analysis program is needed to determine which, if any, of these predictive techniques performs the best. TRC, the Contractor who did the study, actually contacted a trade association to solicit funding for such a program but was unsuccessful in raising the money. The Illinois EPA selected the simplest predictive technique and used certain assumptions to arrive at an escape fraction. Another analyst could justify another technique or use different assumptions to arrive at a different conclusion. The state of knowledge does not allow us to recommend a reliable predictive technique at this time. Thus, we conclude that the use of any technique to account for the pit retention of particles is not warranted unless accompanied by a performance evaluation based on site-specific data."¹⁵

Vulcan used the BEEST implementation of EPA's ISCST3 model. The EPA model comes with an explicit capability for an "open pit" emission source input that was designed to be used to model open pit quarry sources. Vulcan's modeling did not use this approach providing

¹⁵ January 7, 1991 Memorandum, "Pit Retention from Stone Quarries," from Jawad S. Touma, Techniques Evaluation Section, EPA SRAB (MD-14) to Rebecca H. Calby, Technical Analysis Section, EPA Region V (5AR26)

the pit opening area source and instead assumed the physically implausible assumption that pit-related quarry emission sources were actually emitting 20-40 feet above grade.

Outside of the Vulcan fence line, the Vulcan modeling study used a 200 meter grid of receptors for modeling purposes, plus some discreet receptors that were added.

Commentors find the Vulcan air quality modeling objectionable to the extent that any physically unrealistic treatment or failure to incorporate all emissions sources understates predicted ambient concentrations outside of fence line receptors.

Vulcan’s modeling exercise did provide very significant results which are shown in the table below:

Maximum Predicted Impact	Background Concentration Specified by DHEC	Total Ambient Impact	Level of Ambient Air Quality Standard for PM-10
104.98 ug/m3 (6 th highest 24 hour high over a 5 year period)	44 ug/m3 (24 hour average)	148.98 ug/m3 (24 hour average)	150 ug/m3 (24 hour average with expected exceedances not to exceed 1.1 days per year in a 3 year period)
29.88 ug/m3 (highest annual average)	19 ug/m3 (annual average)	48.88 ug/m3 (annual average)	50 ug/m3 (annual average)

As can be seen from the above table, Vulcan’s air quality modeling shows that reliance on the model and its associated emissions inputs by both Vulcan and by DHEC embraces a form of community air pollution exposure brinksmanship. There is no margin of safety and the predictions of ambient impact are not appropriately expressed in proper significant figures – the model predictions are not capable of accurately assessing ambient exposure to 0.01 ug/m3 accuracy.

A well established principle of engineering design and philosophy is the use of proper assessment of the accuracy and uncertainty of model predictions and the use of margins of safety in specification and design. In the present case, the public’s exposure to air pollution and subsequent human health effects will not be protected by these concepts of engineering design.

7.2 Modeling Study Performed by SC DHEC on the Combined Effects of Both the Columbia Quarry and the Martin Marietta Cayce Quarry

SC DHEC modelers have conducted an air quality modeling study intended to show the combined impact of both the Columbia Quarry and the Martin Marietta Cayce Quarry on ambient air quality. According to the modelers, this modeling effort considered terrain (including the pits) for both sources and receptors. This model did not use the ISCST3 capability to handle pit emission sources.¹⁶

This latest DHEC modeling effort used the same road and stockpile emissions information developed by Vulcan for input to their 7/2001 modeling effort, except that such roads and stockpiles were placed at their actual Z-coordinate elevations, according to DHEC modeling staff. However, this effort did not consider emissions from roads and stockpiles contained at the Cayce Quarry, but did consider that quarry's process equipment.¹⁷

At this writing, Commentors are trying to verify whether this model included stockpile and road sources, although Commentor's review appears to indicate that this modeling did not consider such sources.

The DHEC modeling shows very high ambient concentration predictions as shown in the table below:

Prediction	Impact (ug/m3)
1 st high 24 hour	663
2 nd high 24 hour	654
6 th high 24 hour	579
1 st high annual	201
2 nd high annual	167
3 rd high annual	155
4 th high annual	147
5 th high annual	145

Although these model predictions are very high, DHEC staff have stated that all such predictions are for receptors falling on company property. DHEC modeling staff have stated

¹⁶ February 28, 2002 personal conversation with Ross Dubose and Scott Krentz, SC DHEC

¹⁷ March 1, 2002 personal conversation with Ross Dubose and Scott Krentz, DHEC

that this modeling effort shows compliance with ambient air quality standards for all fence line and off-site receptors when considered with ambient background values. Commentors have not verified this fact from examination of the modeling study as a result of lack of time and resources.

As a result, it would be very helpful if DHEC staff place their conclusions about this modeling effort and the predicted effect on fence line and offsite receptors in writing upon the record for comment and documentation purposes.

7.3 Issues Associated with DHEC-Specified Ambient Background Concentrations

DHEC has specified ambient background concentrations for use in association with ambient air quality modeling predictive results. Commentors have reviewed these ambient recommendations and some measured ambient air quality data.

DHEC Specified Ambient Air Quality Background		
Modeling Context	24 hour background	annual average background
Latest Final Vulcan Modeling, 7/2001 (background supplied by Anna Campbell..no longer employed by DHEC)	44 ug/m3	19 ug/m3
Richland County background (supplied by DHEC Section Supervisor Clay Loffson to AJSA on March 1, 2002; claimed as 1998 data as being proper according to now-current DHEC procedure)	59 ug/m3 (2 nd high, Parklane Site) 49 ug/m3 (2 nd high, DHEC site)	26 ug/m3 (annual, Parklane Site) 24 ug/m3 (annual, DHEC site)
Scott Krentz Review of 7/2/2001 Vulcan Modeling (claimed as 1999 data)	40 ug/m3	19 ug/m3
Vulcan Modeling, 4/2001	21 ug/m3	17 ug/m3
Modeling Report from ERM, 6/2000 submitted by Tarmac	21 ug/m3	17 ug/m3

SC DHEC air quality modeling personnel¹⁸ and ambient air quality monitoring personnel¹⁹ indicated that there was no DHEC written procedure for selecting and applying background concentrations for use in association with ambient air quality modeling studies. Air monitoring personnel indicate that the current procedure is to use 1998 air quality monitoring data from a site in the same or adjacent county that is not heavily impacted by an adjacent emission source. On this basis, Commentors were provided with recommended background PM-10 concentration to use for permitting in Richland County and these indications are shown in the above table.

Commentors object to issuance of the proposed permit on the basis that Vulcan's most recent air quality modeling projections, when added to the March 1, 2002 DHEC recommended background concentrations for Richland County, exceed both the 24 hour and annual average National Ambient Air Quality Standards for PM-10.

EPA publishes national ambient air quality modeling guidance that is binding on states doing air quality permitting and in the establishment of State Implementation Plans.²⁰ Commentors generally comment that issuance of the proposed permits is objectionable to the extent that any air quality modeling study on the record (including model inputs, application of the model, selection of background concentrations to add to modeled results, application of the results of the model to the regulatory decision, derivation of emission limitations at variance to Appendix W procedures, etc.) is at variance with policies articulated in EPA's Guideline on Air Quality Modeling, Appendix W.

¹⁸ March 1, 2002 personal telephone conference with Ross Dubose and Scott Krentz, DHEC air modelers

¹⁹ March 1, 2002 personal telephone conference with Clay Loffson, DHEC air monitoring section

²⁰ Available at <http://www.epa.gov/ttn/scram> See file for "Appendix W"