# EXHIBIT B

Responsiveness Summary

Illinois Environmental Protection Agency
Bureau of Air
April 2010

# Responsiveness Summary for the Public Comment Period on a Revision to the Construction Permit/PSD Approval for Vulcan Construction Materials, LP for its Lime Kiln in Manteno, Illinois

Source Identification No.: 091806AAB
Application No.: 96020014

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## DECISION

On April 9, 2010, the Illinois Environmental Protection Agency (Illinois EPA) Bureau of Air issued a Construction Permit/PSD Approval to Vulcan Construction Materials, LP (Vulcan) to upgrade and restart its idled lime kiln located at 6141 North Route 50 in Manteno, Illinois. At the same time, the Illinois EPA issued this Responsiveness Summary to address questions submitted during the hearing and associated public comment period that was held on the proposed issuance of the permit.

## BACKGROUND

Lime is manufactured in kilns by high-temperature roasting or "calcination" of limestone or other material rich in calcium carbonate to convert calcium carbonate ($CaCO_3$) into lime or calcium oxide (CaO). Vulcan's Manteno lime plant has one rotary kiln, which began operation in 1998. The kiln has the capacity to produce about 600 tons of lime per day and is designed to burn solid fuel, i.e., coal and petroleum coke. As the limestone reserves at the adjacent quarry are Dolomitic limestone, which contains a significant percentage of magnesium carbonate as well as calcium carbonate, the plant produces Dolomitic lime, which is a mix of calcium oxide and magnesium oxide. Dolomitic lime has different properties than so-called "high calcium lime" and is typically used as a fluxing agent in the manufacture of steel.

Vulcan's lime kiln has been idle since 2003. Vulcan has applied for a revised construction permit that would allow to restart the Manteno lime plant and that addresses the installation and use of a spray dryer absorber on the lime kiln for control emissions of $SO_2$. Vulcan has also proposed to shorten the length of the kiln and install a pre-heater tower to improve the energy efficiency of the kiln. For handling of lime product, Vulcan has proposed to install several new smaller baghouses that would replace a central baghouse, to provide improved control of particulate emissions. Other changes proposed in the revised permit include reconfiguring of certain fugitive dust units and the roadways at the plant to reduce fugitive dust emissions.

The Illinois EPA, Bureau of Air evaluates applications for permits for proposed sources of emissions. An air pollution control permit application must appropriately address compliance with applicable air pollution control laws and regulations before a permit can be issued. Following its initial technical review of Vulcan's application, the Illinois EPA Bureau of Air made a preliminary determination that the application met the standards for issuance of a permit.

## COMMENT PERIOD AND PUBLIC HEARING

Due to the public interest in the project, the Illinois EPA held a public comment period with a hearing before making a decision on the revised construction permit/PSD approval for the plant. Accordingly, after it completed its preliminary review of the application, the Illinois EPA prepared a draft of the revised construction permit it was proposing to issue. The public comment period opened with the publication of notices in the Kankakee Daily Journal on April 17, 2009 and the Manteno News on April 23, 2009. The notice was again published in Manteno News on April 30, 2009 and May 7, 2009 and the Kankakee Daily Journal on April 24, 2009 and May 1, 2009. The public hearing was held on June 4, 2009 at the Manteno High School to accept oral comments and answer questions about the proposed plant and the draft permit prepared by the Illinois EPA. The comment period was originally scheduled to close on July 6, 2009. The comment period was extended and closed on July 22, 2009.

Following the close of the public comment period, the Illinois EPA reviewed the public comments and conducted its final technical review of Vulcan's application. This review led to a final determination by the Illinois EPA that the application for revision of the construction permit/PSD Approval met the standards for issuance of a permit.

## AVAILABILITY OF DOCUMENTS

Copies of the revised Construction Permit/PSD Approval issued to Vulcan and of this Responsiveness Summary are available by the following means:

1. From the Illinois EPA's website:

   http://www.epa.state.il.us/public-notices/2009/general-notices.html

2 By viewing documents at one of the following repositories:

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|---|---|
| Illinois EPA<br>Des Plaines Regional Office<br>9511 West Harrison<br>Des Plaines, IL<br>847/294-4000 | Illinois EPA<br>1021 N. Grand Ave., East<br>Springfield, IL 62794<br>217/782-7027 |

3. By contacting the Illinois EPA by telephone, facsimile or electronic mail:

   Illinois EPA
   Bradley Frost, Office of Community Relations
   888/372-1996 Toll Free – Environmental Helpline
   217/782-7027 – Desk Line
   217/782-9143 – TDD
   217/524-5023 – Facsimile
   brad.frost@illinois.gov

## APPEAL PROVISIONS

The construction permit being issued includes approval to construct pursuant to the federal rules for Prevention of Significant Deterioration of Air Quality (PSD), 40 CFR 52.21. Accordingly, individuals who filed comments on the draft permit or participated in the public comment period on the draft permit may petition the Environmental Appeals Board of the United States Environmental Protection Agency (USEPA) to review the PSD provisions of the issued permit. Other persons, who did not file comments or participate in the public comment period, may petition for administrative review only to the extent of the changes from the draft permit to the final permit decision. In addition, as comments were submitted on the draft permit for the proposed project that requested a change in the draft permit, the issued permit does not become effective until after the period for filing of an appeal has passed.

The procedures governing appeals are contained in the Code of Federal Regulations (CFR), "Appeal of RCRA, UIC and PSD permits," 40 CFR 124.19. If an appeal request will be submitted to USEPA by a means other than regular mail, refer to the Environmental Appeals Board website at http://www.epa.gov/eab/ and the EAB's Frequently Asked Questions at http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/General+Information/Frequently+Asked+Questions?OpenDocument for instructions. If an appeal will be sent by regular mail, it should be sent on a timely basis to the following address:

U.S. Environmental Protection Agency
Clerk of the Board
Environmental Appeals Board (MC 1103B)
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460-0001
Telephone: 202/233-0122

## QUESTIONS AND COMMENTS WITH RESPONSES BY THE ILLINOIS EPA

1. What happens if there are problems or things are not working right for the equipment, since the scrubbing technology planned for this plant has not applied to other lime plants.

   **Although the planned scrubbing technology has not applied to lime kilns in the past, this technology is not new and has been used in other operations. Furthermore, the draft permit does includes monitoring requirement for the lime kiln as well as the scrubber that will be helpful in diagnosing problems so Vulcan can make appropriate repairs or changes in operation. If a problem cannot be resolved, an enforcement action could result that would lead to monetary fines and even requirement to cease the operation at the lime plant.**

2. Will there be any monitoring performed to determine the possible effect on levels of chemicals in groundwater or the surface waters before and after the construction of the plant?

   **Lime kilns are usually not associated with groundwater or surface water contamination issues. The problem with soil contamination normally results from direct spills that result from rupture of storage tank that holds chemical materials or at manufacturing operation that has chemical leaks from containers or pipes. However Vulcan does perform periodic sampling and analysis of the water that is pumped out of the quarry as required by its water permit.**

3. Is there anything in place for drainage problem? In particular, the fields around the area of planned mining are full of water and do not drain well.

   **Vulcan's understanding is that the drainage addressed in this comment relates to water flow onto Vulcan's property from a culvert under Route 50. In particular, drainage tiles running through the property have been damaged such that a portion of water is diverted into the pit. This water is either pumped and discharged as**

**allowed in its water permit or routed around the pit. Due to very little grade across the Vulcan's property, the outflow of this water around the pit is not efficient and creating overflow of surface water especially when the precipitation is heavy in the area.**

**In response to this comment, Vulcan indicates that it has evaluated ways to improve the water flow across its property. Temporarily, Vulcan has repaired some of the drainage tile that affects water flow across its property. Vulcan has also proposed appropriate changes for its drainage system to the local Drainage District.**

4. The proposed plant will emit significant quantities of the greenhouse gases (GHG) that are causing a climate crisis. Large amounts of carbon dioxide ($CO_2$) will be emitted from the proposed lime plant.[1] Additionally, it should be assumed that the kiln would have significant emissions of $N_2O$. The draft permit would not satisfy the requirements of the Clean Air Act because it does not reflect a "best available control technology" (BACT) analysis or BACT limits for emissions of $CO_2$.

   **The emissions of GHG from stationary sources, like the proposed plant, will be regulated in the future when appropriate rules or laws are in place addressing them. At the present time, GHG emissions of the proposed plant are not regulated under the federal PSD program pursuant to the Clean Air Act, so that the permit should not include provisions addressing GHG emissions. The fact that GHG are a pollutant and USEPA intends to regulate GHG emissions of in the future does not alter the current "unregulated" status of GHG emissions.[2]**

5. The Intergovernmental Panel on Climate Change (IPCC)[3] has found that warming of the climate is "unequivocal," that emissions of $CO_2$ and other greenhouse gases (GHG) alter the energy balance of the planet's climate system, that global concentrations of $CO_2$ in the

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[1] The application for the proposed plant does not include data for its emissions of $CO_2$ and other GHG. This data should have been included in the application. In the absence of such data, it can be assumed that the kiln would potentially emit about 400,000 tons of $CO_2$ each year from calcining about 475,000 tons of dolomitic limestone annually, with the $CO_2$ generated by the calcination process and the combustion of fuel in the kiln,.

[2] **In a letter dated February 22, 2010, addressed to United State Senator Jay Rockefeller, the current Administrator of USEPA, Lisa Jackson, confirmed that USEPA is proceeding with rulemaking under the Clean Air Act that would result in GHG emissions from significant stationary sources being subject to permit requirements and regulation. USEPA expects to begin phasing-in these requirements beginning in calendar year 2011. This timing will enable necessary evaluation to occur on how the BACT requirement of the PSD program should be applied to GHG. As explained in this letter, "EPA continues to review and analyze options for defining Best Available Control Technology (BACT) for green-house-gas emissions. The additional time that EPA will have before permitting requirements will take effect will enable the agency and stakeholders to consider this issue carefully and thoughtfully. The EPA's goal will be to identify practical, achievable, and cost-effective strategies for minimizing emissions increases from new facilities and major modification, recognizing the importance of these projects to the economy and job creation. The agency would of course apply the well-developed framework that exists for determining BACT for non-greenhouse gas pollutants. One of the factors that is applied under that framework is the commercial availability of a given control technology."**

[3] The Intergovernmental Panel on Climate Change (IPCC) is a leading source of research and data regarding climate change, its causes, and its impacts. The IPCC is charged with comprehensively and objectively assessing the scientific, technical and socioeconomic information relevant to human-induced climate change, its potential impacts, and options for adaptation and mitigation. To date, the IPCC has released four assessments—in 1990, 1995, 2001, and 2007, each one stating with greater confidence than the one before that the climate change situation has become increasingly dire.

The IPCC was established by the World Meteorological Organization and the United Nations Environment Programme in 1988 to comprehensively and objectively assess the scientific, technical, and socio-economic information relevant to human-induced climate change, its potential impacts, and options for adaptation and mitigation.

More information about the IPCC is available at http://www.ipcc.ch/about/index.htm. IPCC reports are available at available at http://www.ipcc.ch/ipccreports/assessmentsreports.htm.

atmosphere currently exceed the natural range over the last 650,000 years, and that continued $CO_2$ emissions will lead to continued warming and possibly irreversible impacts. Therefore, the IPCC recommends switching from coal. Other highly-respected scientific authorities have also concluded that solving the climate crisis is possible only if plants control their GHG emissions.[4]

**The Illinois EPA agrees with the findings of the IPCC with respect to climate change and GHG emissions.[5] However, the scientific findings of the IPCC, which is an international scientific body engaged in collection of information, and of other scientists, do not provide a legal basis for the permit for the proposed plant to address emissions of $CO_2$ or other GHG.[6]**

6. Global warming is a threat to public health, welfare, and the environment. USEPA has confirmed this in its Proposed Endangerment Findings for emissions of GHG,[7] in which it has stated that:

> Scientific evidence ineluctably shows that climatic changes are occurring as a result of anthropomorphic GHG emissions, that such climatic changes are already harming health and welfare and the natural environment, and that the effects will worsen over time in the absence of regulatory action. The effects of climate change on public health include sickness and death. The effects on welfare embrace every category of effect described in the Clean Air Act's definition of "welfare" and, more broadly, virtually every facet of the living world around us ... In both magnitude and probability, climate change is an enormous problem.

USEPA's Proposed Endangerment Findings are based on well-established facts that the scientific community have known for several decades. This includes significant impacts on Illinois due to global warming and climate change. Global warming exacerbates the problem of ground-level ozone ("smog"), intensifying the public health dangers associated with air quality violations.[8] Unless emissions of GHG are curbed and then greatly decreased, GHG will continue to pose a significant threat to the health, welfare, and economy of Illinois.

**The Illinois EPA agrees with the conclusions of the USEPA in its Proposed Endangerment Findings. However, the Proposed Endangerment Findings, by themselves, do not provide a legal basis for the permit for the proposed plant to address emissions of $CO_2$ or other GHG. Rather, they represented an initial step by**

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[4] The American Geophysical Union has stated that a prompt moratorium on new coal power plants that do not capture $CO_2$ and a phase-out of existing coal power plants by 2030 are critical to solving climate change. The Pew Center on Global Climate Change has also concluded that reductions in coal-based $CO_2$ emissions will be critical for solving the climate crisis.

[5] **While there have been problems in the assembly, management and reporting of certain data related to climate change an global warming, as reported in the media, these problems do not alter the fundamental conclusion. That is, human activity is contributing to global warming and climate change and the magnitude of the effects are significant, making climate change due to global warming a critical issue for mankind.**

[6] **Recommendations by the IPCC do not carry the force of law. Moreover, it is not appropriate to expect that new sources should comply with these recommendations when existing sources are unaffected, particularly as meaningful reductions in GHG emissions will necessitate comprehensive action to lower energy consumption and develop alternative energy systems.**

[7] USEPA, "Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Proposed Rule," 74 FR 18,886, 18904 (April 24, 2009).

[8] Illinois agriculture is also sensitive to warming because of the existing threats of heat waves, flooding and drought. See National Wildlife Federation, Global Warming and Illinois, available at http://www.nwf.org/GlobalWarming/pdfs/Illinois.pdf

**USEPA to begin the orderly process of regulating or controlling emissions of GHG under the Clean Air Act.**

**This conclusion is confirmed by the Final Endangerment Findings made by USEPA Administrator Lisa Jackson on December 7, 2009.** [9, 10] **When making the Final Endangerment Findings, Administrator Jackson also observed that this action did not by itself impose any requirements on sources or other entities. Rather, it was a prerequisite to finalizing the USEPA's proposed standards for GHG emission from light-duty vehicles, which were jointly proposed by USEPA and the US Department of Transportation, National Highway Safety Administration, on September 15, 2009.** [11]

7. Other states have shown the path to a clean energy future. For example, in Kansas, Governor Sebelius rejected two proposed 700 MW coal-fired generating units because of concerns over $CO_2$ emissions and the potential costs of federal regulations for $CO_2$ emissions. She said "We must move forward strategically—steering our state clear of the environmental, health and economic risks of massive new carbon emissions."[12] Such progress in the fight against global warming would be wiped out if Illinois were to ignore the impacts from the proposed plant

**The permitting of the proposed plant is in accordance with the express federal and state laws and rules that currently apply and govern the permitting of the proposed**

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[9] **On December 7, 2009, USEPA Administrator Lisa Jackson proceeded with Final Endangerment Findings, in which she actually signed two distinct findings regarding GHG under Section 202(a) of the Clean Air Act. First, Administrator Jackson found that the current and projected concentrations of the six GHG compounds--$CO_2$, methane, nitrous oxide ($N_2O$), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride ($SF_6$) in the atmosphere threaten the public health and welfare of current and future generations. Second, Administrator Jackson found that the combined emissions of these GHG compounds from new motor vehicles and new motor vehicle engines contribute to GHG pollution, which threatens public health and welfare. *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 FR 66,496 (December 15, 2009).**

**When adopting the Final Endangerment Findings, Administrator Jackson also made clear that this action did not result in GHG becoming regulated pollutants for purposes of PSD. "Footnote 17: Note that it is EPA's current position that these Final Findings do not make well-mixed greenhouse gases 'subject to regulation' for purposes of the CAA's Prevention of Significant Deterioration (PSD) and title V programs. *See, e.g.*, memorandum entitled 'EPA's Interpretation of Regulations that Determine Pollutants Covered By Federal Prevention of Significant Deterioration (PSD) Permit Program' (Dec. 18, 2008). While EPA is reconsidering this memorandum and is seeking public comment on the issues raised in it generally, including whether a final endangerment finding should trigger PSD, the effectiveness of the positions provided in the memorandum was not stayed pending that reconsideration. Prevention of Significant Deterioration (PSD): Reconsideration of Interpretation of Regulations That Determine Pollutants Covered by the Federal PSD Permit Program, 74 FR 515135, 51543–44 (Oct. 7, 2009). In addition, EPA has proposed new temporary thresholds for greenhouse gas emissions that define when PSD and title V permits are required for new or existing facilities. Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule (74 FR 55292, October 27, 2009). The proposed thresholds would 'tailor' the permit programs to limit which facilities would be required to obtain PSD and title V permits."**

[10] **A number of industry groups that have petitioned the court to review USEPA's Final Endangerment Findings, including the American Iron and Steel Institute, the American Farm Bureau Federation, the American Petroleum Institute, the Corn Refiners Association, the National Association of Home Builders, the National Association of Manufacturers, the National Mining Association, the National Oilseed Processors Association, the National Petrochemical and Refiners Association, the Portland Cement Association, the U.S. Chamber of Commerce, and the Utility Air Regulatory Group. On February 16, 2010, three states, Alabama, Texas and Virginia, also filed lawsuits challenging USEPA's Findings.**

[11] "Proposed Rulemaking To Establish Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards," 74 FR 49,454 (September 28, 2009)

[12] Kansas Department of Health and the Environment, Press Release: KDHE Electric Denies Sunflower Electric Air Quality Permit (October 18, 2007).

"When denying a permit to Sunflower Electric, the Director of the Kansas Department of Health and the Environment stated that 'it would be irresponsible to ignore emerging information about the contribution of $CO_2$ and other greenhouse gases to climate change and the potential harm to our environment and health.'"

**plant. While different requirements may govern in other jurisdictions, those requirements are not applicable to the application or permit for the proposed plant, as the plant would be located in Illinois. Likewise, actions taken on projects proposed in other jurisdictions cannot be directly transferred to and applied to this project. This is because of the differences in the projects, their circumstances, and the legal nature of the decisions that were actually being made on those projects in those other jurisdictions. For example, in the case cited in this comment, both environmental impacts of $CO_2$ and the costs for future control of $CO_2$ were considerations.**

8. Options exist to reduce the GHG emissions from the proposed plant that could be included in a BACT analysis. These include: 1) Increased efficiency; 2) Controls options and work practice standards; and 3) Co-firing the kiln with lower carbon fuels, including biomass or natural gas, instead of solid fossil fuels.

**Due to the fact that GHG are not yet regulated under the PSD program, the BACT analysis for the proposed plant does not and should not consider control options for GHG emissions. However, Vulcan indicates that the proposed lime plant would be designed to reduce its GHG emissions, with features that reduce its fuel and electricity consumption. In particular, in a supplement to the application, Vulcan added a preheater tower to the proposed lime kiln to improve its energy efficiency, lowering its design fuel usage rate from 7 to 5 tons per hour.[13]**

**Vulcan indicates that, based on continuous operation of the kiln, this will lower the plant's fuel consumption by 17,520 tons per year, with a reduction in the plant's annual emissions of $CO_2e$ of 45,360 tons per year.[14] This will also be accompanied by reductions in the plant's indirect or associated $CO_2e$ emissions as less fuel would be used at the plant and smaller volumes of air and flue gas would have to be handled for the kiln. For example, the lower fuel usage will reduce the electricity needed for the kiln fan by approximately 60 kW, which translates to a reduction of approximately 300 tons of $CO_2e$ per year.**

9. Global warming will have a significant impact on the human environment. Vulcan must include in the application and the Illinois EPA must review an analysis of technically feasible control options for minimizing emissions of $CO_2$ and other GHG during startup of the proposed plant and during any other time during which the sale of $CO_2$ is not feasible. In other words, a $CO_2$ BACT analysis should be prepared for all operation of the plant, including startup, shutdown, and malfunction.

**As discussed, GHG are not yet regulated under the PSD program. Accordingly, as a legal matter, the BACT analysis for the proposed plant should not consider control**

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**[13] The BACT determination for the kiln at the proposed plant, as stated in both the draft permit and the issued permit, requires the use of this preheater tower, or other similar device for improved fuel efficiency. Accordingly, even though $CO_2$ is not a regulated pollutant at this time, the technology to minimize $CO_2$ emissions is required as part of the technology component of the BACT determination that was made. This is because use of preheater tower will act to reduce emissions of sulfur dioxide ($SO_2$), nitrogen oxides (NOx) and carbon monoxide (CO), pollutants that are currently regulated. The feasibility of "preheater tower technology" is well established. Vulcan also has not provided any information to show that the cost for use of a preheater tower is excessive. This suggests that the increase in capital and operating costs from use of a preheater tower will be entirely offset by reduced fuel and energy costs or at most be minimal.**

**[14] Vulcan estimated the reduction in GHG emissions from the preheater using the calculation procedures and factors in the May 2008 version of The Climate Registry Protocol, which express GHG emissions in terms of $CO_2$ equivalents ($CO_2e$).**

**options for the GHG emissions for any portion of the operations of the proposed plant.**

**Moreover, as this comment suggests that $CO_2$ from the proposed plant may be "sold," this comment is based on a false premise. $CO_2$ emissions from the proposed lime kiln would not be collected for sale. Technology to collect the $CO_2$ generated by a lime kiln, as would be needed before any $CO_2$ from a lime kiln could be sold, has not been developed.**[15]

10. Consistent with the statutory definition of BACT at Section 169(3) of the Clean Air Act, historic practice, and recent determinations of the EAB,[16] a BACT determination must include consideration of "clean fuels." For this plant, this may include the use of natural gas and biomass in place of some or all of the solid fossil fuel, or a combination of any of these, as readily available methods to reduce $CO_2$ emissions.

**As discussed below, the Illinois EPA has appropriately considered the use of various "clean fuels" by the proposed plant, as an alternative to the use of coal and coke as planned by Vulcan, as a means to reduce the plant's emissions of regulated pollutants that are subject to PSD. However, under the current regulations, it was not appropriate for this consideration to extend to $CO_2$ as it is not yet a regulated pollutants for purposes of the PSD program.**

11. Biomass fuel is readily available in the Midwest and both processed biomass fuel and fuel crops are available. The issues involving acquisition and transport of biomass, if any, involve costs. Biomass cannot be rejected as technologically infeasible. For example, the Department of Energy's website notes that in 2002 there were about 9,733 MW of installed biomass capacity in the United States, the largest source of renewable electricity other than hydroelectricity.[17]

**This comment does not demonstrate that biomass fuel is readily available, much less an appropriate and available fuel, for the proposed lime plant. The use of biomass as the fuel for the proposed plant can be readily considered and rejected as an option for the plant. The fact that biomass fuel is used at certain facilities to produce steam and electricity does not show that biomass fuel is a fuel that should be required to be used at the proposed plant.**

**Biomass fuel is not consistent with the nature of the plant, which would produce lime, a physical product, for sale. To effectively convert limestone into lime, the kiln needs fuel with consistent heat content and other physical properties. This objective is inconsistent with both the nature and the quantity of biomass that would potentially be available for the plant. As a general matter, the composition and properties of**

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[15] **Work is ongoing, spearheaded by the United States Department of Energy, to investigate, develop, demonstrate and refine various technologies for capture and control of $CO_2$ emissions from coal-fired power plants. Given the magnitude of $CO_2$ emissions from coal-fired power plants, it is reasonable that efforts focus on technologies for control of $CO_2$ emissions from coal-fired power plants.**

[16] For example, refer to pages 17 and 18 of the EAB's ruling in the case of: In re Northern Michigan University Ripley Heating Plant, Slip. Op., PSD Appeal No. 08-02 (E.A.B. 2009) "Congressional direction to permitting applicants and public officials is emphatic. In making determinations, they are to give prominent consideration to fuels."

[17] See http://www1.eere.energy.gov/biomass/index.html.

**biomass fuels are significantly different than those of coal and coke,[18] which results in biomass not being a suitable fuel for a calcination process designed for fuels with a high-heat content.[19, 20] In addition, as Vulcan's objective is to manufacture lime, this necessitates use of commercial fuels for which a reliable supply will be available during the life of the plant.**

**Moreover, even if biomass fuels could be used in the kiln, there is not an established supply of biomass fuels in the area surrounding the plant.[21] Farming to produce low quality biomass fuels, of the type that would potentially be available for use at the proposed plant, is in its infancy. Biomass fuels cannot yet generally be considered a commercial fuel. The continuing availability of such fuel and the future cost of such fuel cannot be determined or predicted in a way that would allow them to be considered available fuels.[22] In this regard, key factors are the nature of government programs that accelerate the development of commercial biomass fuels and the extent to which regulations are adopted and programs implemented that increase competition for those resources, such as federal regulations supporting use of renewable fuels. This situation with the proposed plant is different from projects in which the developers propose to utilize or develop certain biomass resources. In those cases, the developers are voluntarily accepting the uncertainty in the future availability and cost of material from the selected resource. Likewise, the circumstances are different from those of individuals who propose to utilize waste as a source of energy and voluntarily accept both the uncertainty associated with use of such material and the accompanying regulatory burden.**

**These considerations, which preclude use of biomass as the required fuel for the proposed plant, also preclude use of a blend of biomass and coal and coke and as the**

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[18] Biomass is not a friable material and cannot be pulverized like coal. This means that biomass would have to be prepared for use as fuel separately from other solid fuel. As compared to coal and coke, this would also make it would be more difficult to maintain consistent sizing of the biomass fed to the kiln, which is desirable to maintain consistent combustion and operation of the kiln. In addition, as compared to coal and coke, more of the carbon in biomass is in a volatile form and less is present as fixed carbon. As such, use of biomass fuel could also negatively affect the temperature profile in the kiln as its higher volatile carbon content made combustion occur more rapidly.

**[19] At the present time, certain types of "high-quality" biomass are used for production of chemicals, e.g., ethanol from corn and biodiesel from vegetable oil. These processes generally involve "high quality" forms of biomass and specific conversion processes and equipment that have been developed for the processing of particular feedstocks. This does not show that biomass is generally suitable as a fuel. It instead shows the specialized nature of chemical processes. To the extent that waste or low-quality biomass is currently being used, it is generally to produce a fuel that is then burned for its heat energy, not as a chemical feedstock. The use of biomass as a fuel or to produce fuel that is immediately burned at the source for conversion into thermal does not demonstrate that biomass is a suitable fuel for the proposed plant. Combustion of a material to produce heat energy as steam is more tolerant of variation in fuel composition that combustion in a lime kiln.**

**[20] The United States Energy Information Agency (EIA) indicates "The U.S. economy uses biomass-based materials as a source of energy in many ways. Wood and agricultural residues are burned as a fuel for cogeneration of steam and electricity in the industrial sector. Biomass is used for power generation in the electricity sector and for space heating in residential and commercial buildings. Biomass can be converted to a liquid form for use as a transportation fuel, and research is being conducted on the production of fuels and chemicals from biomass."** ***See*** **Energy Information Agency,** ***Biomass for Electricity Generation*****, EIA-Biomass Gasification http://www.eia.doe.gov/oiaf/analysispaper/biomass.**

**[21] As described by USDOE's Office of Energy Efficiency and Renewable Energy, in its State Assessment for Biomass Resources: Illinois Potential for Biofuel Production (available at http://www.afdc.energy.gov/afdc/sabre/sabre.php), there are very limited supplies of forest and primary mill residues in Illinois, as would be used by the Bay Front project. Other than in the Chicago Area, where urban wood residues are available, the potential for generation of biomass in Illinois is primarily with crops and crop residues, which are lower quality biomass than wood.**

**[22] Similar considerations also apply to alternative use of "cleaner commercial solid fuel." Vulcan has proposed to use fuel that is commercially available. The plant would use a relatively small amount of fuel, using less than 50,000 tons annually. Given the plant's scale, it cannot be determined that a particular type or quality of cleaner commercial solid fuel would be available for the life of the plant, as would be necessary to specify the use of a cleaner fuel than proposed.**

**fuel for the plant. In addition, use of a blended fuel, even if feasible and otherwise appropriate, would act to negatively affect the operation of the plant. The increase in the complexity of the kiln operation, which would be inherent in using a blend of coal, coke and biomass, would be contrary to consistent and reliable operation, such that an increase in process upsets and production of off-specification lime should be contemplated.** [23]

**Incidentally, given the add-on emissions control required of the proposed plant and the nature of plant, it is unclear whether the use of biomass fuel would be accompanied by significantly lower levels of emissions of regulated pollutants.**[24]

12. Xcel Energy has proposed to build a biomass gasification plant, which would use 200,000 to 250,000 tons of biomass annually, at the site of its existing Bay Front Generating Station in Ashland, Wisconsin.[25] Publicly-available information for this project shows that use of biomass is cost-effective. The Xcel Bay Front facility is currently paying between $25.00 and $29.00 per ton of wood waste ($3.85 to $5.27/mmBtu, based on 6,000 Btu/pound).[26] Therefore, biomass is a transferable emission control option.

**The Xcel project cited by this comment does not demonstrate that biomass, i.e., wood waste, is an available fuel for the proposed plant. Indeed, given the circumstances of the Xcel project,[27] it serves to show that wood fuel is not available for the proposed lime plant. The proposed kiln would be located at a site in Manteno, over 450 miles away from the Xcel project in Ashland, Wisconsin. Manteno is not in a forested area, but in an area in which grain farming predominates. Facilities like Xcel Energy's Bay Front power plant are developed in the vicinity of areas in which biomass fuels are already available. As those facilities are developed in the vicinity of supplies of biomass fuel and are sized to utilize those supplies of fuels, they consume the available supply of biomass fuel. As such, the Illinois EPA cannot assume that there will be unused biomass material available for the proposed lime plant. It would be located**

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[23] **The use of fuels derived from biomass by the proposed lime kiln is also rejected. The conversion of biomass into a biomass-derived fuel adds significantly to the costs of such a fuel compared to conventional fuels. Thus biomass derived fuels are readily rejected for purposes of BACT as their emission characteristic would be no better than those of natural gas but they would be several times more expensive, with higher cost impacts than those of natural gas.**

[24] **For particulate matter, the performance of the fabric filter or baghouse reflects residual levels of contaminants in the flue gas, based on the capabilities of the required baghouse, rather than removal of a percentage of the particulate present in the flue gas. As such, the performance of the baghouse is independent of the level of dust in the flue gas. In other words, "cleaner fuels," which contain less ash, do not translate into lower emissions of filterable particulate.**

**As will be discussed in more detail later, one issue for evaluating alternative fuels is whether the accompanying levels of sulfur dioxide ($SO_2$) emissions from the kiln would be such that an add-on scrubber would not be needed to control $SO_2$ emissions. If a scrubber is still needed, the reduction in $SO_2$ emissions with a lower sulfur fuel would only be a fraction of the reduction in the sulfur content that would accompany use of a low sulfur fuel.**

**For other pollutants, there is not clear information to assess the change in emissions accompanying use of biomass fuels.**

[25] See Application of Northern States Power Company, a Wisconsin Corporation, for a Certificate of Authority and Any Other Authorizations Needed to Construct and Place Into Operation a Biomass Gasifier at Its BayFront Generating Facility, Docket No. 4220-CE-169, PSC Ref # 108437.

[26] See "Assessment of Biomass Resources for Energy Generation at Xcel Energy's Bay Front Generating Station at Ashland," Wisconsin, Energy Center of Wisconsin, 2007.

[27] **The Xcel project would involve use of wood fuel at a facility in Northern Wisconsin, on the shore of Lake Superior. The project would be near the Chequamegon National Forest, in an area with substantial forest land within 50 miles of the project site. This is the reason that wood has historically been used as a fuel at the existing Bay Front power plant.**

**far from the supply of biomass fuel and its fuel transportation costs will be much more than for local facilities located "on top" of the fuel supply.[28]**

13. For a lime kiln, clean fuels may also include the use of a landfill gas as a readily available method to reduce $CO_2$ emissions.

**Use of landfill gas is rejected on several grounds. It is a low-quality fuel posing similar technical issues as those associated with use of biomass in the kiln. In addition, like biomass fuel, use of landfill gas is rejected because it cannot be considered an available fuel. Even if it were practical to pipe landfill gas to the proposed plant, a continuing supply of landfill gas cannot be ensured.[29]**

**As previously discussed, emissions of $CO_2$ are currently not subject to BACT pursuant to the PSD program. Accordingly, as this comment indicates that land fill gas must be considered in the BACT determination for the proposed plant as a "clean fuel" control option to reduce emissions of $CO_2$, such consideration is not justified as $CO_2$ is not currently a regulated pollutant for purposes of the PSD program.**

14. For a lime kiln, clean fuels may also include the use of fuel oil as a readily available method to reduce $CO_2$ emissions.

**The use of fuel oil can be readily rejected as a "clean fuel" control option for emissions of pollutants that are currently regulated under the PSD program. This is because the use of natural gas has been rejected as a control option. The sulfur content of distillate oil is higher than that of natural gas. Distillate oil would also be over two and a half times more expensive than natural gas.[30] Accordingly, the cost-effectiveness and the cost impacts of use of fuel oil would be much higher than those that were the basis for rejecting use of natural gas.**

**As already discussed, emissions of $CO_2$ are not currently subject to the PSD program.**

15. As also addressed in a comment related to emissions of criteria pollutants, natural gas is available at Vulcan's Manteno quarry and is used by other lime kilns in the United States. Moreover, natural gas produces a better, low sulfur lime product and, for this reason too, many kilns fire natural gas during certain periods even if they are capable of firing coal.

**As already discussed, because natural gas is a feasible fuel for lime kilns, the use of**

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**[28] Given that transportation costs are a factor in fuel costs, the costs of wood fuel released by Xcel should not be applied to wood fuel for the proposed lime plant. Using a nominal transportation cost of $0.15 per ton-mile for long-distance truck transport, the cost for transportation of wood fuel for 400 additional miles from Northern Wisconsin to Manteno could by itself cost $5.00 per mmBtu, doubling the cost of fuel. (400 miles x $0.15/ton-mile ÷ 12.0 mmBtu/ton = $5.00/mmBtu)**

**[29] The distance between the proposed plant and a landfill would make the construction of a pipeline to supply landfill gas to the proposed plant impracticable. The costs of a pipeline that would be at least ten miles long, as needed to use landfill gas, would mean that Vulcan could not compete economically for landfill gas with an electrical generating facility located at or near the landfill generating the gas. In addition, a landfill would not provide a long-term, i.e., reliable, supply of fuel for the plant. Landfills have fixed lifetimes, based on their capacity and the rate at which waste is deposited. This means that landfills do not generate gas at a constant rate. Gas generation peaks during the active life of a landfill and then tapers off after a landfill closes. (This is a minor issue for a generating facility at a landfill, as the number of engines at such a facility can be readily raised or lowered to match the rate at which landfill gas is currently being generated.**

**[30] Distillate oil would cost an industrial source in Illinois almost three times as much per Btu as natural gas based on information compiled by the federal Energy Information Administration (EIA).**

**natural gas has been evaluated as option to control emissions of the proposed lime kiln. Its use as BACT was rejected because of the associated cost impacts.**

**Incidentally, the assertion made in this comment, i.e., that natural gas produces a better, low-sulfur lime product and this is the reason that natural gas is used at some lime plants, supports the premise that lime plants do not use natural gas as a means to control emissions. Rather, they do so for other reasons, e.g., natural gas may be used to produce high quality, food-grade lime, which incidentally is low in sulfur, for use in certain food and pharmaceutical products. This is not relevant to the proposed plant, which would use a reserve of dolomitic limestone suitable for making "general purpose" lime targeted for the metallurgical and environmental control markets for lime.**[31]

16. The draft permit would not satisfy the PSD requirements of the Clean Air Act because it does not reflect a BACT analysis and would not set limits or other requirements for the plant's emissions of $CO_2$, $N_2O$, or methane. In light of the USEPA's proposed endangerment findings for GHG and the EAB's recent decisions related to CO2 and other GHG,[32] the Illinois EPA must either reissue a draft permit that would set BACT for emissions of GHG from the proposed plant and hold a new public comment period, or suspend processing of the application until USEPA completes its reconsideration and rulemaking for GHG emissions.

**$CO_2$ and other GHG are not currently regulated pollutants under the federal PSD program, and therefore are not subject to the requirement for BACT under the PSD program. This has recently been clarified in a number of formal actions by USEPA, including actions by the EAB. It is also indirectly acknowledged by this comment as it requests that the Illinois EPA defer action on the application until USEPA completes action to actually regulates emissions of GHG. The Illinois EPA was legally bound when processing the permit application for the proposed plant to follow USEPA's current guidance with respect to the pollutants that qualify as regulated pollutants under the PSD program.**[33] **In addition, given the timing of rulemakings by USEPA to regulate GHG under federal law and the likelihood of legal challenges that might delay the effectiveness of rules that are adopted, it is not appropriate to delay**

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[31] **When used for metallurgical applications and environmental control, lime is commonly used to react with and absorb sulfur compounds and other impurities that are present. High-quality lime is not needed to accomplish this. General purpose lime, which commands a lower price, is serviceable. For example, the specification for food grade lime as produced and distributed by Mississippi Lime is 0.01 percent by weight. The specification for the lime that will be produced by the proposed plant will be significantly higher, in the range of 0.035 to 0.05 percent sulfur by weight.**

[32] The PSD program requires that each "new major stationary source shall apply BACT for each regulated NSR pollutant that it would have the potential to emit in significant amounts." 40 CFR 52.21(j). In addition to pollutants for which there are national ambient air quality standard or emission standards promulgated under Section 111 of the Act, regulated NSR pollutants include "...any pollutant that otherwise is subject to regulation under the Act." 40 CFR 52.21(b)(50)(iv). The Clean Air Act makes clear that the BACT requirements extend to "each pollutant subject to regulation under the Act."

[33] **Section 9.1(a) of Illinois' Environmental Protection Act also specifically states that the PSD program be developed and implemented in Illinois "...to avoid duplicative, overlapping or conflicting State and federal regulatory systems."**
**The Illinois EPA administers the PSD program for sources in Illinois through a formal delegation agreement with USEPA, rather than under a USEPA-approved state PSD program. By virtue of implementing a federally delegated program, the Illinois EPA is obliged to adhere to the same policies and interpretations as a regional Administrator of USEPA.**

**action on the application for the proposed plant pending completion of such rulemakings by USEPA.[34]**

**<u>The Johnson Memorandum</u>**

**USEPA does not consider that the monitoring and reporting of $CO_2$ emissions pursuant to Section 821 of the Clean Air Act Amendments of 1990 and certain provisions under 40 CFR Part 75 is sufficient for $CO_2$ to be considered a regulated pollutant under the PSD program. This position is memorialized in a memorandum by Stephen Johnson, Administrator of the USEPA, dated December 18, 2008.[35] Notice of this determination was subsequently provided by a notice in the Federal Register.[36] As explained in the memorandum, for a pollutant to be considered subject to regulation under the Clean Air Act, a pollutant must be subject to requirements that control or limit emissions of the pollutant, not simply requirements related to the monitoring or reporting of emissions. The memorandum finds that the data gathering requirements for $CO_2$ emissions promulgated under Title IV of the Clean Air Act does not compel the conclusion that Congress meant for $CO_2$ to become a regulated pollutant under the PSD program. USEPA identified several policy concerns with construing the Clean Air Act in this manner, including the undesirable effects such an interpretation would pose for information gathering activities and the administration of the PSD program. The applicability of the Johnson Memorandum is broad and unambiguous, as it also indicates that it applies to "... all PSD permitting actions by EPA regions (and delegated States that issue permits on behalf of EPA Regions)." As such, the Illinois EPA, as a permit authority that administers the federal PSD program in a delegated capacity, is obliged to implement USEPA's interpretation.**

**While the current USEPA Administrator, Lisa Jackson, announced on February 18, 2009, that USEPA had granted a petition for reconsideration of the Johnson Memorandum by USEPA, she did not stay its effect or validity.[37] On March 29, 2010, USEPA completed its reconsideration of the Johnson Memorandum, confirming the principles set forth in the Johnson Memorandum. In addition, USEPA addressed the timing of a pollutant's transition from not being a regulated pollutant to being a regulated pollutant, as will be relevant in the future for GHG. A pollutant becomes a regulated pollutant when control requirements under the Clean Air Act "take effect" for the pollutant, rather than on the date that control requirements are adopted for the pollutant. Accordingly, USEPA expects GHG to become regulated pollutants on**

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**[34] As already discussed, the permit also requires use of a preheater tower on the kiln. This would likely also have been the control technology specified as BACT for the kiln's emissions of GHG, which are primarily $CO_2$, if BACT were applicable to the proposed plant for its emissions of GHG.**

**[35] Memorandum, December 18, 2008, by Stephen L. Johnson, Administrator of the USEPA, entitled *EPA's Interpretation of Regulations that Determine Pollutants Covered By Federal Prevention of Significant Deterioration (PSD) Permit Program* (Johnson Memorandum).**

**[36] Notice of the Johnson Memorandum was published in the Federal Register on December 31, 2008, i.e., Notice of issuance of the Administrator's Interpretation. 73 FR 80,300 (December 31, 2008).**

**[37] As discussed elsewhere, on April 17, 2009, subsequent to announcing reconsideration of the Johnson Memorandum, USEPA Administrator Jackson announced that USEPA would be proposing to issue findings that GHG are pollutants that are present in the atmosphere at levels that threatens public health and welfare. Adoption of these findings by USEPA would set in motion a process whereby GHG would begin to be regulated under various provisions of the Clean Air Act.**

**January 2, 2011, the earliest possible date that companies will have to comply with the proposed standards for GHG emissions from light duty vehicles.** [38]

**Section 821 Argument.**

**The interpretation put forth in the Johnson Memorandum is consistent with Section 821 of the Clean Air Act Amendments of 1990. Section 821 is entitled "Information Gathering on Greenhouse Gases Contributing to Global Climate Change." The regulations adopted by USEPA pursuant to Section 821 of the Clean Air Act Amendments of 1990, which require collection of data for $CO_2$ emissions from power plants, do not evidence an intent by USEPA to regulate $CO_2$ under the PSD program. They merely reflect compliance with the explicit statutory directive of Congress that USEPA adopt rules requiring certain sources to begin collecting data for $CO_2$ emissions and reporting that data to USEPA. If Congress had intended that $CO_2$ be treated as a pollutant subject to the PSD program, it would have certainly indicated that in Section 821. Instead, Congress only provided that certain provisions of the Clean Air Act related to enforcement were to apply to the required collection and submittal of emission data for $CO_2$.** [39] **Congress did not specify that the provisions of the Clean Air Act for PSD were to also be applicable.**

**Delaware SIP Argument.**

**In the Johnson Memorandum and its subsequent reconsideration of the Johnson Memorandum, USEPA also responded to the contention that USEPA's approval of a Delaware SIP addressing $CO_2$ emissions was tantamount to USEPA regulation of $CO_2$ under the Clean Air Act. The USEPA recognizes the difference between SIP regulations under the Clean Air Act, which derive from principles of cooperative federalism, and national regulations, which generally apply in all states and are developed through USEPA rulemaking.**[40] **Based on this distinction, USEPA does not consider pollutants that are only regulated by individual state SIPs to be pollutants subject to regulation under the Clean Air Act for purposes of the PSD program. There is an obvious difference in the nature of SIP revisions and emission standards adopted by USEPA and coincidental action by USEPA in approving a SIP submittal**

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[38] *See* "Fact Sheet: Reconsideration of Interpretation of Regulations that Determine Pollutant Covered by Clean Air Act Prevention of Significant Deterioration Program," March 29, 2010, and the prepublication version of the associated Federal Register Notice.

[39] Section 821 of the Clean Air Act Amendments provides that "the provisions of section 511(e) of title V of the Clean Air Act shall apply for purposes of this section in the same manner and to the same extent as such provision applies to the monitoring and data referred to in section 511." As there is no Section 511 in Section V of the Clean Air Act, this reference is reasonably considered to refer to Section 412(e) in Title IV of the Clean Air Act. (Section 412(e) makes it unlawful to operate a subject source without monitoring and reporting of its emissions of $SO_2$ and $NO_x$ (and opacity) in accordance with applicable USEPA regulations.) This further action in Section 821 providing for enforceability of the data gathering requirements for $CO_2$ emissions would not have been necessary if Congress had been establishing emission limitations or emissions standards for $CO_2$.

[40] In general, USEPA's approval of provisions in State SIPs is a different legal process from the direct adoption of standards by USEPA under its independent authority under the Clean Air Act. The USEPA's approval of the provisions in State SIPs is a mechanism whereby USEPA formally reviews the adequacy of state rules and other measures that have been adopted by individual states to fulfill their obligations under the Clean Air Act. As particular state provisions are found adequate, they are approved by USEPA. If the approved state measure is one that is appropriate for enforcement, such as an emission standard, USEPA's approval of the measure as part of the state's SIP also allows for enforcement of the measure by USEPA under federal law. This is different from the regulatory process whereby USEPA unilaterally adopts National Ambient Air Quality Standards or federal New Source Performance Standards for various pollutants under its direct authority under the Clean Air Act. It is this latter form of regulation that creates or defines the scope of pollutants that are considered "subject to regulation" for purposes of PSD.

**for a particular state is insufficient to create a "regulated air pollutant" as a matter of national law.[41]**

**<u>USEPA's Endangerment Findings</u>**

**In addition, the USEPA, under the leadership of Administrator Jackson, is expeditiously undertaking specific rulemaking whereby emissions of $CO_2$ would be regulated under the Clean Air Act. It has done this by formally making findings under Section 202 of the Clean Air Act that emissions of six GHG, including $CO_2$, threaten the public health and welfare of both current and future generations.[42] In the Federal Register notices for these findings, USEPA also explained that these Findings do not in themselves trigger PSD permitting requirements. In addition, the USEPA affirmed the interpretation taken in Johnson Memorandum, indicating that even though it is engaged in reconsideration of the Johnson Memorandum, the Memorandum still is currently applicable USEPA policy.[43]**

**<u>The Deseret Power Decision</u>**

**Various arguments relating to the premise of this comment, i.e., that $CO_2$ is a regulated pollutant subject to the PSD program, were also considered by the EAB in an appeal by the Sierra Club of a PSD Permit issued by USEPA, Region 8, to the Deseret Power Electric Cooperative for a new generating unit. In its ruling in Deseret Power on November 13, 2008,[44] the EAB rejected the petitioner's contention that the statutory phrase "subject to regulation" was sufficiently clear and unambiguous as to compel USEPA to impose a $CO_2$ BACT limit under the PSD program. However, the EAB also rejected USEPA's position that it could not impose a $CO_2$ BACT limit because its historical interpretation of this phrase "subject to regulation" precluded a limit for $CO_2$. The EAB remanded the permit back to USEPA Region 8 with instructions to further consider the question whether a $CO_2$ BACT limit should be developed "in light of the Agency's discretion to interpret, consistent with the CAA [Clean Air Act], what constitutes a 'pollutant subject to regulation under the Act'." [PSD Appeal No. 07-03, slip opinion, page 64]. The issuance of the Johnson Memorandum on December 18, 2008, as previously**

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[41] **Also, as stated in the USEPA's documentation for the cited Delaware SIP revision, USEPA approved this SIP revision as it would assist in achieving compliance with the 8-hour ozone NAAQS. There is no evidence that USEPA approved this SIP revision as a means to address GHG emissions. This action also was not accompanied by a reasonable opportunity for the public to comment on whether it was appropriate for these rules to be approved as part of Delaware's SIP as a means to control emissions of greenhouse gases.[41] Moreover, Delaware has a "SIP approved" PSD program. As such, actions to include additional pollutants under its state-based PSD programs would necessitate rulemaking by Delaware to revise its state PSD program and SIP for the PSD Program, which has not occurred. (Incidentally, these actions would trigger thoughtful action by USEPA to consider whether to approve such provisions as part of a SIP revision.)**

[42] ***Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) the Clean Air Act,* 74 FR 18,886 (April 24, 2009). *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act,* 74 FR 66,496 (December 15, 2009)**

[43] **As explained in Footnote 29 of the Proposed Endangerment Findings, "At this time, a final positive** endangerment finding would not make the air pollutant found to cause or contribute to air pollution that endangers a regulated pollutant under the PSD program. See memorandum entitled "EPA's Interpretation of Regulations that Determine Pollutants Covered By Federal Prevention of Significant Deterioration (PSD) Permit Program" (Johnson Memorandum, December 18, 2008).
USEPA is reconsidering this memorandum and will be seeking public comment on the issues raised in it. That proceeding, not this rulemaking, would be the appropriate venue for submitting comments on the issue of whether **a final, positive endangerment finding under section 202(a) of the Clean Air Act should trigger the PSD program, and the implications of the definition of air pollutant in that endangerment finding on the PSD program."**

[44] **In re Deseret Power Electric Cooperative, PSD Permit No. PSD-OU-0002-04.00, PSD Appeal No. 07-03, Order Denying Review in Part and Remanding in Part, issued November 13, 2008**

**discussed, a formal action that was nationwide in scope interpreting the key phrase "pollutant subject to regulation under the Act," was directly responsive to the EAB's ruling in the Deseret Case.[45]**

**USEPA's Proposed Rules to Set Applicability Thresholds for GHG in the PSD Program**

**USEPA has also undertaken rulemakings that made it clear that GHGs are not currently regulated under the Clean Air Act and that it is taking steps to carefully approach possible future applicability of the PSD rules to GHG. In particular, on September 30, 2009, in a proposed "GHG Tailoring Rule,"[46] USEPA announced its intent to propose rules establishing applicability thresholds for emissions of GHG under the PSD program. USEPA took this action because it planned to adopt regulations under the Clean Air Act to control GHG emissions from light duty motor vehicles, pursuant to a rulemaking proposal signed on September 15, 2009. USEPA recognized that, absent any intervening changes to federal law by Congress, completion of that rulemaking for motor vehicles would also act to trigger Clean Air Act permitting requirements under the PSD program for GHG emissions.[47] Conversely, absent completion of that rulemaking related to emissions of GHG from motor vehicles or other comparable rulemaking that would actually entail control of emissions of GHG, emissions of GHG would not be regulated under the Clean Air Act.**

**Conclusion**

**USEPA's actions, including issuance and reconsideration of the Johnson Memorandum, its endangerment findings, its proposed federal rules for GHG emissions from certain motor vehicles, and its proposed GHG tailoring rule, which would set emissions thresholds for applicability of PSD for GHG, all indicate the USEPA's willingness to proceed in an orderly fashion to address GHG under the federal PSD program in the future. At the same time, these actions also show that GHG are not currently subject to the federal PSD program. Moreover, in conjunction with legislation to address emissions of GHG, Congress is also considering whether it should expressly prohibit regulation of GHG emissions under the PSD provisions of the Clean Air Act.[48] In this regard, USEPA Administrator Jackson stated in her confirmation hearings that it would be preferable that GHG be**

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**[45] In two other cases following its decision on Deseret Power the November 13, 2008, the EAB has remanded PSD permits to also address the interpretational issues raised in Deseret Power. (In the case of Northern Michigan University Ripley Heating Plant, PSD Appeal No. 08-02, Feb. 18, 2009, the EAB remanded the permit to allow the Michigan Department of Natural Resources (MDNR) to address these issues. In the case of Desert Rock Energy Company, PSD Appeal No. 08-03, 08-04,08-05 & 08-06), the EAB allowed USEPA Region 8, the permitting authority in the case, to voluntarily withdraw the GHG BACT portion of its permit record to address these issues on the record.) However, both these cases involved permits that were issued before USEPA's historic interpretation of the phrase "pollutant subject to regulation under the Act" was questioned by the EAB in Deseret Power and before the Johnson Memorandum firmly established USEPA's interpretation. The EAB has not ruled on this subject in any PSD permit appeal questioning the status of GHG where the record demonstrates consistency with fully established and documented USEPA interpretation, as has since been provided, in the Johnson Memorandum and confirmed by current Administrator Jackson.**

**[46] USEPA, Announcement of Proposed Rule, "Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule," Docket No. EPA-HQ-OAR-2009-0517.**

**[47] In the preamble to this proposal, USEPA states "This proposal is necessary because EPA expects soon to promulgate regulations under the Clean Air Act to control GHG emissions from light-duty motor vehicles and, as a result, trigger PSD and title V applicability requirements for GHG emissions." Pre-publication Proposal, p. 15.**

**[48] *See* the proposed American Clean Energy and Security Act of 2009 (Waxman-Markey Bill) and the proposed Clean Energy Jobs And American Power Act (Boxer-Kerry Bill).**

**regulated under a new comprehensive climate bill, rather than under the Clean Air Act. In any event, until relevant national legislation is adopted or appropriate regulatory action is taken by USEPA, the Illinois EPA is bound to follow existing law and established USEPA policy on the status of GHG under the federal PSD program.**

17. Given the threat posed by global warming and climate change, it is now more important than ever for new coal-fired facilities to implement the federal Clean Air Act's requirement to impose stringent BACT limits on GHG emissions.

**The threat posed by global warming and climate change does not provide a legal basis to set BACT limits on the GHG emissions of the proposed plant. This is because GHG are not currently regulated pollutants for purposes of the federal PSD program. In addition, the threat posed by global warming and climate is not a direct and immediate result of the GHG emissions of the proposed plant. Rather, the threat is the secondary result of national and global emissions of GHG in total. As such, absent a legal requirement that GHG emissions of the proposed plant be addressed during permitting, the threat from global warming and climate change is appropriately addressed by comprehensive laws or regulations for GHG emissions, not with case-by-case action in the permitting of a proposed project.**

**Incidentally, while this comment implies that the proposed lime plant is a "coal-fired facility," that terminology is commonly used for coal-fired power plants and large manufacturing facilities with coal-fired boilers. The proposed plant would produce lime, not energy. It would use less than 50,000 tons of solid fuel annually, which is a fraction of the usage of typical "coal-fired facilities."**

18. The EAB has repeatedly rejected refusals by USEPA and delegated states to apply BACT requirements to GHG emissions under the Clean Air Act as unsupported by any existing law or policy. In re Deseret Power Electric Coop., PSD Appeal No. 07-03, slip op. at 25 (Nov. 13, 2008); and In re Northern Michigan University Ripley Heating Plant, Slip. Op., PSD Appeal No. 08-02 (2009). The only possible conclusion is that CO2 is subject to regulation and that BACT limits are required for CO2. Illinois EPA cannot ignore these clear directives from the EAB.

**This comment misrepresents the rulings of the EAB. As already discussed, the EAB has never found that GHG are "regulated pollutants" for purposes of the federal PSD program. Rather, the EAB found that the USEPA and, in the case of Northern Michigan University, the MDNR, had not adequately supported their position that GHG were not currently regulated pollutants. The necessary support for this position was subsequently provided by the Johnson Memorandum and thereafter confirmed by other proposed USEPA rulemakings that would involve emissions of GHG.**

19. The USEPA is reassessing whether GHG are regulated under the Clean Air Act. On February 16, 2009, less than two months after the issuance of the Johnson Memorandum, the USEPA granted a petition for reconsideration of this Memorandum. (See Letter from Administrator Lisa Jackson to David Bookbinder (February 16, 2009.)[49] In agreeing to

[49] Even before Administrator Jackson agreed to reconsider the Johnson Memorandum on February 16, 2009, USEPA Region 9

revisit this Memorandum, Administrator Jackson, the current USEPA administrator, warned that PSD permitting authorities "...should not assume that the memorandum is the final word on the appropriate interpretation of Clean Air Act requirements." Instead, USEPA intends to begin rule-making in order to establish USEPA's official interpretation in the "near future." The result of that USEPA rulemaking will have a direct impact on the permit for the proposed plant. However, as shown in other comments, that rulemaking is not necessary as GHG are already subject to regulation under the Clean Air Act.

**As already discussed, the "future" USEPA rulemaking addressed by this comment, has now been completed.[50] The status of GHG under the federal PSD program is unchanged. GHG are not currently regulated pollutants for purposes of PSD. Some final action by USEPA through rulemaking to control emissions of GHG would be necessary for GHG to become regulated pollutants for purposes of PSD. Moreover, contrary to the suggestion made in this comment, even in its preamble for its formal notice of reconsideration of the Johnson Memorandum, the USEPA explained that its preferred interpretation would continue be that in the Johnson Memorandum.[51]**

20. Certain other permit applicants have begun to submit $CO_2$ BACT analyses.[52] Other permitting authorities have also issued draft permits with $CO_2$ BACT limits.[53] While these $CO_2$ analyses suffer their own flaws, they demonstrate that certain permit applicants and permitting authorities have now concluded that $CO_2$ BACT limits are a requirement of the Clean Air Act.

**The cited actions do not demonstrate that it is necessary or appropriate to set BACT for the $CO_2$ emissions of the proposed lime plant. In particular, the cited actions do not include applications submitted to or reviewed by USEPA. As the Illinois EPA is acting as an agent of USEPA to administer PSD permitting in Illinois, the Illinois EPA is bound by federal law and regulation. These currently do not provide a legal basis for permitting of CO2 emissions.**

**In addition, the actions cited by this comment do not show meaningful action by certain state permitting authorities to control emissions of $CO_2$. Rather, the cited actions propose and/or accept levels of $CO_2$ emissions that reflect the applicants' engineering plans for proposed projects as being BACT. In this regard, it is**

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petitioned the EAB for a voluntary remand of a PSD permit previously issued for the Desert Rock plant in New Mexico based on the EAB's decision in Deseret. See Notice of Partial Withdrawal of Permit, In re Desert Rock Energy Company LLC, PSD Appeal Nos. 08-03, 08-04, 08-05 and 08-06, Docket Entry No. 60 (Jan. 8, 2009)

[50] **USEPA, Proposed Rulemaking, *Prevention of Significant Deterioration (PSD): Reconsideration of Interpretation of Regulations That Determine Pollutants Covered by the Federal PSD Permit Program*, 74 FR 51,535 (October 7, 2009).**

[51] **"Of the five interpretations described in this reconsideration, the EPA continues to favor the 'actual control interpretation,' which remains in effect at this time. As explained in the following section, the actual control interpretation best reflects our past policy and practice, is in keeping with the structure and language of the statute and regulations, and best allows for the necessary coordination of approaches to controlling emissions of newly identified pollutants. While the other interpretations described herein may represent alternatives for interpreting 'subject to regulation,' no particular one is compelled by the statute, nor did the EAB determine that any one of them was so compelled. Because we have overarching concerns over the policy and practical application of each of the other interpretations, as discussed in more detail later in this notice, we are inclined to adopt the actual control interpretation as our final interpretation." 74 FR 51,539**

[52] See Addendum #2, CO2 BACT Analysis for Cash Creek Generating Station, dated December 2008; Hyperion Energy Center, Best Available Control Technology (BACT) Analysis for Emissions of Carbon Dioxide, March 2009.

[53] See Draft Statement of Basis, Russell City Energy Center (June 23, 2009), available at http://www.baaqmd.gov/Divisions/Engineering/Public-Notices-on-Permits/2009/062309-15487/Russell-City-Energy-Center/Draft-Statement-of-Basis/15487-Draft-Statement-of-Basis.aspx

**significant that this comment suggests that the cited actions in other jurisdictions are flawed and would not necessarily fulfill applicable requirements for proper determinations of BACT.**

21. With its release of proposed endangerment findings for GHG, including $CO_2$, which will trigger regulation of GHG emissions from certain motor vehicles under the Clean Air Act,[54] USEPA has now officially declared that GHG are air pollutants that "may be reasonably anticipated to endanger public health and welfare" for purposes of regulation under the Clean Air Act. This irrefutably shows that GHG emissions are subject to regulation under the Clean Air Act.

**The USEPA's endangerment findings,[55] as generally addressed by this comment, did not result in $CO_2$ or other GHG becoming regulated pollutants under the Clean Air Act. Rather, the USEPA's issuance of endangerment findings for GHG are actions by USEPA that show that GHG are not yet regulated under the Clean Air Act. The USEPA would not have to make such findings to make GHG subject to PSD if emissions of GHG were already being controlled pursuant to the Clean Air Act.**

**More importantly, the USEPA's endangerment findings for GHG do not constitute regulation of GHG under the Clean Air Act. Rather, they merely reflect formal findings by USEPA that GHG are appropriate for regulation under Title II of the Clean Air Act, which deal with control of emissions from mobile sources. To actually regulate GHG emissions, separate, further rulemaking action by USEPA pursuant to the Clean Air Act is needed to adopt rules that actually have requirements that control or "regulate" emissions of GHG from certain categories of sources.[56]**

22. $CO_2$ is a regulated pollutant under the Clean Air Act because it is actually regulated under the Act. In particular, Section 821 of the Clean Air Act Amendments of 1990 required USEPA to adopt regulations requiring certain sources, including coal-fired electric generating stations, to monitor $CO_2$ emissions and report monitored data to USEPA.[57] By requiring "regulation" of CO2 in Section 821 of the Act, Congress clearly made CO2 "subject to regulation" under the PSD program under Section 165 of the Act. Enforcement of Section 821 is accomplished through the various enforcement mechanisms in the Act, including Sections 113(a)(4) and (b)(2), 304(a)(1), and 414. USEPA subsequently adopted

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[54] USEPA, *Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 FR 18,886 (April 24, 2009).

[55] **As already discussed, USEPA Administrator Lisa Jackson has now made Final Endangerment Findings, which were issued on December 7, 2009. Challenges to these findings have been filed with the federal courts. However, to date, the USEPA's endangerment findings have not been stayed pending resolution of the appeals.**

[56] **In anticipation of completion of such rulemaking controlling emissions of $CO_2$ from certain new motor vehicles, USEPA has proposed certain revisions to the PSD program to appropriately address emissions of $CO_2$ and GHG. The proposed revisions are intended to set appropriate applicability criteria for applicability of the PSD program to proposed projects based on their potential GHG emissions or the increase in GHG emissions accompanying a proposed modification.**

[57] The United States Supreme Court has found recordkeeping and reporting requirements to constitute regulation in other contexts. Buckley v. Am. Constitutional Law Found., Inc., 525 U.S. 182, 204 (1999) (holding that compelled reporting of ballot initiative petition circulators' names was impermissible regulation of speech and association rights); Riley v. Nat'l Fed'n of the Blind, Inc., 487 U.S. 781, 798-99 (1988) (compelled reporting of professional fundraiser status is impermissible regulation of speech); Buckley v. Valeo, 424 U.S.1, 66-68 (1976) (evaluating recordkeeping, reporting, and disclosure requirements as regulation of political speech). Therefore, by requiring "regulation" of $CO_2$ in Section 821, Congress clearly made $CO_2$ "subject to regulation" for purposes of the BACT requirement of the PSD program.

the required regulations.[58, 59]

**While collection of emission data may constitute a certain form of regulation of a pollutant, it does not make $CO_2$ a regulated pollutant for purposes of the PSD program. This was addressed by the Johnson Memorandum and is confirmed by subsequent actions by the USEPA, including the Proposed Endangerment Finding and the Tailoring Rule.**

23. By adopting regulations in 1993 at 40 CFR Part 75 that require monitoring of $CO_2$ emissions, USEPA made $CO_2$ further subject to regulation under the Clean Air Act. These regulations are located in Title 40, Chapter I, Subchapter C, which makes them "regulation[s] under the Act," according to USEPA's only official interpretation. See 43 FR 26,388, 26,397 (June 19, 1978); Deseret, Slip Op. at 41 (holding that the fact that $CO_2$ is regulated by rules contained in 40 CFR Subchapter C "augurs in favor" of a conclusion that $CO_2$ is "subject to regulation under the Act," based on USEPA's official interpretation in its 1978 rulemaking).

**The provisions of 40 CFR Part 75 for monitoring and reporting of $CO_2$ emissions do not support the proposition that $CO_2$ is "regulated" under the Clean Air Act. 40 CFR Part 75 imposes certain monitoring and reporting requirements; it does not establish emission limitations. As explained in the Johnson Memorandum, for a pollutant to be considered subject to regulation for purposes of the PSD Program under the Clean Air Act, a pollutant must be subject to requirements that control or limit emissions of the pollutant. The Johnson Memorandum was issued after the EAB's decision in the Deseret case. It responded to and resolved the uncertainty that the EAB found in Deseret with respect to the USEPA's historic statements and actions with respect to the status of $CO_2$ under the PSD program.**

24. USEPA has designated the monitoring, recordkeeping, and reporting requirements in 40 CFR Part 75 for $CO_2$ emissions as applicable Clean Air Act requirements that must be incorporated into Title V operating permits. [40 CFR 70.2.] Various states, including Illinois, have included these requirements related to $CO_2$ emissions in Title V permits. USEPA has also enforced these $CO_2$ requirements under the Clean Air Act on a number of occasions.[60] Accordingly, $CO_2$ is currently subject to regulation under the Clean Air Act.

**As already discussed, the fact that certain sources are required to track and report their emissions of $CO_2$ to the USEPA does not mean that $CO_2$ emissions from those sources are "regulated," i.e., subject to requirements to control or limit their emissions of $CO_2$. This distinction between tracking of emissions of emissions and**

[58] In 1993, USEPA adopted regulations requiring monitoring of the $CO_2$ emissions of subject sources with installation, certification, operation, and maintenance of continuous emission monitoring systems or alternative methods (40 CFR 75.1(b) and 75.10(a)(3)) preparation and maintenance of monitoring plans (40 CFR 75.33), maintenance of certain records (40 CFR.75.57), and reporting of certain data to USEPA (40 CFR 75.60 – 64). Additionally, 40 CFR 75.5 requires operators of subject sources to comply with these regulations, providing that a violation of applicable requirement is a violation of the Clean Air Act.

[59] Numerous states, including Illinois, Wisconsin, Indiana, and Michigan have included $CO_2$ monitoring, record keeping, and reporting requirements in Title V permits. USEPA has also enforced these $CO_2$ monitoring regulations under the Clean Air Act on a number of occasions. It is, therefore, clear that $CO_2$ is subject to regulation under the Clean Air Act.

[60] See, e.g., In re City of Detroit, Dept. of Public Lighting, Mistersky Power Station, Docket No. Clean Air Act_05-2004-0027, Consent Agreement and Final Order ¶ 7 (May 10, 2004) and In re Indiana Mun. Power Agency, Docket No. Clean Air Act 05-2000-0016, Compl. ¶¶ 5, 14-15, 34-37.

**control of emissions is reasonable. Requiring the gathering of data for emissions of a pollutant is different from adoption of emission standards and control requirements for the pollutant. The former only entails consideration of appropriate methodology to track emissions. The latter necessitates consideration of the feasibility, reasonableness, and impacts of the emission standards or control requirements that would be adopted for the pollutant.**

25. Two GHG, $CO_2$ and methane, are also regulated as components of landfill gas. USEPA has adopted standards for municipal solid waste (MSW) landfill emissions at 40 CFR 60.33c and 60.752. "MSW landfill emissions" are defined as "gas generated by the decomposition of organic waste deposited in an MSW landfill or derived from the evolution of organic compounds in the waste." 40 CFR 60.751. USEPA has identified $CO_2$ as one of the components of the regulated "MSW landfill emissions." [61] Thus, $CO_2$ is regulated through the federal rules at 40 CFR 60 Subparts Cc and WWW. See also 56 FR 24,468 (May 30, 1991) ("Today's notice designates air emissions from MSW landfills, hereafter referred to as 'MSW landfill emissions,' as the air pollutant to be controlled").

**This comment does not demonstrate that emissions of $CO_2$ and methane have been regulated by USEPA under the Clean Air Act. In particular, in the cited federal rules for MSW landfills, USEPA has not adopted provisions that limit the amount or rate of $CO_2$ or methane emissions from MSW landfills. In these rules, the USEPA has set emission standards and control requirements for the emissions of organic compounds and hazardous air pollutants from MSW landfills. The fact that other pollutants, i.e., $CO_2$ and methane may also be present in the emissions of landfills does not mean that the emissions of those other pollutants have been regulated. Indeed, USEPA was very artful in its development of these rules to not directly regulate emissions of $CO_2$ or methane.**

**Moreover, as indicated by this comment, USEPA used a specific term, "MSW landfill emissions," to generally describe and define the pollutant that is addressed by the cited rules. Lime kilns are not MSW landfills and cannot emit MSW landfill emissions.**

26. Emissions of $CO_2$ and methane were central to USEPA's adoption of NSPS and Emission Guidelines for MSW landfills. In part, these rules were designed to control emissions of the trace amounts of non-methane organic compounds (NMOC) in landfill gas. When the USEPA adopted rules for control of landfill gas emissions, it was doing so based on its determination that the emissions contribute to global climate change. In fact, given the composition of MSW landfill emissions, these rules can best be described as limits on methane and $CO_2$ and secondarily limits on other constituents of landfill gas. (Landfill gas consists almost entirely of methane and $CO_2$, containing about 50 percent of these two GHG, and only traces of other compounds, including less than 1 percent NMOC.) In 1991, in its background technical document for these rules, USEPA observed that emissions of GHG, including methane and $CO_2$, contribute to global warming.[62] These rules include

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[61] See *Air Emissions from Municipal Solid Waste Landfills – Background Information for Final Standards and Guidelines*, USEPA, EPA-453/R-94-021, December 1995 (explaining "...MSW landfill emissions, or [landfill gas], is composed of methane, $CO_2$, and NMOC.").

[62] One of the specific justifications that USEPA articulated for adopting this NSPS (particularly at the chosen level of stringency) was to limit emissions of methane to avoid global warming impacts. See 56 FR 24468, 24481 (March 12, 1996) ("[i]n considering

numerous measures that reduce emissions of methane and $CO_2$. As the impacts of landfill gas emissions on global warming were central to these rules, emissions of methane and $CO_2$ are regulated under the Clean Air Act. Thus BACT limits are required for the GHG emissions of the proposed lime plant.

**While emissions of methane and $CO_2$ and their role in global warming were factors considered by USEPA in the adoption of the cited rules, the USEPA did not adopt emission standards for either methane or $CO_2$. Given that USEPA considered global warming during the adoption of these rules but did not adopt emission standards for either methane or $CO_2$, the cited rules confirm that USEPA has historically proceeded with specific intent not to regulate emissions of either methane or $CO_2$.[63]**

**Moreover, global warming impacts were not "central" to the adoption of the cited rules. The USEPA considered a number of aspects of MSW landfill emissions when proposing to adopt the cited rules. Most significantly, USEPA recognized the potential presence of various organic compounds with adverse effects on human health and welfare in the non-methane organic compounds emitted by landfills.[64] It also recognized the potential for odor nuisances from MSW landfill emissions.**

27. $CO_2$ is also subject to regulation under the Clean Air Act through USEPA's approval of revisions to the SIP for the State of Delaware that added various $CO_2$ regulations. 73 FR 23,101 (April 29, 2008); 40 CFR 52.420(c). This revision approved $CO_2$ emission limits and operating requirements, recordkeeping and reporting requirements, and $CO_2$ emissions certification, compliance, and enforcement obligations for new and existing stationary electric generators. Del. Admin. Code 7 1000 1144.[65] USEPA's approval was made "in accordance with the Clean Air Act," 73 FR 23,101, and by approving these provisions as part of Delaware's SIP, the USEPA made $CO_2$ "subject to regulation" under the Act, as SIPs are developed pursuant to Sections 110 and 113 of the Act and become federally enforceable upon USEPA approval. As such, the Delaware SIP approval also

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which alternative to propose as BDT, USEPA decided to consider both NMOC's and methane reductions"); 61 FR 9905 ("Briefly, specific health and welfare effects from [landfill gas] emissions are as follows...methane emissions...contribute to global climate change as a major greenhouse gas"); id. At 9914 (anticipated "methane reductions ... are also an important part of the total carbon reductions identified under the Administration's 1993 Climate Change Action Plan). USEPA further noted in the preamble to the final rule that "[c]arbon dioxide is also an important greenhouse gas contributing to climate change," and quantified the benefits of the rule based on "equivalent reduction in $CO_2$." 56 FR 24,472 (stating that "1.1 to 2.0 billion trees would need to be planted...to achieve an equivalent reduction in $CO_2$ as achieved by today's proposal").

[63] **It is also unclear what measures in the cited rules would act to directly reduce emissions of $CO_2$. Indeed, as the rules require that landfill gas be captured and processed or burned to control emissions of NMOC, the cited rules do not appear to include any measures whose effect would be to reduce a landfill's emissions of $CO_2$. The rules would appear to only indirectly act reduce emissions of $CO_2$ as landfill gas would have to be collected and might productively be used as a fuel, thereby acting to displace use of fossil fuels at other sources.**

[64] **In responding to comments on the proposed rules, USEPA explained "The pollutant to be regulated, MSW landfill emissions, or LFG, is composed of methane, CO2, and NMOC. The EPA selected NMOC as a surrogate for determination of control because NMOC includes those LFG constituents of most concern. The nature of the individual compounds commonly found in LFG and the health concerns they present are discussed in chapter 2 of the proposal BID. By controlling NMOC emissions, the non-NMOC constituents in LFG would also be controlled. By basing control on NMOC emission rates, the EPA is controlling the subset of landfills having MSW landfill emissions of greater concern. The EPA, therefore, considers the use of NMOC as a surrogate for MSW landfill emissions to be effective and appropriate."**

[65] In the appeal proceeding for Deseret Power, USEPA informed the EAB of this SIP action, thereby acknowledging its potential significance. This occurred in a letter date September 9, 2008 from Brian Doster, USEPA Office of General Counsel, to Erika Durr, EAB. "...Office of General Counsel... believe that it is incumbent on them, in recognition of a duty of candor, to inform the Board of a recent action by the Agency... EPA Region 3 issued a final approval of a Delaware State Implementation Plan (SIP) revision incorporating state regulations which include specific limitations on the rate of several pollutants, including CO2..."

demonstrates that $CO_2$ is subject to regulation under the Clean Air Act for purposes of triggering the BACT requirements.

**This comment does not demonstrate that $CO_2$ is a regulated pollutant for purposes of the PSD program in Illinois, much less in Delaware. In particular, the Johnson Memorandum rejects the position put forth in this comment. It recognizes differences between SIP regulations under the Clean Air Act, which derive from principles of cooperative federalism, and national regulations, which generally apply in all states and are developed through USEPA rulemaking.[66] Based on this distinction, USEPA does not consider pollutants that are only regulated by individual state SIPs to be pollutants subject to regulation under the Clean Air Act for purposes of the PSD program.[67] This comment does not address this obvious difference in the nature of SIP revisions and emission standards adopted by USEPA, much less support its proposition that coincidental action by USEPA in approving a SIP submittal is sufficient to create a "regulated air pollutant" as a matter of national law.**

**The actions by USEPA cited in these comments also do not demonstrate thoughtful action by USEPA to treat $CO_2$ as a regulated pollutant for purposes of PSD, so as to rebut the recent direct action by Administrator Johnson of the USEPA. As stated in the USEPA's documentation for the cited Delaware SIP revision, USEPA approved this SIP revision as it would assist in achieving compliance with the 8-hour ozone NAAQS. There is no evidence that USEPA approved this SIP revision as a means to address emissions of greenhouse gases. This action also was not accompanied by a reasonable opportunity for the public to comment on whether it was appropriate for these rules to be approved as part of Delaware's SIP as a means to control emissions of greenhouse gases.[68] Moreover, Delaware has a "SIP approved" PSD program. As such, actions to include additional pollutants under its state-based PSD programs would necessitate rulemaking by Delaware to revise its state PSD program and SIP for the PSD Program, which has not occurred. (Incidentally, these actions would trigger thoughtful action by USEPA to consider whether to approve such provisions**

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[66] In general, USEPA's approval of provisions in State SIPs is a different legal process from the direct adoption of standards by USEPA under its independent authority under the Clean Air Act. The USEPA's approval of the provisions in State SIPs is a mechanism whereby USEPA formally reviews the adequacy of state rules and other measures that have been adopted by individual states to fulfill their obligations under the Clean Air Act. As particular state provisions are found adequate, they are approved by USEPA. If the approved state measure is one that is appropriate for enforcement, such as an emission standard, USEPA's approval of the measure as part of the state's SIP also allows for enforcement of the measure by USEPA under federal law. This is different from the regulatory process whereby USEPA unilaterally adopts National Ambient Air Quality Standards or federal New Source Performance Standards for various pollutants under its direct authority under the Clean Air Act. It is this latter form of regulation that creates or defines the scope of pollutants that are "subject to regulation" for purposes of the PSD program.

[67] USEPA confirmed its position on this matter through the Administrator's decision in Louisville Gas & Electric, on August 12, 2009. That decision also rejected the proposition in this comment that USEPA action on a state's SIP is sufficient to make a pollutant into a regulated pollutant for purposes of the federal PSD program.

[68] The notice for the USEPA's proposed approval of Delaware Regulation No. 1144 makes no mention, and thus did not provide any notice that certain emission standards for $CO_2$ were included in Regulation No. 1144. The notice for this approval (73 FR 11845, March 5, 2008) indicates that the subject of the regulations is emissions that contribute to ambient levels of ozone and particulate matter. "EPA is proposing to approve the Delaware SIP revision for Regulation No. 1144—Control of Stationary Generator Emissions submitted on November 1, 2007. This regulation will help ensure that the air emissions from new and existing stationary generators do not cause or contribute to the existing air quality problems with regard to ground-level ozone and fine particulate matter, thereby adversely impacting public health, safety and welfare. EPA is soliciting public comments on the issues discussed in this document. These comments will be considered before taking final action."

**as part of a SIP revision.) Finally, even if USEPA inadvertently created a pollutant for purposes of PSD, this action would be restricted to the State of Delaware, as it occurred in the context of approval of Delaware's SIP.**

28. Current USEPA Administrator Lisa Jackson has warned that "PSD permitting authorities should not assume that the Johnson Memorandum is the final word on the appropriate interpretation of Clean Air Act requirements." Instead, USEPA intends to begin notice-and-comment rule-making in order to establish USEPA's official interpretation in the "near future."

**While the Johnson Memorandum may not have been the final interpretation of the term "regulated pollutant" while this Memorandum was being reconsidered by USEPA, it was nevertheless the governing interpretation of the term "regulated pollutant." As such, the Illinois EPA had to carry out the permitting of the proposed plant based on that interpretation. This is because the Illinois EPA administers the federal PSD program in Illinois in a delegated capacity, effectively standing in the shoes of USEPA.**

**Moreover, contrary to the suggestion in this comment, reconsideration of the Johnson Memorandum, did not act to directly stay or reverse the Johnson Memorandum. Indeed, on February 18, 2009, when announcing that she had granted a petition for reconsideration of the Johnson Memorandum, Administrator Jackson expressly declined to stay the effect or validity of the Memorandum. Therefore, during the period in which the USEPA was reconsidering the Johnson Memorandum, the Memorandum was controlling and USEPA and states continued to apply it.**[69, 70]

29. The Johnson Memorandum will almost certainly be reversed by the courts or withdrawn by the USEPA under the leadership of Administrator Jackson. The Illinois EPA should not and cannot rely upon this Memorandum.

**As explained above, the Illinois EPA must carry out the permitting of the proposed plant based on the USEPA's current interpretation of the term "regulated pollutant," as was set forth in the Johnson Memorandum. As a legal matter, the Illinois EPA cannot rely on predictions or assumptions about future USEPA actions that would change this interpretation. And, in fact, in its reconsideration of the Johnson Memorandum, the USEPA confirmed the principles originally laid out by Administrator Johnson.**

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**[69] In the Administrator's decision in the case of *In re Louisville Gas & Electric,* Pet. No. IV-2008-3 (Administrator, August 12, 2009), the Johnson Memorandum was cited as a basis for refusing a request that the permit for a proposed new facility be remanded to include BACT limits for $CO_2$. The case involves a combined construction and operating permit for a proposed 750 MW coal fired generating unit. Administrator Jackson refused to review the permit with respect to $CO_2$ citing the Johnson Memorandum, as well as the EAB decision in *In re: Deseret Power Cooperative,* 14 E.A.D.___, PSD Appeal No. 07-03 (EAB, Nov. 13, 2008), finding that $CO_2$ was not currently regulated under the Clean Air Act.**

**[70] On July 7, 2009, in *Longleaf Energy v. Friends of the Chattahoochee,* the Georgia Court of Appeals held that neither the Clean Air Act nor Georgia State law "regulate" $CO_2$ such that a $CO_2$ emission limitation was required in the permit. Ga. Ct. App., No. A09A0387. In reaching its decision, the Georgia Court considered the USEPA's proposed endangerment findings and that Congress is considering $CO_2$ emission caps as part of the American Clean Energy and Security Act. Therefore, the court stated that to require emission limits for $CO_2$in a PSD permit now "would preempt ongoing Congressional and EPA efforts to formulate a $CO_2$ emissions policy for all the states, and require the [Georgia Environmental Protection Division] to invent in a vacuum $CO_2$ emission controls for permits." According to the Court, this would result "in a flood of litigation over permits, and impose far-reaching economic hardship on the State."**

**Moreover, this comment does not include any factual support for the claim that the Johnson Memorandum will be overturned by the courts. The actions of USEPA, under the leadership of Administrator Jackson, demonstrate the intent to commence regulation of $CO_2$ under the Clean Air Act in the future in an orderly and intentional manner, in a way that is legally sound and defensible, by adoption of regulations for $CO_2$ emissions.**

30. Congress' 2008 appropriations legislation demonstrates that $CO_2$ is currently regulated under the Clean Air Act. In its Fiscal Year 2008 Consolidated Appropriations Act, Congress specifically required USEPA to undertake rulemaking to establish monitoring and reporting requirements for all GHG (including CO2), economy wide. H.R. 2764; Public Law 110–161, at 285 (enacted Dec. 26, 2007). Congress made clear that USEPA is "to use its existing authority under the Clean Air Act" including "existing reporting requirements for electric generating units under section 821 of the Clean Air Act" in adopting these regulations.[71] This action by Congress not only confirms that Section 821 is part of the Clean Air Act, but also establishes a separate and distinct statutory obligation to regulate $CO_2$ through mandatory emission monitoring requirements under the Act. In fact, the USEPA's regulatory obligations under the Appropriations Act are much broader than its duties under Section 821 as the Appropriations Act requires economy wide reporting.

**The action by Congress cited in this comment does not demonstrate that emissions of $CO_2$ are currently regulated pollutants for purposes of the Clean Air Act and the federal PSD program. Collection of $CO_2$ emission data from certain sources was already occurring pursuant to Section 821 of the Clean Air Act. The cited action by Congress merely expands the range of sources from which such data would be collected.[72, 73] In addition, if $CO_2$ were already being regulated, as also argued by this commenter, the cited action by Congress would have been unnecessary. Sources of $CO_2$ emission would already be subject to permitting and requirements for reporting of emission data under the Clean Air Act. Congress would merely have had to instruct USEPA to carry out the current Clean Air Act, without instructing it to adopt additional regulations for collections of $CO_2$ emission data.[74]**

31. On July 8, 2009, USEPA issued its acceptance pursuant to Section 209(b) of the Clean Air Act of the adoption by numerous states and air quality districts of the "California

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[71] Conference Report for the Consolidated Appropriations Act, at 1254. available at http://www.epa.gov/climatechange/emissions/ghgrulemaking.html

[72] **USEPA has completed its adoption of a rule for reporting of data for emissions GHG, commonly known as the "GHG Reporting Rule," as mandated by Congress. 74 FR 51535 (October 30, 2009). In the preamble to this rulemaking, USEPA explains that the reported data will inform decisions about whether and how to adopt emission standards under Section 111 of the Clean Air Act to control GHG emissions from certain categories of sources. USEPA also explains that its rulemaking for collection of emission data should not be considered to indicate that USEPA has made final decisions on matters addressed by other rulemakings related to GHG emissions, including its reconsideration of the Johnson Memorandum.**

[73] **Given the nature of this rule and its origin in a congressional mandate, it is unlikely that this rule will be successfully challenged and struck down by the courts. Thus, as a matter of federal law, when the proposed plant begins operation, Vulcan will be required to report actual GHG emissions to USEPA in accordance with applicable provisions of this rule.**

[74] **As the GHG Reporting Rule will require operators of lime manufacturing plants to submit data for GHG emissions, which they are not currently required to do, this rule will collect information that may be useful in regulating emissions of GHG from lime plants. It will also assemble information on actual GHG emissions, which is not currently available, that could be useful in the future in setting numerical limits for the GHG emissions from proposed major projects at lime plants.**

Standards" for certain motor vehicles.[75, 76] The California Standards include limits for four GHG ($CO_2$, $N_2O$, methane, and hydrofluorocarbons). While USEPA elected not to address whether its decision resulted in these GHG being "subject to regulation" under the Act for purposes of PSD and left that decision to another forum (see 74 FR 32,783), this is that other forum. There is no other interpretation of USEPA's decision but that it resulted in the four subject GHG being regulated under the Act and subject to PSD permitting. Therefore, emissions of each of these four GHG, in any amount, from the proposed plant requires a BACT limit.

**This comment does not show that certain GHG are regulated under the Clean Air Act. It presumes an action by USEPA has occurred with respect to emissions of GHG that USEPA explicitly states in the cited rulemaking on the California Standards did not occur. The comment does not provide any further insight on this matter. Certainly, it does not show that the permitting of the Vulcan lime plant is that "other forum" referred to by USEPA. Such a position is not supportable as this action involves permitting of a particular project, not general rulemaking by USEPA directly addressing the status of GHG under the PSD program. Moreover, there are "other forums" involving general rulemaking by USEPA, notably the proposed Tailoring Rule and the Reconsideration of the Johnson Memorandum, in which the status of GHG under the PSD program is being directly addressed by USEPA. As such, USEPA's action by with respect to the California Standards, as cited by this comment, serves to further confirm that emissions of GHG are not currently regulated pollutants for purposes of the PSD program under the Clean Air Act.**

32. $CO_2$ and other GHG are also subject to regulation under the Clean Air Act because "subject to regulation" means "capable of being regulated" and is not limited to pollutants that are "currently regulated." Federal regulations define "regulated NSR pollutants" to include not only air pollutants for which there are NAAQS under Section 109 of the Act, standards of performance for new sources under Section 111 of the Act, or standards under or established by Title VI of the Act (relating to acid deposition control), but also "[a]ny pollutant that is otherwise subject to regulation under the Act." 40 CFR 52.21(b)(50).

**The term "subject to regulation" does not mean "capable of being regulated." This would be a ridiculous interpretation of the term "subject to regulation" This is because all manner of substances are capable of being regulated, i.e., being made subject to limits. It also lacks any linkage to the potential occurrence of deleterious**

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[75] 74 FR 32,744 (July 8, 2009);
http://yosemite.epa.gov/opa/admpress.nsf/bd4379a92ceceeac8525735900400c27/5e448236de5fb369852575e500568e1b%21OpenDocument;http://www.arb.ca.gov/cc/ccms/ccms.htm; http://www.ensnewswire.com/ens/jun2009/2009-06-30-01.asp

[76] Section 209(b) of the Clean Air Act:

"(b)(1) The Administrator shall, after notice and opportunity for public hearing, waive application of this section to any State which has adopted standards (other than crankcase emission standards) for the control of emissions from new motor vehicles or new motor vehicle engines prior to March 30, 1966, if the State determines that the State standards will be, in the aggregate, at least as protective of public health and welfare as applicable Federal standards. No such waiver shall be granted if the Administrator finds that—

(A) the determination of the State is arbitrary and capricious,

(B) such State does not need such State standards to meet compelling and extraordinary conditions, or

(C) such State standards and accompanying enforcement procedures are not consistent with section 202(a) of this part.

(2) If each State standard is at least as stringent as the comparable applicable Federal standard, such State standard shall be deemed to be at least as protective of health and welfare as such Federal standards for purposes of paragraph (1).

(3) In the case of any new motor vehicle or new motor vehicle engine to which State standards apply pursuant to a waiver granted under paragraph (1), compliance with such State standards shall be treated as compliance with applicable Federal standards for purposes of this title."

**or polluting effects from the emissions of a substance. As is clear from the cited definition of regulated NSR pollutant, the term "regulated" means actually subject to requirement that limit or control emissions of a pollutant, not the hypothetical possibility of regulation.**

33. Because BACT requirements extend to pollutants that are "subject to regulation under the Act" rather than to only those that are actually regulated, the Illinois EPA need not and, in fact, cannot wait until the USEPA actually adopts further regulations. Instead, the Illinois EPA must include GHG BACT limits for the proposed plant. Given the adverse impacts of GHG emissions, and the widely acknowledged need to reduce and control GHG emissions, it would be nonsensical to let a major new source of GHGs to slip in under the wire and avoid regulation.

**This comment does not provide a legal basis for the construction permit issued for the proposed plant to establish BACT for the GHG emissions of the plant. If GHG are not currently regulated pollutants for purposes of the PSD program, as this comment implicitly acknowledges, there is not a legal basis to treat GHG as regulated pollutants in the permit being issued for the proposed plant.**

**At the same time, this does not mean that the GHG emissions of the proposed plant will be shielded from and avoid such regulations. When regulations are adopted that address the GHG emissions of lime manufacturing plants, the proposed plant will be subject to the requirements of those regulations like other lime plants.**

34. The USEPA's Proposed Endangerment Findings irrefutably shows that GHG are subject to regulation under the Clean Air Act. The Proposed Endangerment Findings conclude that GHG in the atmosphere threaten public health and welfare of current and future generations and that GHG emissions from motor vehicles contribute to the atmospheric concentrations of GHG and hence to the threat of climate change. Once these findings are finalized, the USEPA is legally required to regulate GHG emissions from motor vehicles pursuant to Section 202 of the Clean Air Act, which requires the USEPA to adopt standards for motor vehicles for emissions of pollutants that endanger public health or welfare. The USEPA is also engaged in rulemaking to adopt such standards for GHG emissions from motor vehicles. Thus, not only are GHG clearly subject to regulation, the regulatory process is in motion to further regulate GHG under the Clean Air Act.

**The comment again points to USEPA's Endangerment Findings to argue that GHG are currently regulated pollutants under the Clean Air Act. However, as also observed by the comment, Endangerment Findings by themselves do not make regulated pollutants for purposes of the PSD program. In its preamble to this proposed rulemaking, USEPA specifically explained that Final Endangerment Findings, if adopted, would not mean that GHG are "regulated pollutants" under the PSD Program. Instead USEPA pointed to its reconsideration of the Johnson Memorandum as the regulatory forum in which the applicability of the PSD program to GHG was specifically being considered.**[77]

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[77] **"At this time, a final positive endangerment finding would not make the air pollutant found to cause or contribute to air pollution that endangers a regulated pollutant under the Clean Air Act's Prevention of Significant Deterioration (PSD) program. See memorandum entitled 'EPA's Interpretation of Regulations that Determine Pollutants Covered By Federal Prevention of Significant Deterioration (PSD) Permit Program' (Dec. 18, 2008). EPA is reconsidering this Memorandum**

**Accordingly, this comment merely confirms that certain USEPA rulemakings are underway that, if adopted as proposed, would result in GHG becoming a regulated pollutant for purposes of the PSD program in the future. While the USEPA's Endangerment Findings indicate that GHG should be regulated, they do not result in GHG being regulated. An effective Final Endangerment Finding is only a prerequisite to adoption of standards for GHG emissions from motor vehicles under Title II of the Clean Air Act. It is the future adoption and effectiveness of those standards for GHG emissions from motor vehicles that is expected to result in emissions of GHG being regulated under the federal PSD program.**

35. In addition to being required to set BACT limits for GHG emissions from the proposed plant, the Illinois EPA is authorized to take steps to avoid or minimize such emissions, including the authority to set limits for GHG emissions and/or require offsets for GHG emissions. One source of such authority is Section 165(a) (2) of the Clean Air Act. It gives a PSD permitting authority broad discretion to impose permit conditions that go beyond the basic requirements of BACT in order to protect air quality.[78] Under this authority, the Illinois EPA should consider such additional permit conditions on its own initiative.

**This comment does not demonstrate that the permit for the proposed plant should address GHG emissions. While a PSD permitting authority may have authority to impose conditions in a PSD permit to protect air quality, that authority is used to address emissions of regulated pollutants for which air quality standards have been set or regulations have been adopted requiring control of emissions. Moreover, that authority is used in circumstances where there is a more direct linkage between the emissions of a pollutant and air quality than is currently present with GHG emissions. Comments have not been submitted that show that the presence in the atmosphere of GHG emissions from the proposed plant directly constitutes a threat to air quality. Rather the plant's emissions of GHG would be an indirect threat to the environment, as they contribute to global warming and climate change. In this regard, emissions of GHG are similar to the emissions of the acidic precursors that contribute to acid rain and the emissions of ozone depleting substances that contribute to depletion of stratospheric ozone. In both cases, the environmental problem posed by emissions of these pollutants were addressed by comprehensive regulations for control of the precursor pollutants, not by case-by-case actions on permit applications, independent of other authority to regulate emissions of the relevant precursor pollutant.**

**Incidentally, Section 165(a)(2) of the Clean Air Act does not actually provide the authority or act in the manner indicated by this comment. This provision of the Clean Air Act addresses the procedural steps that must take place before a PSD permit may be issued. The ability of permitting authorities to include conditions in federal PSD permits and the nature and extent of such authority has been established through USEPA policy and review of permits by the EAB upon appeal. As related to**

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**and will be seeking public comment on the issues raised in it. That proceeding, not this rulemaking, would be the appropriate venue for submitting comments on the issue of whether a final, positive endangerment finding under section 202(a) of the Act should trigger the PSD program, and the implications of the definition of air pollutant in that endangerment finding on the PSD program." 74 FR 18,905.**

[78] Refer to In re Prairie State Generating Co., PSD Appeal No. 05-05, slip op. at 40 (EAB. 2006), quoting NSR Manual at page B.13.

**alternatives to a proposed project, Section 165(a)(2) only provides that a permitting authority must accept public comments that address alternatives to the proposed project and, presumably, appropriately respond to those comments.**

36. Section 169(3) of the Clean Air Act authorizes a permitting authority to take steps to protect air quality that go beyond the requirements of BACT. A PSD permitting authority also has the obligation under Section 165(a)(2) to consider and respond to relevant public comments on alternatives to the proposed source. ," The USEPA has also found that a "PSD permitting authority has discretion under the Clean Air Act to modify the PSD permit based on comments raising alternatives or other appropriate considerations." Brief of the USEPA, Office of Air and Radiation and Region V, In re Prairie State, PSD Appeal 05-05, 12 E.A.D. 176 (EAB, Aug. 24, 2006). Here, these comments expressly require Illinois EPA to fulfill this duty. Moreover, the EAB has made clear that a permitting authority has discretion to modify a permit based on consideration of "alternatives," whether or not commenters raise the issues

> Indeed, the permit authority is not required to wait until an "alternative" is suggested in the public comments before it may exercise the discretion to consider the alternative. Instead, the permitting authority may identify an alternative on its own. This interpretation of the authority conferred by Clean Air Act Section 165(a)(2)'s reference to "alternatives" is consistent with the USEPA's longstanding policy that "...this is an aspect of the PSD permitting process in which states have the discretion to engage in a broader analysis if they so desire."
> See In re Prairie State, PSD Appeal 05-05 (Aug. 24, 2006) (quoting the NSR Manual at B.13).

Accordingly, the Illinois EPA can engage in a wide-ranging exploration of options. It also has the discretion to require specific evaluation and control of $CO_2$ emissions, and/or to require other action to mitigate potential global warming impacts. Failure to do so in this case would be a material breach of the Illinois EPAs obligations.

To date, there has been no specific assessment of available measures or options to reduce the expected GHG emissions from the proposed plant. The Illinois EPA must consider and could require any number of possible actions to address the $CO_2$ footprint of the proposed plant. Options include requiring construction of a more efficient plant, use of biomass fuel, use of a less polluting fuel to run plant processes, and requiring the purchase of CO2 offsets, or some combination of these approaches or others. Offsets can be an essential component of reducing $CO_2$ emissions because they can be implemented quickly for a relatively low cost, such as programs to increase the energy efficiency in buildings, factories or transportation, generating electricity from renewable energy sources like wind or solar, shutting down older and less efficient power plants, and capturing $CO_2$ in forests and agricultural soils. An advantage of offsets is that they often result in other environmental, social, and economic co-benefits such as reductions in emissions of other pollutants, restoration of degraded lands, improvement in watersheds and water quality, and creation of jobs and lower prices for electricity and gasoline.

**The Illinois EPA has appropriately considered the "new" suggestions made by this comment as suggested alternatives for the proposed plant. Further consideration of the use biomass fuel is not needed, as it has already been considered in response to a**

**comment suggesting that biomass fuel should be required as BACT. It was determined to be infeasible given the size and circumstances of the proposed plant. Use of lower emitting fuels has also already been considered in response to a comment related to the BACT analysis.**

**With regard to the efficiency of the plant, it should be assumed that the plant will be designed with equipment and features that can be safely operated and provide an appropriate balance of capital cost, operating cost, reliability, and efficiency, as would be present with the design of a major new manufacturing plant. As the plant would have multiple systems that must operate together in an integrated manner and efficiency would only be one factor in the design of the plant, it should not be expected that an independent evaluation of the design of the plant would be able to identify a more efficient design that would satisfy other needs that must be met by the design of the plant.[79]**

**With regard to purchase of $CO_2$ offsets, given that $CO_2$ is not currently a regulated pollutant for purposes of the federal PSD program, it would not be appropriate to impose a requirement on the proposed plant whose principal justification would be to control emissions of $CO_2$. In addition, requiring $CO_2$ offsets would be contrary to the "rule-of-law." The mechanisms and institutions that might be used to obtain $CO_2$ offsets are in their infancy. It is also only possible to speculate on the cost of such offsets over time, particularly as control programs are adopted for $CO_2$ emissions that could compete for such offsets. Lastly, if $CO_2$ offsets are required of the proposed plant, considerations of equity under the rule of law would argue that existing sources with similar levels of $CO_2$ emissions should also be required to provide $CO_2$ offsets to mitigate the effects of their emissions. However, this cannot occur without regulatory adoption of a control program for $CO_2$ emissions.[80]**

**The "combination" of the options suggested by this comment would not avoid the difficulties posed by the individual options, and could act to compound them. As such, combinations of options also cannot be justified.**

37. Under Section 165(a)(2) of the Clean Air Act, the Illinois EPA must consider the "no-build" option, where the permit would be denied based on considerations related to emissions of $CO_2$ and other pollutants.

**In response to this comment, which succinctly observes that one alternative to the proposed plant is not building a plant at all, the Illinois EPA has considered the "no-build" option. The Illinois EPA can readily respond to and reject this alternative.**

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**[79] In this regard, the design of the proposed plant should not be compared to the selection process that might be followed by an individual for purchase of a new refrigerator or other appliance. That is a far simpler process as that individual is picking from a limited number of models of a particular type of unit that generally meet his or her needs. Considering the suitable units, the individual must then only make a decision balancing initial cost against energy efficiency and future operating costs. Moreover, the relevant information to make this evaluation is readily available from the price tag and the energy information posted on the unit. The individual is not seeking bids from multiple potential suppliers for multiple pieces of equipment to design and fabricate the various units that would be part of an integrated chemical processing facility, like the proposed plant.**

**[80] The Illinois Public Utilities Act may also be relevant as it provides a statement of the State of Illinois' policy with respect to requirements for $CO_2$ offsets. That is, these measures should be encouraged by the State of Illinois but should not be mandated at this time. This is a sound approach to the proposed plant until a regulatory program is appropriately adopted that would address the plant's $CO_2$ emissions as well as the $CO_2$ emissions of other similar plants.**

**The potential benefits for Illinois from the plant would be blocked if the permit were denied, as it would effectively block further effort to develop the plant. If the plant is built, it would support the economy of Kankakee County and Illinois generally, as it would provide jobs, purchase equipment and services, and pay taxes. The plant would produce dolomitic lime, adding to Illinois' local supply of this useful commodity. It would produce this lime from Illinois limestone, taking advantage of a mineral resource in the state. Reliable and affordable supplies of dolomitic lime are important to the economic well-being of industry, notably the steel industry, in Illinois and neighboring Indiana. As a practical matter, it also should be assumed that the proposed kiln would only resume operation if there is a reasonable expectation that there would actually be a market or demand for the lime produced by the plant.**

**As related to its environmental impacts, the proposed plant must be constructed and operated to comply with all applicable environmental regulations. This would include any changes to the operation of the plant as needed to comply with future laws and rules that are adopted that address emissions of $CO_2$ and other GHG. Finally, while blocking the continued development of the proposed plant would "eliminate" its potential GHG emissions, it would do nothing to reduce actual GHG emissions from existing lime kilns that currently supply the market for dolomitic lime.**

38. Even assuming that Illinois EPA could lawfully issue a PSD permit for the proposed plant without setting BACT limits for GHG, the Illinois EPA has the authority and duty under Section 165 of the Clean Air Act to limit GHG emissions of the proposed plant, and require all available measures and technologies to reduce its GHG emissions, measures to offset its GHG emissions, and any other appropriate alternatives and options in order to minimize the plant's GHG emissions.

**This comment does not demonstrate that the federal PSD program, as established in part pursuant to Section 165 of the Clean Air Act, currently provides any legal basis or authority to set any requirements in a PSD permit for emissions of GHG. As already discussed, GHG are not currently regulated pollutants for purposes of the federal PSD program.**

39. $CO_2$ is currently subject to regulation under the Clean Air Act because 35 IAC 201.141 prohibits emissions that cause "air pollution."[81] Anthropomorphic emissions of $CO_2$ are causing global warming, a form of air pollution, and will continue to do so until abated. 35 IAC 201.141 is directly enforceable and does not require pollutant-specific standards or rules to be adopted first. See e.g., Fleishmann Malting Co. v. Ill. Pollution Control Bd., 329 N.E.2d 282, 285 (Ct. App. 5th Dist. 1975) (and collected cases). As uncontrolled $CO_2$ emissions cause air pollution, they are prohibited by 35 IAC 201.141, to the extent they contribute to air pollution through global warming. This rule is included in Illinois' SIP (40 CFR Part 52, Subpart O). Accordingly, $CO_2$ is subject to regulation under the Clean Air Act and a BACT limit is required before a PSD permit can be issued for the proposed plant.

[81] As defined by 35 IAC 201.102, "Air pollution" is "the presence in the atmosphere of one or more air contaminants in sufficient quantities and of such characteristics and duration as to be injurious to human, plant, or animal life, to health."

**The proposition argued in the comment is flawed. 35 IAC 201.141 does not impose an independent obligation under state law to address $CO_2$ emissions under the PSD program. Rather, this rule is a general prohibition. It prohibits certain actions by sources but it does not require control of or set emission standards for any particular pollutants. It does not provide legal authority for the Illinois EPA to control or restrict $CO_2$ emissions of the proposed plant during permitting.**

40. The Illinois EPA cannot issue this permit without requiring mitigation of the emissions of GHG because it would allow the proposed plant to emit $CO_2$, $N_2O$ and other GHG in such quantities that would cause or tend to cause air pollution. This would be contrary to 35 IAC 201.141, which provides that "[N]o person shall cause or threaten or allow the discharge or emission of any contaminant into the environment in any State so as, either alone or in combination with other sources, to cause or tend to cause air pollution in Illinois."

**This comment does not show that a permit should not be issued for the proposed plant without mitigating its GHG emissions. The proposition put forth in this comment is flawed in several respects. First, the statutory framework for "air pollution," as cited by the comment, is geared towards enforcement, not regulation.[82] The language of both the statute and regulation is that of prohibition, whose redress would normally be found in an injunction or other equitable remedy before a court. It is not language that creates enabling authority through which the Illinois EPA could lawfully seek to "mitigate" or regulate the impacts of $CO_2$ emissions during permitting. Moreover, the concept of a statutory prohibition does not lend itself to partial restraints. That is, the offending conduct is to be prohibited, not mitigated or sanctioned. Given the absence of any technology to completely eliminate $CO_2$ emissions from lime kilns, it is not clear how the remaining amounts of $CO_2$ that this comment would allow from the plant could be judged any less harmful or offending to society if, as alleged, $CO_2$ emissions are broadly deemed a form of "air pollution." Finally, to the extent that this comment would have the Illinois EPA itself constrained through such a prohibition, the premise is also misplaced. State courts have rejected the notion that the Illinois EPA is subject to enforcement when acting in its established role as a permitting authority.**

**The argument advanced by the comment also fails to satisfy principles of "fundamental proof." A complainant seeking to enforce a right conferred by statute is generally required to prove both causation and injury. In the scientific community, as well as among public policy-makers, the notion of cause and effect is relative. However, in a courtroom, causation takes on a rigorous meaning, that is both highly demanding and structured. Generally speaking, factual causation is shown when a reasonable certainty exists that the alleged conduct caused an injury. Mere**

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[82] **"Air pollution" is defined by Illinois law, in Section 3.115 of Illinois' Environmental Protection Act, is the "presence in the atmosphere of one or more contaminants in sufficient quantities and of such characteristics and duration as to be injurious to human health, plant, or animal life, to health, or to property, or to unreasonably interfere with the enjoyment of life or property." As with nuisance law, the statutory definition contemplates an activity that creates such injury or unreasonable consequences that the law will presume damage and provide redress. Notably, the statute refers to the definition in the general air pollution prohibition that is found in Section 9(a) of the Act. The definition of air pollution adopted by the Pollution Control Board at 35 IAC 201.102 , which this commenter cites, is nearly identical.**

**conjecture or speculation of causation is not enough. Similarly, the alleged injury must be amenable to proof, not merely contingent, remote or prospective. A speculative possibility of an injury does not satisfy this element. Given the difficulties in assessing the extent of global warming, not to mention assigning responsibility for harm to individual sources of $CO_2$ emission, the enforcement approach to regulating $CO_2$ emissions recommended by the commenter is clearly ill-advised.**

**Finally, treating $CO_2$ emissions as a regulated air pollutant under Illinois law would be wholly unconventional. $CO_2$ is a compound that is present in the earth's atmosphere, occurring both naturally and as a product of fossil fuel combustion. $CO_2$ in the atmosphere has not been commonly regarded as an air "pollutant." Indeed, the ecosphere depends upon the presence of $CO_2$ emissions to support green plants. Historically, $CO_2$ in the ambient atmosphere has not been considered harmful to humans or the environment. While the statutory definition of air contaminant in Section 3.165 of the Environmental Protection Act is broad, citing to "any solid, liquid, or gaseous matter... or form of energy, from whatever source..." and $CO_2$ would seem to fall within the meaning of the term, it should not be presumed that courts would conclude that CO2 emitted by any given source would constitute air pollution. Courts are reluctant to construe language literally when it would defeat the purpose or intent of the law, leading to an outcome that was not contemplated by the legislature.[83]**

41. The GHG emissions from the proposed plant will cause air pollution as defined by Illinois' rule.[84] Accordingly, because 35 IAC 201.141 is part of Illinois' State Implementation Plan (SIP), Section 165(a)(3)(C) of the Clean Air Act provide that a PSD permit cannot be issued for the plant unless and until Vulcan demonstrates that emissions from the plant will not cause or contribute to air pollution in violation of 35 IAC 201.141.

**The nature and effect of 35 IAC 201.141, as discussed above, is not changed by the fact that this state rule is part of Illinois' SIP. At a minimum, this is because 35 IAC 201.141 is neither an applicable emission standard nor a standard of performance for purposes of the Clean Air Act, as are specifically addressed by Section 165(a)(3)(C) of the Act.**

42. The Intergovernmental Panel on Climate Change (IPCC) has found that due to emissions of GHG, principally $CO_2$, from human activity, the concentrations of GHG in the atmosphere are at unprecedented levels.[35] The global concentration of $CO_2$ has increased from a pre-industrial value of about 280 to about 380 ppm in 2005. This exceeds by far the historical range over the last 650,000 years (180 to 300 ppm $CO_2$).[85] In the absence of

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**[83] Interestingly, Professor Currie, widely known as the principal draftsman of Illinois' Environmental Protection Act, expressed concerns about reading too much into certain elements of the definition of air pollution. In a 1976 law review article, Professor Currie remarked: "To seize upon broad definitional language of modest purpose to expand state regulation into areas not traditionally thought of as pollution smacks too much of invading the province of the legislature." See Enforcement Under the Illinois Pollution Law, Northwestern University Law Review, Vol. 70, No. 3 (July-August 1976).**

**[84] As defined by 35 IAC 201.102, air pollution means "the presence in the atmosphere of one or more air contaminants in sufficient quantities and of such characteristics and duration as to be injurious to human, plant or animal life, to health, or to property, or to unreasonably interfere with the enjoyment of life or property."**

[85] IPCC Working Group I, Climate Change 2007: The Physical Science Basis, Summary for Policymakers at ES-2 .

corrective action, the rates of $CO_2$ emissions continue to rise.[86] According to a prominent expert, "The world is already at or above the worst case scenarios.... In terms of emissions, the earth is moving past the most pessimistic estimates of the IPCC and by some assessments is above that red line."[87] In light of these findings, climate experts urge immediate action to curtail emissions of $CO_2$ and other GHG.[88] Rajendra Pachauri of the IPCC asserts "If there is no action before 2012, that's too late.... What we do in the next two to three years will determine our future. This is the defining moment."[89]

**While these comments describe the serious nature of global warming and climate change as caused by anthropogenic GHG emissions, global warming and climate change do not provide a legal basis to address GHG emissions in the permit for the proposed plant. This is because GHG are not currently regulated pollutants under the Clean Air Act, as previously discussed. Moreover, these general concerns about global warming and climate change do not translate into specific effects for which the proposed plant can or should be held accountable as a legal matter. This is because global warming and associated climate change are the result of the overall anthropogenic GHG emissions. As such, the identification of mandatory actions to address GHG emissions should be determined by law or regulation, rather than case-by-case action on individual permit application. In this regard, Congress has begun discussing the actions that should be taken at the national level to comprehensively and responsibly address GHG emissions in the United States.[90]**

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[86] The amount of $CO_2$ now in the atmosphere also diminishes the earth's ability to continue to remove or assimilate the amount of $CO_2$ that is emitted into the atmosphere. Through the carbon cycle, the earth is able to remove $CO_2$ from the atmosphere, with oceans and forests acting as "carbon sinks" absorbing $CO_2$ from the atmosphere, but only at certain rates and to a certain point. The increasing levels of anthropogenic emissions of $CO_2$, such as power plant emissions, have exceeded the capacity and disrupted the carbon cycle. For example, the ocean's uptake of further $CO_2$ is slowing as $CO_2$ concentrations increase. In some areas, oceans are reaching their $CO_2$ saturation points. (Refer to C. Le Quere and others, "Saturation of the Southern Ocean CO2 sink due to recent climate change," Science, 316 (5832), 1735-1738, 2007.) In addition, once the saturation point is reached, when a carbon sink is no longer able to absorb $CO_2$, it may actually begin releasing accumulated $CO_2$ into the atmosphere. As a consequence, small temperature changes can have large impacts on climate. (Testimony of James Hansen, Director of NASA's Goddard Institute for Space Studies.) The inevitable result of the disruption of the carbon cycle is increasing concentrations of $CO_2$ in the atmosphere, which leads to global warming with the potential for catastrophic consequences for humans and other species. As explained in the IPCC Working Group I Report: Climate Chance 2007, rising atmospheric CO2 concentrations are the leading cause of and most influential factor in global warming. Based on the observed data from 75 studies, the IPCC has concluded that "Warming of the climate system is unequivocal." The IPCC reports the temperature increase since the 1950s is very likely due to the increase in human caused GHG emissions and cannot be due to natural causes alone. The IPCC considered direct indicators of climate change, including global average air and ocean temperatures, ice and snow melt patterns, rising sea levels, changes in arctic temperatures, ocean salinity, wind patterns, and incidence of extreme weather events.

[87] 41 E. Rosenthal, "U.N. Report Describes Risks of Inaction on Climate Changes," New York Times, November 17, 2007.

[88] The IPCC in its Working Group I Report: Climate Chance 2007, also finds that increasing emissions of CO2 and other GHG are triggering climactic feedback that likely will exacerbate climate change. For example, the melting and shrinking of the extent of Arctic ice, which occurs as the atmosphere warms, can itself trigger additional warming. This is because the open ocean and ice-free land are less reflective than the ice and more of the sun's heat is absorbed rather being reflected back out into space. Given these types of feedback that exacerbate warming, it is difficult for scientific models to accurately predict the full extent of climate change that will occur if emissions of GHG continue unabated.

[89] The International Energy Agency (IEA) has warned that "[u]rgent action is needed if greenhouse-gas concentrations are to be stabilised at a level that would prevent dangerous interference with the climate system." The IEA specifically focused on the threat posed by the increased construction of coal-fired power plants. According to the IEA, "...government action must focus on curbing the rapid growth in CO emissions from coal-fired power stations – the primary cause of the surge in global emissions in the last few years." IEA World Energy Outlook 2007, Executive Summary, page 12.

**[90] Discussions have also taken place in Illinois concerning the appropriate actions that should be taken at the state level to address GHG emissions. Most recently, in 2006, Governor Blagojevich created the Illinois Climate Change Advisory Group to investigate this subject. While this group came forward with a number of recommendations, the downturn in the economy as well other events have interfered with implementation of those recommendations.**

43. Numerous scientific studies directly link climate change with significant public health, environmental, economic, and ecological impacts. Such impacts include direct heat-related effects, extreme weather events, climate-sensitive disease impacts, air quality effects, agricultural effects (and related impacts on nutrition), population displacement and social disruption, and property damage. Ecological impacts include effects on marine life, wildlife habitat, and biodiversity. These effects are in addition to the melting of ice sheets, which would significantly raise the sea level by levels that are measured in tens of meters. Climate changes associated with global warming, such as increases in average temperature and increased incidences of extreme heat, droughts, and other extreme weather events will be experienced in and affect Illinois.

**As already discussed, while global warming and climate change, as caused by anthropogenic GHG emissions, will have devastating consequences on the natural environment, in the absence of appropriate laws or regulations, global warming and climate change do not provide a legal basis to further address GHG emissions in the permit for the proposed plant since GHG are not currently regulated pollutants under the Clean Air Act.**

44. Certain aspects of public health are closely linked to climate and global warming is expected to have numerous significant impacts on human health. The only reasonable way to address these threats to human health is to address the underlying problem, global warming, as the U.S. and international public health communities are not prepared for multiple large scale disasters, induced by global warming. The USEPA warns:

> Throughout the world, the prevalence of some diseases and other threats to human health directly relate to local climate. Extreme temperatures can lead directly to loss of life, while climate-related disturbances in ecological systems, such as changes in the range of infective parasites, can indirectly impact the incidence of serious infectious diseases. In addition, warm temperatures can increase air and water pollution, which in turn threaten human health.[91]

The only reasonable way to address the threats to human health and welfare from climate change is to address the underlying problem, that is, the emissions of GHG that are causing global warming.

**The Illinois agrees that it is appropriate to adopt laws and regulations that address emissions of GHG, as global warming and climate change, as caused by anthropogenic GHG emissions, will have serious consequences for public health and human welfare. However, as already discussed, in the absence of appropriate laws or regulations, global warming and climate change do not provide a legal basis to address GHG emissions in the permit for the proposed plant since GHG are not currently regulated pollutants for purposes of the PSD program.**

45. The draft permit does not include BACT limits for $PM_{2.5}$, nor does the record contain a top-down BACT analysis for $PM_{2.5}$. The PSD program required that a major project apply BACT "...for each regulated NSR pollutant for which it would result in a significant net emissions increase at the source." 40 CFR 52.21(j)(3). $PM_{2.5}$ is regulated NSR pollutant

[91] USEPA, Climate Change, Health and Environmental Effects, http://www.epa.gov/climatechange/effects/health.html

because USEPA has adopted a NAAQS for $PM_{2.5}$. 40 CFR 50.7. The potential emissions of $PM_{2.5}$ from the proposed plant will be "significant" because they will be more than 10 tons per year. The plant will also have significant emissions of $SO_2$ and NOx, which are precursors to $PM_{2.5}$.

**The permit includes provisions that address BACT for emissions of $PM_{2.5}$, as emissions of particulate matter (PM) serves as a surrogate for $PM_{2.5}$. That is, as applied to the proposed plant, BACT provisions expressed in terms of PM also ensure effective, BACT-quality control of $PM_{2.5}$. As a general matter, for the kiln and other process units that are controlled with filters, this is because the PM limits require proper operation of the filters, which are the "best devices" for control of fine particulate, as would be emitted by these units. For other operations that are controlled by work practices, this is because requirements reflect "best practices" for emissions of PM, $PM_{10}$ and $PM_{2.5}$. These provisions are also more readily implemented than provisions in terms of $PM_{2.5}$, so provide both more certainty and better practical enforceability. Furthermore, if BACT requirements were expressed in terms of $PM_{2.5}$, there are significant issues remaining with respect to $PM_{2.5}$ emissions that would result in such requirements being less stringent as well as less effective. This is because USEPA has not finalized an applicable reference test method for $PM_{2.5}$ and there is a dearth of $PM_{2.5}$ emission data for emission units based on actual testing.[92] Thus, limits and requirements in terms of $PM_{2.5}$ would be likely be identical or similar to those set for PM, arguably being less stringent as they address only $PM_{2.5}$ emissions and not the entirety of PM emissions.**

**The proposed plant is an ideal situation in which to use PM as a surrogate for $PM_{2.5}$ in setting BACT requirements.[93] $PM_{2.5}$ emissions are a subset of emission of PM, so that a direct correlation exists between emissions of $PM_{2.5}$ and PM. As BACT is set for and applies to individual units, the correlation is consistent, i.e., lower emissions of PM also mean lower emissions of $PM_{2.5}$.[94] Although the permit does not set BACT limits in terms of $PM_{2.5}$, the use of PM as a surrogate does not result in a difference in the control technology required as BACT. For the kiln, filterable particulate emissions would be controlled with a fabric filter or baghouse. In applications where filtration is feasible, filtration is commonly recognized as the most effective control technology for emissions of filterable particulate matter.[95] It is certainly applicable to lime kilns.[96] In addition, to generally enhance control of particulate matter and**

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[92] **In addition to there still being impediments to setting BACT limits in terms of $PM_{2.5}$, there are also issues remaining for air quality analyses conducted in terms of $PM_{2.5}$. The dearth of information for emissions of $PM_{2.5}$ for different categories of sources has direct implications for the quality of the emission inventories for existing sources. USEPA has not adopted significant air quality impact levels for $PM_{2.5}$.**

[93] **Incidentally, while not raised or addressed in comments, PM is also used as a surrogate for setting BACT requirements for $PM_{10}$. Similar principle apply for use of PM as a surrogate for $PM_{10}$ as apply for $PM_{2.5}$.**

[94] **The situation is not one in which a reduction in PM emissions or a lower limit for PM could be accompanied by higher emissions for $PM_{2.5}$. The potential for such a relationship was a concern during the adoption of a NAAQS for $PM_{2.5}$. However, ambient air quality is the overall result of the impacts of many sources, with different emissions characteristics.**

[95] **For a general discussion of the effectiveness of fabric filters for control of particulate, refer to *Stationary Source Control Techniques for Fine Particulate Matter, prepared by EC/R Inc. for USEPA, AQSSD, October 1998***

[96] **Filtration technology underlies the particulate limit set to address emissions of particulate hazardous air pollutants from new lime kilns set by the National Emission Standards for Hazardous Air Pollutants (NESHAP) for the Lime Manufacturing Industry, 40 CFR 63, Subpart AAAAA, 0.10 lb/ton stone feed. Pursuant to Sections 112(d)(2) and (3) of the Clean Air Act, emission standards set by USEPA under the NESHAP program must reflect the maximum degree of reduction in emissions that is deemed achievable by USEPA or "Maximum Achievable Control Technology" (MACT) for a category of source. For**

**specifically enhance control for fine particulate, the baghouse on the kiln must be refitted and operated with filter bags that have a membrane of Teflon™ (PTFE).[97] As dry scrubbing must be used for control of emissions of $SO_2$, add-on control will also be used to control emissions of $SO_2$ and $SO_3$ as of concern for formation of condensable particulate. Because the plant was subject to PSD before the USEPA adopted a "moratorium" on including condensable particulate in $PM_{2.5}$ and $PM_{10}$ emissions, the BACT determination for the kiln includes a limit for total emissions of particulate, including both the filterable and condensable particulate. For the other operations at the plant, which do not involve any combustion of fuel, control measures and requirements for PM also serve to address the $PM_{2.5}$ present in the PM emissions. Given the nature of these operations, it would be wholly impractical to set requirements that only targeted the $PM_{2.5}$ fraction.**

**The permit also includes separate BACT limits for emissions of both $SO_2$ and NOx, as the emissions of both these pollutants from the proposed plant are subject to PSD and thus to BACT. Thus emissions of both these pollutants are also controlled as they also constitute precursors to formation of $PM_{2.5}$ in the atmosphere.**

46. There is no legal or factual basis for Illinois EPA's failure to include a $PM_{2.5}$ BACT limit for each emission point at the proposed plant. There are no longer any technical reasons prohibiting such limits. Proposed Rule, 72 FR 54,112 (Sept 12, 2007); see also 70 FR at 66,043 (recognizing that the "practical difficulties" identified in the Seitz memo "have been resolved in most respects").
USEPA withdrew all guidance suggesting that $PM_{10}$ could be used as a surrogate. 73 FR 2 8,321 (May 16, 2008). USEPA has also stayed the effectiveness of 40 CFR 52.21(i)(1)(xi), which purported to allow the limited time use of $PM_{10}$ as a surrogate for $PM_{2.5}$. See Letter from Administrator Jackson to Paul Cort, Earthjustice (April 24, 2009).

**There are both factual or technical bases and legal bases for not setting BACT limits in terms of $PM_{2.5}$. The technical bases have already been discussed. As a legal matter, the USEPA has not yet "withdrawn" all guidance suggesting that $PM_{10}$ can be used as a surrogate. Rather, in its May 2008 proposed rulemaking concerning Increments, SILs, and SMC for $PM_{2.5}$, the USEPA stated that the $PM_{2.5}$ PSD program will no longer use $PM_{10}$ as a surrogate once the proposed rule on increments, SILs, and SMC is finalized.[98] This has not yet happened. In addition, USEPA is still actively engaged in rulemaking to repeal the grandfathering provision in the PSD**

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**new sources, the standards must "...not be less stringent than the emission control that is achieved in practice by the best controlled similar source."**

**While the proposed lime plant is not expected to be subject to this NESHAP because it would not be a major of HAP emissions, the kiln should be equipped and operated to comply with this NESHAP limit. This is because it is appropriate for the kiln to use MACT technology. It also would accommodate an unexpected change in the status of the kiln.**

**[97] Because the baghouse must be fitted with advanced filter bags, it should be assumed that $PM_{2.5}$ will make up the majority of the particulate emitted by the kiln. In other words, the size distribution for particulate provided in AP-42 for rotary lime kilns equipped with fabric filters would greatly understate the fraction of the PM that would be $PM_{2.5}$. (AP-42 indicates that $PM_{2.5}$ would make up only about one third of the PM emissions.**

**[98] In its proposed rulemaking in 2008 for implementation of the PSD program for $PM_{2.5}$, "Implementation of New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers (PM2.5)," 73 FR 28,321, May 16, 2008, USEPA states "This final action on the bulk of the major NSR program for PM2.5 along with our <u>proposed</u> rule on increments, SILs, and SMC, <u>when final</u>, will represent the final elements necessary to implement a $PM_{2.5}$ PSD program. When both rules are promulgated and in effect, the $PM_{2.5}$ PSD program will no longer use a $PM_{10}$ program as a surrogate, as has been the practice under our existing guidance." (emphasis added) 73 FR 28,324**

**rules.[99] This suggests that a modified form of either the grandfathering provisions or the $PM_{10}$ surrogate policy might be adopted on some interim basis. Lastly, USEPA's formal $PM_{10}$ surrogate policy is an embodiment of a broader technical approach to control of emissions that allow control requirements for particular pollutant(s) to be adopted and set in terms of a surrogate pollutant that reasonably stands in place of the pollutant(s) of particular concern.**

47. It is not appropriate to assume that a PM (or $PM_{10}$) limit is equivalent to a $PM_{2.5}$ limit. The USEPA's adoption of a $PM_{2.5}$ NAAQS is premised upon a finding that $PM_{10}$ and $PM_{2.5}$ are not equivalent and a $PM_{2.5}$ air quality standard, in addition to a $PM_{10}$ standard, was needed to protect public health. That finding cannot be effectively undone, by substituting $PM_{10}$ through a guidance document, based upon administrative expediency. $PM_{2.5}$ is comprised of a larger fraction
of condensable particulates than is PM or $PM_{10}$, and controls for PM and $PM_{10}$ are not necessarily controls for $PM_{2.5}$. See 73 FR at 28,334; In re So. Montana Elec. Generation and Transmission Coop., Highwood Gen. Station, Slip. Op. at 9, 25-30 (Mont. Bd. Envt. Rev. May 30, 2008).

**This comment does not show that is inappropriate to use particulate as PM as a surrogate for emissions of $PM_{2.5}$ from the proposed plant. The fact that a NAAQS was adopted for $PM_{2.5}$ does not show that emission standards must be set in terms of $PM_{2.5}$. Even though the USEPA has adopted NAAQS for both $PM_{10}$ and $PM_{2.5}$, the USEPA has continued to adopt NSPS emission standards in terms of PM.[100] The issue that is posed for emissions of $PM_{2.5}$ is a technical one, that is, what are the most appropriate terms in which to set emissions standards or limits to control emissions of $PM_{2.5}$ from particular sources or emission units. For the proposed plant, as discussed, the Illinois EPA has determined that such limits are most appropriately set in terms of PM. This does not mean that the rates of PM, $PM_{10}$ and $PM_{2.5}$ emissions from the plant are assumed to be identical or equivalent.**

48. Based on the Project Summary, $PM_{2.5}$ emissions from the proposed plant have not been modeled to demonstrate that they comply with the $PM_{2.5}$ NAAQS (and the $PM_{2.5}$ increment if adopted by USEPA prior to issuance of any permit), despite USEPA's instructions to do so. 73 FR 28,336 ("...sources will be required to perform [air quality impact] analysis for the $PM_{2.5}$ NAAQS and, when finalized, PM2.5 increments.").[101] Before Illinois EPA can issue a permit for the proposed plant, it must ensure that the plant will not cause or contribute to any violation of a national ambient air quality standard (NAAQS) or PSD increment, 40 CFR 52.21(k). Moreover, preconstruction ambient monitoring has not been conducted for $PM_{2.5}$ as required before a PSD permit can be issued by Section 165(a)(7) and (e) of the Clean Air Act; 40 CFR 52.21(m). This must include condensable $PM_{2.5}$.

**The Illinois EPA has assessed the impact of the plant on $PM_{2.5}$ air quality, using the**

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**[99] Implementation of New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers (PM2.5); Notice of Proposed Rulemaking to Repeal Grandfathering Provision and End $PM_{10}$ Surrogate Policy, 75 FR 6827, February 11, 2010**

**[100] In addition, USEPA has adopted any emission standards for ozone. Rather USEPA has adopted emissions standards for emissions of VOC and NOx, the precursors to formation of ozone in the ambient air.**

[101] There was discussion with the Illinois EPA about this and it appears that at one point, the Illinois EPA was intending to require a full $PM_{2.5}$ NAAQS analysis.

**results from the analysis for $PM_{10}$ impacts. This assessment became necessary when USEPA stayed the grandfathering provision of the PSD rules for PM2.5. This assessment shows that the plant would not result in exceedances of the $PM_{2.5}$ NAAQS.[102] This conclusion is consistent with the general nature of $PM_{2.5}$ air quality in Illinois, in which air quality can generally be correlated with the nature of an area, i.e., center city, urban, suburban or rural, especially when considered on an annual basis. In addition, given these circumstances, representative data for background ambient concentrations are readily available from Illinois' existing ambient monitoring network.**

**As this comment again asserts that there is not a legal basis for the approach taken to the emissions of $PM_{2.5}$ from the proposed plant. Contrary to this assertion, the Illinois EPA appropriately followed USEPA guidance in addressing the plant's emissions of $PM_{2.5}$. When the Illinois EPA distributed a draft permit for public comment, USEPA's rules provided that the permit did not need to address $PM_{2.5}$.[103] This is because the application was filed under a previous version of the PSD rules and was "grandfathered." USEPA subsequently stayed the grandfathering provision. The Illinois EPA has conducted a further assessment to address the impacts of the proposed plant in response to the stay of the grandfathering provision.**

49. A state rule, 35 IAC 201.141, prohibits the Illinois EPA from granting a construction permit for the proposed plant without first determining that the plant would not cause or threaten or allow the discharge or emission of $PM_{2.5}$ "...into the environment... so as,

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[102] **Assessment of $PM_{2.5}$ Air Quality Impacts (ug/m3)***

| Contribution | Annual Impacts | | Daily (24- Hour) Impacts | |
|---|---|---|---|---|
| | PM10 | PM2.5 | PM10 | PM2.5 |
| Kiln | 0.13 | 0.130 | 2.10 | 2.10 |
| Flue Dust Pile | 0.01 | 0.010 | 0.21 | 0.21 |
| Pit Operations | 2.92 | 0.584 | 17.47 | 3.49 |
| Roadways | 1.13 | 0.222 | 7.21 | 1.44 |
| Subtotal | 3.48 | 0.946 | 21.90 | 7.24 |
| Background (2006 – 2008, 3 year average) | | 10.8 | | 25.6 |
| Total | | 11.75 | | 32.84 |

*** Impacts for pit operations and roadways adjusted based on $PM_{2.5}$ making up 20 percent of the $PM_{10}$ emissions.**

[103] **After USEPA adopted NAAQS for $PM_{2.5}$ in 1997, it issued a guidance document entitled "Interim Implementation for the New Source Review Requirements for PM2.5" (John S. Seitz, USEPA, October 23, 1997). This guidance provided that implementation of a $PM_{10}$ program is allowed as a surrogate for meeting $PM_{2.5}$ NSR requirements until certain technical and procedural issues with respect to NSR for $PM_{10}$ have been addressed by the USEPA. These included the lack of necessary tools to calculate the emissions of $PM_{2.5}$ and related precursors, the lack of adequate modeling techniques to project ambient impacts, and the lack of $PM_{2.5}$ monitoring sites.**

**On April 5, 2005, USEPA issued another guidance memorandum entitled "Implementation of New Source Review Requirements in PM2.5 Nonattainment Areas" (Stephen D. Page, USEPA). This guidance addressed the implementation of the NSR provisions in $PM_{2.5}$ nonattainment areas in the interim period between the effective date of USEPA's attainment designations for $PM_{2.5}$ NAAQS (April 5, 2005) and the promulgation date of final nonattainment NSR $PM_{2.5}$ regulations. Besides affirming the continuation of the Seitz guidance memo, the April 5, 2005 memo recommends that until USEPA promulgates $PM_{2.5}$ NSR regulations, states should use $PM_{10}$ as a surrogate to address the requirements for $PM_{2.5}$. This is the so-called "grandfather" provision, which is codified at 40 CFR 51.21(i)(l)(xi) and in USEPA guidance.**

**On May 16, 2008, USEPA published a final rule entitled "Implementation of New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers (PM2.5)," (73 FR 28,321), which finalized certain aspect of the NSR program for $PM_{2.5}$ and extended the "grandfathering" provision for three years (until 2011) to allow states sufficient time to implement the new $PM_{2.5}$ NSR requirements.**

**The Illinois EPA released the draft permit for the proposed plant for public comment on April 17, 2009, at a time when the grandfathering provision was in effect. The "grandfathering" provision remained in effect until June 1, 2009, when Administrator Jackson issued a three-month administrative stay. (This stay has subsequently been extended pending reconsideration of the grandfathering provisions by USEPA). Thus, at the time the draft permit was released, the grandfathering provision was still in effect.**

either alone or in combination with other sources, to cause or tend to cause air pollution in Illinois." There has been no analysis of $PM_{2.5}$ impacts from the proposed plant to address this requirement.

**As already discussed, there has been an assessment of the impacts of the proposed plant on $PM_{2.5}$ air quality. This assessment shows that the plant would not cause a violation of the $PM_{2.5}$ NAAQS. As such, the plant's emissions of $PM_{2.5}$ should not be considered to be a threat to human health or the environment.**

50. The current NAAQS for $PM_{2.5}$ were challenged and have been remanded back to the USEPA as insufficient to protect public health and the environment.[104] As such, they do not serve to prevent "sufficient quantities... and duration as to be injurious to human, plant, or animal life," as required by 35 IAC 201.141. Before issuing a permit, the Illinois EPA must first identify the $PM_{2.5}$ concentration that will satisfy 35 IAC 201.141 and then determine that emissions from the proposed plant "either alone or in combination with other sources" will not exceed that standard.[105] That has not been done for the proposed plant.

**It would be inappropriate for the Illinois EPA to establish an ambient air quality standard for $PM_{2.5}$ in the context of permitting of a specific project, as effectively requested by this comment. In Illinois, ambient air quality standards are rules and are appropriately established through rulemaking by the Pollution Control Board, not the Illinois EPA. Similarly, at the national level, ambient air quality standards are adopted by the USEPA.**

**At the same time, the proposed plant should not cause concentrations of $PM_{2.5}$ in the atmosphere that would be injurious to human, plant or animal life. In Illinois, elevated levels of $PM_{2.5}$ in the atmosphere, which pose a potential threat to human health and welfare, are associated with developed urban areas, not with less developed areas like Manteno. The reductions in emissions that are needed to reduce ambient concentrations of $PM_{2.5}$ in urban areas will have the secondary effect of further improving air quality throughout the state.**

51. Scientific evidence exists that the current $PM_{2.5}$ NAAQS are not sufficiently protective of public health, especially for young children and the elderly. USEPA staff and the Clean Air Scientific Advisory Committee have suggested an annual $PM_{2.5}$ NAAQS lower than 15 $\mu g/m^3$.[106] USEPA staff pointed to health studies that suggest annual $PM_{2.5}$ concentrations should be limited to below 13 μg/m3. USEPA staff also recommended a daily $PM_{2.5}$ NAAQS at the "middle to lower end" in a 25 to 35 $ug/m^3$ range (i.e., 25 to 30 $\mu g/m^3$).[107] USEPA staff noted that short-term studies are relevant to determining the annual

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[104] American Farm Bureau Federation v. EPA, Case No. No. 06-1410, Slip Op. (D.C. Cir. Feb. 24, 2009).

[105] *See also* Section 165(a)(3)(C) of the Clean Air Act.

[106] *See* Office of Air Quality Planning and Standards (OAQPS), USEPA, Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information (Staff Paper) § 5.3.1.1, at 5-7 (2005); Letter from Dr. Rogene Henderson, Clean Air Scientific Advisory Committee, to Administrator Stephen L. Johnson, USEPA 3–4 (Mar. 21, 2006) ("Studies described in the PM Staff Paper indicate that short term effects of $PM_{2.5}$ persist in cities with annual $PM_{2.5}$ concentrations below [15 μg/m3]").

[107] OAQPS Staff Paper Section 5.3.5.1, at page 5-32. "[S]taff continues to believe that an annual standard cannot be expected to offer an adequate margin of safety against the effects of all short-term exposures." *See* also Sections 5.3.4.1, at pages 5-22–23, and 5.3.7, at page 5-46.

concentrations protective of public health and that "the strongest evidence for short-term $PM_{2.5}$ effects occurs at concentrations near the long-term (e.g., annual) average." (*See* Final Rule: National Ambient Air Quality Standards for Particulate Matter, 62 FR 38,652, (June 1, 1997).) Illinois EPA's analysis under 35 IAC 201.141 must account for the evidence that indicates that concentrations below 15 $\mu g/m^3$ may be a threat to public health.

**The assessment of $PM_{2.5}$ impacts for the proposed plant responds to the matters described in this comment. As already explained, with the proposed plant, the maximum annual ambient concentrations of $PM_{2.5}$ in the area should be significantly lower than 15 $\mu g/m^3$. As measures are implemented to reduce ambient concentrations of $PM_{2.5}$ in urban areas, concentrations of $PM_{2.5}$ throughout the state will also be reduced.**

52. There is very little, if any, top-down BACT analysis in the Illinois EPA's Statement of Basis or Project Summary prepared by the Illinois EPA to accompany the draft permit for the proposed lime plant. The Project Summary only provides conclusory statements about what BACT controls are. (See Section VII of the Project Summary.) This does not satisfy Illinois EPA's obligations to provide a sufficient Project Summary for public review and comment.

**The Project Summary provides key findings of the Illinois EPA with respect to the proposed determination of BACT. It was in an appropriate level of detail as it addressed addition of "emission control technology," i.e., a preheater tower and a scrubber, to an existing plant that had operated. The Illinois EPA's explanation of its BACT determination for this plant has been expanded upon in this Responsiveness Summary, in response to specific comments that were made on the proposed determination of BACT.**

53. The entire BACT analysis omits the necessary consideration of clean fuels. The Project Summary does not mention the use of natural gas or even cleaner fuels, such as waste biomass, as compared to Vulcan's proposed coal and coke mix. Such fuels would provide significant reductions in emissions of PM and $SO_2$, compared to the proposed fuel. These alternative fuels would also provide significant reductions in GHG emissions.

**As the next comment shows, while not discussed in the Project Summary, the use of natural gas, a clean fuel, was considered in the BACT analysis that is the foundation of the proposed BACT determination in the draft permit. For this purpose, the potential role of fuel selection on $SO_2$ emissions was recognized. It was also recognized that a reduction in SO2 emissions could be accompanied by a reduction in condensable particulate, although the extent of such reduction is uncertain. However, because lime kilns emit particulate due to dust in the limestone feed and the mechanical attrition of limestone as it is being calcined in the kiln, separate from combustion of fuel in the kiln, a potential effect on filterable PM emissions was not considered. The "process-related" particulate must be appropriately controlled regardless of the fuel selected for a kiln. These particulate emissions will be controlled by filtration, a control technology that provides a constant emissions rate. Accordingly, a reduction in the inlet dust loading to the filter, as could accompany use of a clean fuel, cannot be assumed to result in any reduction in the actual dust or particulate in the exhaust of the filter and the emissions to the atmosphere.**

**For the proposed BACT determination, limited consideration was given to use of "unconventional fuels," such as waste biomass. This is because there would not be a reliable supply of such fuels, so that such fuels cannot be considered available. The heat content and other properties of such fuel is both different from that of commercial fuels and subject to more variation so that such fuels would also not provide the consistent fuel composition needed for efficient production of lime. The variation in fuel composition would also potentially have adverse impacts on emissions of NOx and CO, which are related to the operation of the fuel combustion process which is more readily managed with commercial fuel with its consistent composition.**

54. In its BACT analysis, Vulcan addresses use of natural gas as a possible alternative control technology for $SO_2$ emissions from the proposed plant. However, Vulcan does not adequately explain the difference between the analysis in an application submittal from February 2002, which indicated 99.99 percent reduction in $SO_2$ emissions from use of natural gas, and the analysis subsequently provided in a 2006 submittal, which indicated only a 78 percent reduction. The higher value, which was provided first, appears to be correct.

**In fact, the lower value of efficiency (78 percent reduction) is the more appropriate value for the reduction in $SO_2$ emissions that would accompany use of natural gas, although the value is now out-of-date as the kiln will have a preheater tower. The lower value is the better value because sulfur is present not only in the fuel fired in the kiln but also in the limestone fed to the kiln. When the limestone undergoes calcination, this sulfur oxidized, contributing to $SO_2$ emissions.[108] The use of natural gas or other clean fuel would not affect the contribution of the sulfur in the limestone to the $SO_2$ emissions of the kiln. This fact was not considered in the 2002 application submittal. It was considered in the supplement to the application submitted in 2006.**

**The addition of a preheater to the kiln, as it reduces the fuel use of the kiln, increases the relative contribution of sulfur in limestone to the kiln's $SO_2$ emissions. The new split between fuel and limestone sulfur is 71 percent from fuel and 29 percent from**

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**[108] The application submittal from 2006 cited by this comment, which predates Vulcan's decision to add a preheater tower to the kiln, reflects a potential reduction of about 45 pounds per ton of lime in the "uncontrolled" $SO_2$ emissions of the kiln from use of natural gas instead of solid fuel, from 58 pounds of $SO_2$ with solid fuel to 13 pounds of $SO_2$ with natural gas. This would be a 77.5 percent reduction in the rate of uncontrolled $SO_2$ emissions.**

**In particular, with limestone with a maximum sulfur content of 0.15 percent by weight and a conversion factor of 2.16 tons of stone feed per ton of lime, limestone contributes 13 pounds of "uncontrolled" $SO_2$ emissions per ton of lime product. (2.16 tons x 0.0015 S by wt. x 2 pounds $SO_2$/pound S x 2000 pounds/ton = 12.96, ≈ 13.0 pounds)**

**With a fuel sulfur content of 4 percent by weight and usage of 7 tons of fuel per 25 tons of lime, the sulfur in fuel contributes 45 pounds of $SO_2$ emissions per ton of lime product. (7 tons x 0.04 S by wt. x 2 pounds $SO_2$/pound S x 2000 pounds/ton ÷ 25 tons = 44.8, ≈ 45 pounds)**

**Total uncontrolled $SO_2$ emissions with solid fuel are 58 pounds per ton of lime product. (45 + 13 = 58). Use of natural gas would reduce uncontrolled $SO_2$ emissions to 13 pounds per ton, or by 77.6 percent. (45 ÷ 58 = 0.776, or 77.6 %)**

**This assessment did not account for sulfur adsorbed in the lime product, which would have a minor effect in the evaluation. A nominal value for the sulfur content in the lime is 0.025 percent by weight, which is equivalent to 1.0 pounds of $SO_2$ equivalent per ton. (1 ton x 0.00025 sulfur by wt. x 2 pounds $SO_2$/pound x 2000 pounds/ton = 1.0 pounds)**

**Considering the sulfur in the lime, the uncontrolled $SO_2$ emissions with solid fuel are only 57 pounds per ton of lime. (13 + 45 – 1 = 57) Uncontrolled $SO_2$ emissions with natural gas would then be 12 pounds per ton of lime product. (13 – 1 = 12) The reduction in uncontrolled SO2 emissions from use of natural gas would be 77.2 percent. (12 ÷ 57 = 0.772,≈ 77.2 %)**

**limestone.**[109]

55. Vulcan's application submittal of February 2002 contains two possible values for the "baseline" $SO_2$ emissions, 7,902 tons/year based on the sulfur content of fuel and 3,434 tons/year based on "controlled potential emissions based on inherent design of the kiln and current baghouse." *See* Application Submittal, February 2002, page 2-9.

**Neither of these values, which are taken from an application submittal for the issuance of a revised permit in 2002,[110] accurately portrays the "uncontrolled" $SO_2$ emissions of the proposed plant. Both values are incorrect as they do not consider the contribution of the sulfur in the limestone feed to the kiln to $SO_2$ emissions. The higher value is not correct because it reflects, as of 2002, a <u>maximum</u> rate for the expected fuel usage of the kiln (8.2 tons/hour) and a <u>maximum</u> sulfur content of fuel (5.5 percent by weight). Neither of these maximum values should be expected on a long-term basis. As explained in the NSR Manual, the baseline emissions for a BACT analysis should reflect "a realistic scenario of upper bound uncontrolled emissions for the source." NSR Manual, page B.37. In this respect, the lower value did not properly account for adsorption of $SO_2$ on kiln dust and lime.[111] It also reflected the fuel use rate as of 2002, which is now out-of-date since it does not consider the reduction in fuel usage that will accompany the addition of a pre-heater to the kiln.**

**More appropriate values for the baseline $SO_2$ emissions of the kiln, <u>with solid fuel</u> and <u>assuming that the preheater is now an inherent feature of the plant</u>, are now 4,224 and 2,844 tons per year, respectively, without and with consideration for the adsorption of $SO_2$ on lime dust.[112] As already discussed, the lower value is a more appropriate value for baseline $SO_2$ emissions accompanying use of solid fuel. Reliance on the higher value would overstate the amount of $SO_2$ emissions that are**

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[109] With the preheater, the maximum amount of sulfur entering the lime kiln, theoretically available for conversion to $SO_2$, is 562 pounds per hour. The solid fuel entering the kiln would contribute 400 pounds of sulfur per hour, based on usage of 5 tons of fuel per hour and a sulfur content of 4 percent by weight. The limestone could contribute 162 pounds of sulfur, based on a feed rate of 54 tons per hour and a maximum sulfur content of 0.15 percent by weight.
The fuel would only contain 71 percent of the sulfur entering the kiln. (400/562 = .712)

[110] The initial application submittal for the current permit action was received over a year later, on October 27, 2003.

[111] An appropriate value for natural adsorption of $SO_2$ for use in the determination of the $SO_2$ baseline of the proposed kiln is 40 percent. The level of natural $SO_2$ adsorption that was shown by emission testing when the kiln historically operated, nominally 70 percent, cannot be relied upon for this purpose. In part, this is because this value is based on a single test. It does not address normal variation in the level of adsorption that may occur, which clearly is much lower than the levels achieved at high-calcium lime kilns, given the measured level of $SO_2$ adsorption. Equally important, the level of adsorption that was historically measured cannot be relied upon because of the change that will have to be made to the operation of the baghouse to ensure compliance with the BACT limit for PM, i.e., use of a membrane-type filter fabric in place of a conventional filter fabric. This will be accompanied by a decrease in the thickness of the filter cake, which will directly act to reduce the effectiveness of $SO_2$ adsorption as the flue gas will pass through and interact with less dust. Accordingly, rather than relying on only 30 percent of the $SO_2$ entering the kiln being unabated by natural adsorption, it is appropriate to expect 60 percent of the $SO_2$ entering the kiln, twice as much, will be unabated.

[112] With the kiln equipped with a preheater as will now be the case, Vulcan indicates that the kiln would use 5 tons of fuel per hour (maximum 43,800 tons of fuel per year). With a sulfur content of 4 percent sulfur by weight, the plant's "theoretical" uncontrolled $SO_2$ emissions attributable to fuel sulfur would be 3,504 tons per year. After considering natural adsorption of $SO_2$ by the dust, the "realistic" uncontrolled $SO_2$ emissions attributable to fuel are 2,102 tons/year.
With 473,000 tons of limestone fed to the kiln annually and a maximum sulfur content of 0.15 percent by weight, the uncontrolled $SO_2$ emissions attributable to stone feed would be 1,419 tons per year. After consideration of the adsorption of $SO_2$ on lime dust, the "realistic" uncontrolled $SO_2$ emissions attributable to limestone are 851 tons/year.
With a nominal sulfur content of 0.025 percent by weight, the 219,000 tons of lime produced by the kiln annually would contain 65.7 tons of sulfur. This is equivalent to 109.5 tons of $SO_2$ emissions that would not be emitted by the kiln.
Accordingly, the appropriate $SO_2$ baseline for use of solid fuel is 2,843.5 tons/year. (2,102 + 851 – 109.5 = 2,843.5)

**actually being controlled by add-on or "discretionary" control techniques. This would result in a BACT analysis that does not accurately portray the cost-effectiveness of such control techniques. As confirmed by the NSR Manual, the baseline emissions used in a BACT analysis should reflect inherent physical constraints on the emissions of a source, determining baseline emissions after the effect of such constraints is considered. Adsorption of a portion of the $SO_2$ entering the kiln on dust is such an inherent constraint, as it naturally occurs without any additional effort or expenditures by Vulcan.**

56. According to USEPA's *Compilation of Air Pollutant Emission Factors*, AP-42, rotary lime kilns, firing natural gas have significantly lower emissions for particulate matter (including $PM_{10}$ and condensable $PM_{10}$), $SO_2$ and sulfuric acid mist.

**In fact, the general claim made by this comment is not supported by AP-42. This is because AP-42 does not provide emission factors for rotary preheater kilns controlled by dry scrubbers and advanced baghouses, which must comply with a particulate limit of 0.1 lb/ton of stone feed. Indeed, for sulfuric acid mist ($SO_3$), AP-42 only includes a single emission factor for one class of lime kilns. Emission factors for condensable particulate are also not provided for many categories of lime kilns.[113]**

**As already discussed and addressed, emissions of $SO_2$ could be lower with use of natural gas. However, emissions of filterable particulate matter should not be expected to change, as they are controlled by a baghouse. A reduction in the emissions of condensable particulate is likely. However, as fuel is only one source of the precursors to condensable particulate and emissions of condensable particulate would be controlled by a dry scrubber, the extent of the reduction is uncertain.[114] In addition, any reduction would be very small compared to the potential effect of use of natural gas on emissions of $SO_2$. The use of natural gas would not significantly lower emissions of sulfuric acid mist ($SO_3$). The permitted $SO_3$ emissions of the kiln are only 4.4 tons per year, which is not significant, so any change in emissions also cannot be significant.**

57. Vulcan identified use of natural gas as a technically feasible control option for $SO_2$ on page 9 of its July 2006 Supplemental BACT submittal. Examples of lime kilns that use natural gas include Continental Lime's Cricket Mountain Plant in Delta, Utah, for which use of natural gas is the basis for BACT for two lime kilns. At Arkansas Lime's Batesville plant, use of natural gas is the basis for BACT for its Rotary Lime Kiln No. 2.

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**[113] For emissions of $SO_3$, AP-42 only includes an emission factor for one of 13 categories of lime kilns, 0.21 lb $SO_3$/ton lime for coal-fired rotary kilns equipped with wet scrubbers. For emissions of $SO_3$ for the other 12 categories of kilns, AP-42 indicates "ND" (no data). For the organic fraction of condensable particulate, emission factors are only provided for two categories of kilns. For the inorganic fraction of condensable particulate, emission factors are only provided for 8 categories of lime kilns, none of them similar to the proposed kiln.**

**[114] An estimate for the reduction in emissions of condensable particulate that would accompany use of natural gas is possible. If one assumes that the emissions of condensable particulate would be reduced by 50 percent, the reduction in annual emissions would be 17.3 tons per year. This reduction is calculated by applying the a 50 percent reduction to an expected emission rate of the kiln for condensable particulate matter, i.e., the limit for combined particulate matter emissions of the kiln (0.246 pound per ton of stone feed) less a compliance margin (0.05 pounds per ton) less the expected emissions of filterable particulate (0.05 pound per ton, i.e., half the BACT limit). This results in an emission factor for condensable particulate of 0.073 pound per ton with use of natural gas, instead of 0.146 pound per ton with solid fuel.**

**While use of natural gas is a technically feasible option for control of $SO_2$, this option has been rejected as BACT based on its cost impacts and environmental impacts. While natural gas may be used as the fuel for production of high quality, food-grade lime, which commands a higher price than "general purpose lime," this does not show that the cost impacts of use natural gas would be reasonable for the proposed plant, which would produce general purpose lime. In addition, the use of natural gas could be accompanied by an increase in NOx emissions that would be equal to or greater than any reduction in $SO_2$ emissions.**

**Moreover, notwithstanding the information in the RBLC reported in this comment for certain lime plants, a review of their operating permits indicates that these plants have been permitted to use coal and coke. The operating permit for the Arkansas Lime shows all three kilns at this lime plant, including new Kilns 2 and 3, permitted for construction in 2007, permitted to use coal and petroleum coke. The permit also notes that "Alternately, pipeline-quality natural gas is fired in the kilns during startup and to produce low-sulfur lime. Gas firing results in higher fuel consumption and cost." The operating permit for the Cricket Mountain plant (now Graymont Western, ), shows all five kilns at this plant, including new Kiln 5 permitted for construction in 2007, allowed to fire coal and petroleum coke. Propane (natural gas) is characterized as a startup fuel, i.e., a fuel used during initial startup of the kiln before introduction of limestone while the baghouse on the kiln may be bypassed.**[115]

58. In its BACT determination for another proposed project in Illinois, a solid fuel-fired cogeneration facility proposed by MGP Ingredients of Illinois (MGP), the Illinois EPA attempted to calculate the cost-effectiveness of the use of natural gas as an alternative to use of solid fuel in the proposed cogeneration boiler. The Illinois EPA should do the same for this project, but correcting the errors made in that analysis. In particular, the Illinois EPA must calculate the average cost-effectiveness of use of natural gas, not merely the incremental cost-effectiveness of use of natural gas.

**The Illinois EPA has prepared further analysis of the cost-effectiveness of the use of natural gas a means to reduce emissions of the proposed lime kiln. This analysis includes calculations for both "average" and "incremental" cost-effectiveness. It should be noted that the performance of these calculations should not be presumed to represent how the calculation for MGP should have been performed.**[116, 117]

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[115] See Title V Operating Permit, Permit No. 2700005001, last revised September 18, 2008, issued to Graymont Western US Incorporated, by the Utah Department of Environmental Quality.

[116] USEPA Guidance and particularly decisions by the EAB to do not compel use of both measures of cost-effectiveness to evaluate proposed control alternatives, as suggested by this comment. This is shown by a recent permit action by one of USEPA's own Regional Offices, involving USEPA, Region 8, and the evaluation of an alternative coal supply for a solid-fuel fired generating unit proposed by Deseret Power Electric Cooperative. For that project, USEPA relied on incremental cost-effectiveness in its decisions, calculating cost-effectiveness by dividing the additional costs associated with the alternative fuel by the additional reduction in emissions that would result. Refer to "Response to Public Comments on Draft Air Pollution Control Prevention of Significant Deterioration (PSD) Permit to Construct Permit No. PSD-OU-0002-04.00. It should be noted that the PSD permit for the proposed Deseret plant was subject to an appeal to the USEPA's Environmental Appeals Board (EAB). However, this aspect of USEPA's decision making does not appear to have been raised in the appeal and reviewed by the EAB.

[117] In addition to not conceding that an analysis of average cost-effectiveness is required or that such an analysis should be prepared in a particular way, the nature of the proposed project is significantly different from the MGP project. The MGP project involved a boiler, with the "product" being steam and electricity to be used on-site for production of ethanol. With a boiler, all $SO_2$ emissions were attributable to sulfur in fuel. The use natural gas would have eliminated the need for an $SO_2$ scrubbing system on the proposed boiler, as well as the need for a selective catalytic reduction system and a baghouse.

59. In its further analysis of the potential use of natural gas by the proposed plant, the Illinois EPA should calculate average cost-effectiveness from a baseline of "no control," as Vulcan used for calculating for calculating the cost-effectiveness of the using a scrubber on the kiln to control emissions of $SO_2$.

**While USEPA guidance indicates that the baseline emissions used in a PSD cost-effectiveness analysis should reflect the "uncontrolled emissions" of a proposed source, this does not fully explain how a cost-effectiveness analysis for use of natural gas at the proposed plant should be conducted. This is because USEPA guidance specifically addressing these emissions baselines states that "When calculating the cost effectiveness of adding post process emissions controls to certain inherently lower polluting processes, baseline emissions may be assumed to be the emissions from the lower polluting process itself."[118] As related to emissions of $SO_2$, use of natural gas would be an inherently lower emitting process for the kiln. This suggests that the baseline emissions for evaluating the cost-effectiveness of use a scrubber on the kiln in conjunction with use of natural gas should be the uncontrolled emissions of $SO_2$ that would accompany use of natural gas, i.e., 741.5 tons/year. It should not be the uncontrolled emissions of $SO_2$ with use of solid fuel, 2843.5 tons per year, as was used by Vulcan in evaluating the cost-effectiveness of use of a scrubber for control of $SO_2$ emissions.[119] However, cost-effectiveness has been calculated using both values for the baseline.[120]**

60. In the further analysis of the potential use of natural gas, the Illinois EPA should also compare the cost-effectiveness of using natural gas (in dollars per ton of pollutant reduced) to the cost of using natural gas at existing lime manufacturing plants that are fueled with natural gas. As explained by USEPA in the NSR Manual, page B.31 "Where control alternatives have been used in the same source category, the average and incremental cost effectiveness is [the] primary tool in determining if a control is viable. An applicant needs to document significant cost differences between the use of that control on other sources in

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**[118] In the NSR Manual, Pages B.37 and 38, when explaining how to calculate baseline emissions, USEPA states "The baseline emissions rate represents a realistic scenario of upper boundary uncontrolled emissions for the source. The NSPS/NESHAP requirements or the application of controls, including other controls necessary to comply with State or local air pollution regulations, are not considered in calculating the baseline emissions. In other words, baseline emissions are essentially uncontrolled emissions, calculated using realistic upper boundary operating assumptions. When calculating the cost effectiveness of adding post process emissions controls to certain inherently lower polluting processes, baseline emissions may be assumed to be the emissions from the lower polluting process itself. In other words, emission reduction credit can be taken for use of inherently lower polluting processes. Estimating realistic upper-bound case scenario does not mean that the source operates in an absolute worst case manner all the time. For example, in developing a realistic upper boundary case, baseline emissions calculations can also consider inherent physical or operational constraints on the source. Such constraints should accurately reflect the true upper boundary of the source's ability to physically operate and the applicant should submit documentation to verify these constraints. If the applicant does not adequately verify these constraints, then the reviewing agency should not be compelled to consider these constraints in calculating baseline emissions. In addition, the reviewing agency may require the applicant to calculate cost effectiveness based on values exceeding the upper boundary assumptions to determine whether or not the assumptions have a deciding role in the BACT determination. If the assumptions have a deciding role in the BACT determination, the reviewing agency should include enforceable conditions in the permit to assure that the upper bound assumptions are not exceeded."**

**[119] These values for the $SO_2$ emission baseline consider the preheater tower to be an "inherently lower emitting process" and account for the sulfur in solid fuel and limestone, applying a factor of 40 percent for the abatement of $SO_2$ that will occur from natural adsorption of $SO_2$ on limestone and lime dust, which is another inherent process lowering emissions.**

[120]

the same category to their source."[121]

**This comment is based on the flawed premise that "use of natural gas" is a control alternative that is in use by general purpose lime kilns, the category of source to which the proposed plant would belong. A review of the lime manufacturing industry, including information in the RBLC and in actual permits, and from other sources, indicates that the primary fuels used in lime kiln producing general purpose lime are coal and petroleum coke.[122] These are the fuels that are proposed to be used at the proposed plant. As such, the comparison requested by this comment is neither required nor possible.**

61. As discussed in the Responsiveness Summary for a permit issued to MGP Ingredients of Illinois (MGP), Illinois EPA evaluated the cost effectiveness of using natural gas for the MGP project. The Illinois EPA should do a similar analysis for this project, correcting the mistakes it made in the MGP analysis. Specifically, the Illinois EPA must spread the cost of the control (use of natural gas) across all pollutants that will be reduced with this control option.[123]

**As already discussed, the only regulated pollutant for which a significant reduction in emissions of the kiln should be projected to occur from use of natural gas is $SO_2$.[124] In addition, while it is possible to include reductions in other pollutants in the cost-effectiveness analysis as will be done for this project (and in fact was done for the analysis for MGP as well), such practice is not required by the NSR Manual. Rather, the NSR Manual would suggest that reductions in emissions of other pollutants be addressed as a beneficial environmental impact in Step 3 of the Top-Down BACT Process. This distinction can be important if there is difference in the environmental significance of the different pollutants that are being addressed.**

62. In its further analysis of the potential use of natural gas by the proposed plant, the Illinois EPA should only consider incremental cost effectiveness in combination with average cost-effectiveness and, then, only according to the NSR Manual's proscriptions.

**The Illinois EPA has followed the NSR Manual, as it is understood by the Illinois EPA and it is applicable. However, it is unclear to which "proscriptions" in the NSR Manual this comment specifically refers or any particular further significance the commenter places on those proscriptions. In addition, there are sources of direction on how analyses of cost-effectiveness under the PSD program should be conducted that are more recent than the general guidance provided in the NSR**

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[121] Vulcan actually cited this provision of the NSR Manual in its 2002 application submittal, at page 4-2, and in its BACT Update Submittal, July 2006, page 3.

[122] **Certain plants, for example Mississippi Lime, in Sainte Genevieve, Missouri, has both kilns for production of food-grade lime fired with natural gas and conventional lime kilns fired with coal and petroleum coke. Certain other plants, for example, Arkansas Lime, In Batesville, Arkansas, may switch the fuel used in the kiln based on the type of lime being produced, with natural gas used for high quality lime and coal and coke used for general purpose lime.**

[123] Also, as discussed in other comments, BACT limits are required for $CO_2$. Natural gas will reduce $CO_2$ emissions by about half and will further significantly reduce the cost-per-ton of natural gas as a clean fuel emission control.

[124] **As already discussed, the reduction in condensable particulate matter that would accompany the use of natural can be estimated at 17 tons per year. There would also be a small reduction in particulate matter emissions of the proposed plant as coal and coke would no longer be handled. This reduction would be less than 1.0 ton per year. This would not be sufficient to affect this analysis and the resulting conclusions. The inclusion of these reductions should not be expected to meaningfully change the results.**

**Manual. These include direct guidance on this subject from USEPA, the precedents set by USEPA's own permitting actions, and USEPA's comments and actions on permitting decisions taken or proposed to be taken by state permitting authorities. Also relevant are decisions by the EAB and the Courts that establish precedents for analyses of cost-effectiveness under the PSD program.**

63. In its further analysis of the potential use of natural gas by the proposed lime plant, the Illinois EPA should use a realistic price for natural gas.

**The Illinois EPA's analysis of the potential use of natural gas appropriately addresses the cost of natural gas. The "basic" cost used in this analysis, $7.71/mmBtu, was calculated from the most recent cost projections made by an authoritative source, the U.S. Energy Administration (EIA), in its "Annual Energy Outlook 2010: Reference Case."[125]**

**However, a relevant issue for this evaluation of the use of natural gas as a BACT alternative is how uncertainty in the predictions of future cost should be handled. If use of natural gas were to be specified as BACT because the cost impacts were found to be reasonable, the Illinois EPA should be able to state with a high degree of confidence that the future costs of natural gas will be such that the cost impacts of natural gas will continue to be reasonable as compared to other alternatives. This is important for natural gas as there has been significant variation and volatility in the cost of natural gas over the last decade.[126] Some degree of certainty and volatility in the price of natural gas should also be expected in the future.[127] Accordingly, with appropriate technical basis, higher costs for natural gas could have been used by the Illinois EPA in its analysis of cost-effectiveness, especially if the conclusions from the analysis were not clear cut.[128]**

64. In its Responsiveness Summary for MGP, the Illinois EPA used cost of natural gas of $8.12 per mmBtu. However, others estimate lower long term prices for natural gas. In particular, XcelEnergy, an expert in the field, in a submittal for its proposed biomass gasification project at the Bay Front power plant,[129] projected the cost of natural gas at the Chicago Hub in 2009 with long- term contracts to be about $7.00/mmBtu. The projected cost only becomes $8.00/mmBtu in 2020 and about $9.50/mmBtu in 2030.

**The projections of the cost of natural gas by Xcel Energy, as provided in this**

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**[125] The cost of natural gas was calculated as the average cost, in constant 2008 dollars, for the period from 2011 to 2035, as evaluated by the EIA in its "Annual Energy Outlook 2010: Reference Case."**

**[126] Based on data compiled by the EIA, the price for natural gas for industrial customers in Illinois over the last ten years has ranged from $4.97 to $10.50 per 1000 cubic feet, starting at $5.85 in 2001 and ending at $7.29 in 2009. (The heat content of 1000 cubic feet of natural gas is equivalent to about 1 million Btu.)**

**[127] For example, the EIA reports data for natural gas futures from the NYMEX exchange indicating that the price of natural gas in January 2011 at the Henry Hub, which is in Southern Louisiana, will be about $6/mmBtu. However, the IEA also notes a range of price from about $3.25 to $11.00, based on a 95 percent confidence interval. The probability that the cost would exceed $8.50/mmBtu is about 10 percent.**

**[128] Another approach to predicting the future cost of natural gas would use historical data, with a multi-year average to account for variation in past costs from year to year. Historic costs are often used to predict future costs. Approached in this manner, based on data reported by the EIA, the average cost of natural gas for industrial users in Illinois was $9.00/mmBtu over the last five years (2005 through 2009) and $8.70 over the last three years (2007 through 2009).**

[129] Application of Northern States Power Company, a Wisconsin Corporation, for a Certificate of Authority and Any Other Authorizations Needed to Construct and Place Into Operation a Biomass Gasifier at Its Bay Front Generating Facility, Docket No. 4220-CE-169 at p. 18, available at http://psc.wi.gov/apps/erf_share/view/viewdoc.aspx?docid=108437

**comment, are not appropriate for use in the BACT analysis for the proposed plant. First, as they reflect the cost of natural gas under long-term contracts, they reflect a wholesale cost of natural gas, as available at the Chicago Hub. Presumably, they reflect costs under long-term contracts as would be available to Xcel as it is an electricity and natural gas utility, but not to an industrial source like Vulcan.[130] They do not consider whether a higher cost would apply for purchase of a non-interruptible supply of natural gas.[131] The projections also do not consider the cost for transfer of gas to the proposed plant. After considering these factors that would result in higher costs for industrial users, it is not unreasonable that cost of natural gas for a facility like Vulcan could be 10 to 20 percent more than that at the Chicago Hub as projected by Excel Energy, e.g., $7.70 to $8.40/mmBtu in 2009, compared with the approximately $7.00/mmBtu projected by Excel.[132] Equally important, this comment also does not consider the uncertainty in the cost projections made by Xcel, as was actually considered by Xcel in the cited document. For example, Xcel indicates that the 2009 cost of natural gas could range from about $5.60 to $8.40/mmBtu. This comment also does not report the assumptions or consideration actually made by Xcel for developments that would affect the demand for and supply of natural gas in the future, as would be relevant if one were to rely on Xcel's cost projections.[133] Lastly, this comment does not propose an approach to dealing with the change in cost of natural gas over time, as Xcel clearly acknowledges will occur.**

65. The fuel nitrogen content of natural gas is lower than that of coal. To the extent that fuel nitrogen contributes to NOx formation in the proposed kiln, that component would be expected to be lower with natural gas. However, because NOx formation is affected by certain technical aspects of the kiln, including its temperature profile and oxygen and nitrogen concentrations, a specific determination of the degree to which NOx emissions would be lowered by burning natural gas requires more detailed engineering and analysis than has been performed.

**Thermal NOx formation is a more significant factor for the NOx emissions of a lime kiln than formation of NOx from fuel nitrogen. As a result, the use of natural gas in the kiln would act to increase thermal NOx formation and increase the overall NOx emissions of the kiln. This is because of the more intense flame that would be present with combustion of natural gas in the confined space of the refractory-lined kiln. Unlike solid fuel, the natural gas would all be immediately available for combustion since it would be in a gaseous state. This phenomenon is discussed by USEPA in its**

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**[130] As potentially available to Vulcan, "long-term" contracts would be in the range of only 18 to 36 months and would include escalator clauses, based on the cost of natural gas to the supplier, so that the fuel cost would not really be locked in.**

**[131] Industrial sources may purchase natural gas on either an interruptible or non-interruptible basis. If gas is purchased on an interruptible basis, the supply of gas to an industrial source may be reduced or cut-off during periods when there is shortage of natural gas, so that the needs of other customers can be met. Natural gas suppliers charge a higher cost for non-interruptible service. Because of impacts of process disruption, Vulcan would either face additional costs for non-interruptible gas service or potential costs due to the effects of interruptions in gas service.**

**[132] In fact, the cost of natural gas to Xcel Energy itself would actually be higher than indicated in the cited projections. This is because the projections do not consider the expense for transferring natural gas from the Chicago hub to facilities operated by or areas serviced by Xcel Energy, at which the natural gas would actual be used..**

**[133] Predictions for the future cost of natural gas are affected by the specific predictions that are made for increases in energy demand generally, development of new sources of natural gas, supplies and costs of other fossil fuels (notably crude oil), and the effects of regulatory programs for $CO_2$ emissions.**

**investigations into control of NOx emissions from portland cement kilns.[134] (While these investigations focused on cement kilns, the phenomenon would also occur for firing of natural gas in a lime kilns.)**

**As use of natural gas would act to increase rather than reduce NOx emissions, "detailed engineering and analysis" are not needed to address a possible decrease in NOx emissions as requested by this comment. In addition, USEPA provides information that is sufficient to assess the likely increase in NOx emissions as related to the possible use of natural gas. That is, any reduction in $SO_2$ emissions from use of natural gas in the kiln would likely be accompanied by an equal or greater increase in its NOx emissions. As such, the use of natural gas would increase emissions of NOx, a pollutant that is of comparable concern for its environmental impacts as $SO_2$.[135, 136]**

66. The application and Project Summary do not identify the costs (if any) Vulcan or the Illinois EPA assumed for natural gas, as compared to the coal/coke blend proposed for this lime plant.

**If the plant were use to natural gas, the Illinois EPA estimates that its annual gas bill would be about $8.4 million. With use of solid fuel, as proposed by Vulcan, the annual fuel cost is estimated to be about $3.3 million including costs for handling and preparation of fuel.[137]**

67. Using the available information and the cost of natural gas used by the Illinois EPA for the MGP project, and considering only the reduction in $SO_2$ emissions, I calculate the average cost effectiveness of using natural gas to be low, i.e., about $1,600 per ton of $SO_2$ controlled.[138] This vastly overstates the cost of control, as it does not consider the savings

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**[134] In *NOx Control Techniques for Cement Kilns: Final Report*, (EPA-457/R-07-002), pages 32, USEPA indicate that use of natural gas in a cement kiln, rather than coal, could result in as much as a factor of three increase in the NOx emissions. (Also refer to *NOx Control Techniques Document*, (EPA-453/R-07-006) page 32.)**

**[135] Based on the information in the USEPA's evaluations of control of NOx emissions from cement kilns, it would not be unrealistic to expect that with use of natural gas the NOx emissions of the kiln would increase by 50 to 100 percent. That is, the nominal NOx emission rate would increase from 3.0 lbs/ton stone feed, 30-day average, to 4.5 to 6.0 lbs/ton, 30-day average. (As already mentioned, USEPA states that use of natural gas in a cement kiln results in a 300 percent increase in NOx emissions.) Accordingly, the increase in NOx emissions that would accompany use of natural gas could be of the same magnitude or greater than any decrease in $SO_2$ emissions from use of natural gas. The potential reduction in $SO_2$ emissions from use of natural gas can at most be reduction of the $SO_2$ emissions of the kiln to zero. That is the reduction in SO2 emissions would at most be a reduction of 2.0 lbs/ton stone feed, 30-day average.**

**[136] $SO_2$ is of concern due to its direct impact on human health as it is a respiratory irritant, as it is a precursor to formation of $PM_{2.5}$ and $PM_{10}$ in the atmosphere, and as it contributes to acid rain. NOx is of concern for similar effects and because it is a precursor to formation of ozone in the atmosphere.**

**[137] With the preheater tower, the design heat input to the proposed kiln would be 125 mmBtu per hour. On an annual basis, assuming continuous operation at design capacity, the kiln would use 1,095,000 mmBtu/yr. At a cost of $7.71 mmBtu, the annual fuel bill for the plant would be $8,442,250. (1,095,000 x $7.71 = $8,442,250) The cost of solid fuel, based on EIA data for coal using the same approach as taken for the cost of natural gas, would be $2.76/mmBtu. In addition, Vulcan would have costs for handling and preparation of fuel that have been estimated as 10 percent of the fuel cost or $0.276/mmBtu. This yields an annual fuel cost with use of solid fuel of $3,324,420. The difference in annual costs for fuel would be $5,117,830.**

[138] The proposed lime plant would use 1,533,000 mmBtu/year, based on the plant's capacity, 600 tons of lime per day, and Vulcan's projection for the plant's heat rate, 7.0 mmBtu per ton of lime product. This results in an annual fuel cost for natural gas (and therefore an annualized cost of control for the natural gas option) of $12,447,960, based on a cost of $8.12/mmBtu for natural gas, as used by the Illinois EPA for the MGP project.

. Starting from a baseline of 7,709 tons of $SO_2$/year, natural gas would achieve a reduction of 7,708 tons/year. Therefore, the cost-effectiveness of natural gas is $1,614 per ton of $SO_2$ ($12,447,960 ÷ 7708 tons = $1,614/ton).

. Starting from a baseline of 3,434 tons of $SO_2$/year, natural gas would achieve a reduction of 3433 tons/year. Therefore, the cost-effectiveness of natural gas is $3,626/ton $SO_2$ ($12,447,960 ÷ 3433 tons = $3,626/ton).

in capital and operating costs that would accompany use of natural gas rather than solid fuel. In addition, the actual cost per ton would be much lower because the cost of using natural gas must be spread among the reductions in emissions of all pollutants.

**The evaluation of the cost-effectiveness provided in this comment for the use of natural gas is flawed and cannot be relied upon. Even assuming, for purposes of discussion, that it is appropriate to evaluate the potential use of natural gas in the manner proposed by this comment, the evaluation performed by this commenter does not properly account for the reduction in the $SO_2$ emissions of the plant that would accompany use of natural gas. As already discussed, the $SO_2$ emissions baseline used for this evaluation, 7,708 tons per year, is outdated and inappropriate, as it does not reflect the reduction in fuel usage from use of a preheater tower on the kiln. It also does not account for the $SO_2$ emissions of the kiln due to the sulfur in the limestone feed, which would be unaffected by the use of natural gas as a fuel.[139] Lastly, it does not account for any natural adsorption of $SO_2$ by limestone dust. As already discussed, a more appropriate value for the $SO_2$ emission baseline for the plant as now planned by Vulcan, is 2,843.5 tons per year. That is, with use of solid fuel, 2,843.5 tons of $SO_2$ would be available for control by the scrubber installed to control those emissions.**

**Accordingly, using the general approach to the calculation of cost-effectiveness taken by this commenter, the cost-effectiveness of use of natural gas would now be $3,500 per ton of $SO_2$ controlled.[140, 141] This is substantially more than the estimated cost of $SO_2$ control with solid fuel, which is only about $500 per ton. In addition, it is only one factor in determining whether use of natural gas should be required. Also relevant, are other measures of cost impacts, in terms of incremental cost-effectiveness and direct cost-impacts for the lime industry, and the environmental impacts related to NOx emissions.**

68. A cost effectiveness analysis must compare the cost-effectiveness of using natural gas at the proposed plant to the costs experienced by other lime plants using natural gas, which has not yet been done. I doubt, however, that there can be any significant difference since

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**[139] As the evaluation prepared by this commenter does not account for the sulfur in the limestone feed to the kiln, it also does not properly account for the reduction in $SO_2$ emissions that would be achieved with use of natural gas. Most critically, it does not consider whether a $SO_2$ scrubber would still be needed if natural gas were used, presuming instead that a scrubber would no longer be needed. This overstates the reduction in $SO_2$ emissions that would accompany use of natural gas. It also potentially overlooks the continuing costs for control of $SO_2$ emissions associated with operation of a scrubber. The control costs for scrubbing would certainly be reduced with use of natural gas, as the sulfur input to the kiln from fuel would be reduced and less lime would be needed. However, these costs would only be completely eliminated if a scrubber would not be needed to address $SO_2$ emissions from the sulfur in the limestone feed. This does not appear to be the case. The $SO_2$ emissions baseline or uncontrolled $SO_2$ emissions from the limestone feed are significant, i.e., 741.5 tons per year. Based on its historical operation of this kiln, the natural adsorption of $SO_2$ by dust would not reduce these emissions to zero. In the absence of a scrubber, $SO_2$ emissions of the kiln with natural gas could be identical to those with solid fuel, with the effect of the reduction in fuel sulfur being identical to the control of emissions that would otherwise have been provided by the scrubber. The cost of the scrubber is also a small factor in the overall costs and not sufficient to justify the risk to Vulcan's future compliance by making a BACT determination that does not include a scrubber.**

**[140] With an $SO_2$ emission rate of 1.0 lb/ton stone feed, the annual $SO_2$ emissions of the kiln would be 236.5 tons. (473,040 tons/yr x 1.0 lb/ton ÷ 2000 lb/ton = 236.5 tons/yr)**

**[141] The annual control costs are $9,122,453 ($8,442,450 for natural gas and $680,003 for the scrubber). The annual reduction in $SO_2$ emissions is 2,607 tons, assuming that use of natural gas would enable an $SO_2$ emissions rate of 1.0 lb/ton to be achieved. (2843.5 tons - 473,040 tons x 1.0 lb/ton ÷ 2000 = 2607 tons) The reduction in $SO_2$ emissions is not significantly different if one assumes natural gas would enable a much lower $SO_2$ emissions rate. (2843.5 tons - 473,040 tons x 0.10 lb/ton ÷ 2000 = 2,819 tons)**

natural gas is a commodity and most purchasers will be in a similar situation as far as costs. Moreover, because gas is a clean fuel and does not necessitate add-on $SO_2$ control equipment, the cost of the control is essentially the cost of the fuel.

**This comment erroneously presumes that certain existing lime plants that are similar to the proposed plant are using natural gas, rather than solid fuel. However, this is not case. Further investigation indicates that lime plants that are similar to the proposed plant, that is, lime plants that are producing general purpose lime, appear to use coal and coke as fuel. This is a logical result of the higher cost of natural gas, which means use of natural gas would greatly increase the cost of lime, by over 25 percent.[142, 143] This would generally make use of natural gas cost-prohibitive for production of general purpose lime.[144] The fact that lime kilns producing food-grade lime use natural gas, which is a more valuable product, does not show that this is practical for production of general purpose lime.**

**In addition, this comment again erroneously assumes that the use of natural gas would eliminate the need for add-on $SO_2$ control equipment. This is not the case. The limestone feed to the kiln also contains sulfur. As dolomitic limestone is being produced, based on the historic operation of the kiln, natural adsorption cannot be relied upon to control the resulting $SO_2$ emissions. The kiln must be equipped with a scrubber to address those $SO_2$ emissions from that sulfur and ensure compliance.[145]**

69. While it is not appropriate to merely use a default cost-per-ton threshold for average cost effectiveness regardless of what costs other similar plants are incurring to use the same control option, I note that the value of cost-effectiveness that I calculated, $1,600 per ton, is a fraction of the $10,000/ton default cost effectiveness threshold Illinois EPA used in the issuance of a permit for the MGP Project. Therefore, even under Illinois EPA's less stringent cost-effectiveness analysis, it must require use of natural gas as BACT.

**As already discussed, the evaluation relied upon by this comment is flawed and greatly understates the cost impacts that would accompany use of natural gas by the**

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**142 With production of 219,000 tons of lime per year, the difference between fuel costs with solid fuel and natural gas would be over $23 per ton of lime. ($5,117,830/yr ÷ 219,000 tons/yr = $23.36/ton)**

**143 By way of comparison, when USEPA adopted the NESHAP for lime manufacturing plant, it projected an increase in the cost of lime on a national basis as a result of this rule less than a 5 percent.**

**144 It is readily demonstrated that the use of natural gas for production of general purpose lime should be considered cost-prohibitive. Based simply on the difference in fuel costs for solid fuel and natural gas, use of natural gas would increase fuel costs by over $22 per ton of lime produced. Assuming a generous selling price of $80/ton for general purpose lime as would be made by the proposed plant, the accompanying increase in manufacturing costs would be more than 25 percent. A lime plant that was required to use natural gas would not be able to compete in the marketplace for general purpose lime with plants that use solid fuel, as the cost of its product would be over $100/ton, compared to $80/ton from its competitors.**

**145 In this regard, this comment is also flawed as it would suggest a comparison for fuel costs simply be made between lime plants producing high-calcium lime, for which scrubbers are not needed and the proposed plant, which would produce dolomitic limestone and for which an $SO_2$ scrubber would be required. The "emissions control costs" of the proposed plant will be substantially higher than those of high-calcium lime plants that do not require $SO_2$ scrubbers.**

**A more refined comparison would be needed than the comment is suggesting to appropriately compare the proposed plant with existing plants. As discussed in the NSR Manual, page B.44, "Consequently, where unusual factors exists that result in cost/economic impacts beyond the range normally incurred by sources in that category, the technology can be eliminated provided the applicant has adequately identified the circumstances, including the cost or other analyses, that show what is significantly different about the proposed source." (It is noteworthy that the NSR Manual does not suggest that an applicant must obtain information from existing sources, who would be its competitor, as part of this demonstration.) Vulcan's application identifies the unusual circumstances of the proposed plant, including estimates for the additional costs that it would bear because of the need to use a scrubber.**

**proposed plant. As compared to the cost-effectiveness for control of $SO_2$ with use of solid fuel, about $500 per ton of $SO_2$ controlled, the use of natural gas would be much more costly. The average cost-effectiveness would become $2,224, $3,500 or $11,480 per ton of $SO_2$, depending upon the $SO_2$ emissions baseline that is used and whether the entire cost of natural gas is used or only the additional cost for fuel.[146] More significantly, the incremental cost-effectiveness would be in excess of $15,000 per ton.[147] These cost-impacts are at levels that are excessive, justifying the rejection of natural gas as an approach for control of $SO_2$ emissions of the kiln, even without consideration of the environmental impacts related to emissions of NOx.[148]**

70. The permit record is either missing significant parts or Illinois EPA's review was incomplete. It does not appear that the permit record contains detailed engineering documentation of the kiln. Control of emissions is affected by fuel inputs, the manner in which the kiln is operated (i.e., conditions such as temperatures, air flow rates, the extent of preheating, etc.) and the design of the kiln. In particular, the design affects the design of any downstream feasible control technologies that should and could be considered and in assessing their costs. Without detailed design data, it is not feasible to conduct an appropriate and adequate engineering BACT evaluation.

**This comment does not identify a deficiency in the application for the proposed plant. In particular, the application indicates the size of the plant and its product. It also includes information on the planned fuel and the temperature and flow rate of the exhaust leaving the kiln. The other information requested by this comment would not assist in the evaluation of BACT for the kiln. Moreover, it would likely include information that would be considered proprietary, as it extends to the design of the kiln as related to production of lime rather than to the emissions from the kiln.**

71. It appears that the Illinois EPA has relied mostly on statements by Vulcan in order to conduct its BACT evaluation. This is not correct. The Illinois EPA should have conducted a thorough and independent BACT review, consistent with applicable statutory and regulatory requirements.

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**[146] If the baseline is 2843.5 tons of $SO_2$, the average cost-effectiveness is about $2,225/ton if only the <u>difference</u> in cost of fuel is considered. (($8,442,450 - $3,324,420 + $680,003) ÷ (2843.5 - 236.5) = $2,224/ton) Alternatively, if the total cost of natural gas is considered, the average cost-effectiveness becomes about $3,500/ton (($8,442,450 + $680,003) ÷ (2843.5 - 236.5) = $3,499/ton) If the baseline is 741.5 tons of $SO_2$, the average cost-effectiveness based on the difference in fuel cost is about $11,480/ton. (($5,117,830 + 680,003) ÷ (741.5 - 236.5) = $11,481/ton). These results are not changed in a meaningful way if one also accounts for a reduction in the kiln's emissions of condensable particulate (17 tons) and the particulate associated with handling of fuel (1 ton) . For example, with an $SO_2$ baseline of 2,843,5 tons, the average cost-effectiveness becomes about $2,225/ton. (($5,117,830 + $680,003) ÷ (2843.5 - 236.5 + 18) = $2,209/ton)**

**[147] The incremental change in control costs is $4,453,814 ($8,442,450 - $3,324,420 - $1,344,219 + $680,003). Accordingly, the incremental cost-effectiveness is about $18,800/ton, based on a reduction in $SO_2$ emissions with use of natural gas of 236.5 tons/year, reflecting achievement of an $SO_2$ emission rate of 1.0 lb/ton feed. Even if one assumes that the $SO_2$ reduction is 345.8 tons/year (reflecting a reduction in the $SO_2$ emission rate from 1.5 lbs/ton feed to essentially zero), the incremental cost-effectiveness is about $12,880/ton. ($4,453,814 ÷ 345.8 = $12,879/ton)**

**[148] As already mentioned, when USEPA, Region 8 evaluated an alternative coal supply for a solid-fuel fired generating unit proposed by Deseret Power, it relied on incremental cost-effectiveness in its decisions, calculating cost-effectiveness by dividing the additional costs with the alternative fuel by the additional reduction in emissions that would result. As part of its assessment whether the incremental cost-effectiveness for an alternative coal was reasonable for that project, USEPA surveyed decisions about levels of incremental cost-effectiveness that were considered reasonable or excessive and at what level of incremental costs alternative emission controls were being required as BACT. The survey showed that control alternatives with an incremental cost-effectiveness in excess of $10,000/ton were not being required as BACT. Refer to "Section 4.1 – Cleaner coals" in the USEPA's "Response to Public Comments on Draft Air Pollution Control Prevention of Significant Deterioration (PSD) Permit to Construct Permit No. PSD-OU-0002-04.00."**

**The Illinois EPA conducted an appropriate determination of BACT for the proposed plant. While the foundation of the BACT determination is the information and analysis submitted by Vulcan, the Illinois EPA conducted its own analysis. This is evident as Vulcan was required to supplement its application to provide additional information demonstrating that BACT would be provided by the proposed plant. In addition, the BACT determinations for the proposed plant, as reflected in the provisions of both the draft and issued permits, are more stringent than were proposed by Vulcan.**

72. The Illinois EPA has proposed that the $SO_2$ emissions of the proposed kiln would be controlled by the combination of a lime kiln's natural ability to adsorb $SO_2$ and a dry scrubber, consistent with the BACT demonstration submitted by Vulcan. It is not clear why wet scrubbing, a more effective $SO_2$ control technology, was not selected as the basis for BACT. The construction permit previously issued for this kiln in 2002 reflected use a wet scrubber.[149] It is commonly known that wet scrubbers achieve 98 percent, or greater, $SO_2$ control. This, in addition to the control provided by the kiln's natural ability to adsorb $SO_2$, would provide greater control than the dry scrubber now proposed in the draft permit.[150] Therefore, as a higher ranked control option, wet scrubbing is presumptively preferred unless rejected in Step 4 of the Top-down BACT process.

**The use of a wet scrubber for control of the kiln's $SO_2$ emissions was appropriately rejected in Step 4 of the Top-Down BACT process due to its associated environmental impacts. Most significantly, the use of a wet scrubber would be accompanied by an increase in the kiln's emissions of particulate matter. If equipped with a wet scrubber, the proposed lime kiln could not meet the limit that was proposed and has now been set as BACT for the kiln's emissions of filterable particulate, 0.10 pounds per ton of limestone feed. This is equivalent to a particulate matter concentration of 0.015 gr/dscf in the exhaust from the kiln. With a typical inlet particulate matter concentration to the control device of 10 grains/acf, a particulate limit of 0.10 lb/ton would require a wet scrubber on the kiln to achieve a nominal particulate control efficiency of more than 99.85 percent. This removal efficiency is not achievable on a lime kiln with current wet scrubber technology. Even slight re-entrainment of the scrubbing liquid, with its suspended and dissolved solids, can result in particulate matter emissions above 0.015 gr/dscf. A PM limit of 0.10 lb/ton is achievable with a spray dryer absorber or dry scrubber because the baghouse is installed after the dry scrubber, so that re-entrainment of the scrubbant is not an issue.**[151, 152]

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[149] While the construction permit issued on October 28, 2002 only specified that that a scrubber must be used for control of SO2 emissions, the application reflected the use of a wet scrubber.

[150] The 2002 permit did not reflect the level of control that is achievable with a wet scrubber, requiring only 50 to 60 percent reduction with the wet scrubber, with an $SO_2$ limit of only 2.76 pounds per ton of stone feed, less stringent than the limit now being proposed, 2.76 pounds per ton of stone feed.

[151] **The challenge presented by particulate matter emission limits for use for wet scrubbers at lime plants is mentioned in Vulcan's Updated BACT Analyses, November 2008. (See Vulcan's November 2008 submittal "Updated Best Available Control Technology Analyses," pages 9 and 10.)**

[152] **The particulate limits that are achievable by lime kilns with wet scrubbers are confirmed by USEPA'a action when adopting the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Lime Manufacturing Plants, 40 CFR 63, Subpart AAAAA. This NESHAP limits the particulate matter emissions of new lime kilns (i.e., kilns constructed after December 20, 2002) to 0.10 pounds per ton of stone feed. By contrast, the limit for existing kilns equipped with wet scrubbers is 0.6 pounds per ton, six times higher. (*See* 40 CFR 63.7082 and 40 CFR 63.7090 and Table 1). As explained by USEPA in its Response to Public Comments for the Adoption of this NESHAP, this action was taken to accommodate**

**The use of dry scrubbing also responds to experience with a wet scrubber at another lime plant formerly operated by Vulcan in Illinois, which was not available in 2002. At that plant, which is now shut down, the wet scrubber did not perform reliably. Its use was also accompanied by significant degradation in the performance of the existing particulate matter control device, an ESP located downstream of the scrubber.[153] Accordingly, while the design efficiency of a wet scrubber for $SO_2$ may be higher than that of a dry scrubber, it is uncertain whether that efficiency would actually be achieved in practice when applied on a lime kiln. The use of a dry scrubber-baghouse combination represents a well-established, robust approach for coordinated control of emissions of $SO_2$ and particulate. It is an approach to control of $SO_2$ that enhances the performance of the baghouse for control of particulate.[154]**

**Lastly, the use of a wet scrubber would have impacts on wastewater. Wet scrubbers generate wastewater that must be treated, with accompanying discharges of wastewater after treatment. These impacts are avoided with dry scrubbing, which produces a single "waste" stream, in the form of a solid that can potentially be beneficially used.**

**Incidentally, this comment does not accurately portray the level of $SO_2$ control that would be required by the proposed BACT limit. This is because the control of $SO_2$ by the scrubber device and the natural scrubbing action both need to be considered when evaluating the performance of control technology for $SO_2$ emissions.[155] The**

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**continued use of wet scrubbers on existing lime kilns on which they were installed. This action responded to comments from a number of lime companies that the limit that was otherwise proposed for existing kilns, 0.12 lb/ton, was not achievable with the existing wet scrubber technology used for control of particulate. Those scrubbers would have to be replaced by baghouses, with excessive economic impacts and inappropriate environmental impacts, if USEPA did not set a separate, higher particulate limit for existing kilns controlled by wet scrubbers. (Refer to Section 3.1 of "National Emission Standards for Hazardous Air Pollutants (NESHAP for Lime Manufacturing Background Information Document – Volume II: Public Comments And Responses," USEPA, OAQPS, August 2003.)**

[153] **The primary problem with a wet scrubber experienced at the other lime plant in Illinois was likely due to the loading of dust into the scrubber from the lime kiln. This caused chronic precipitation of salts and scaling in the scrubber due to excessive levels of calcium in the scrubbing solution. The problem then cascaded to the particulate control device. This phenomenon would be avoided with dry scrubbing, which are not dependent on careful of management of the composition and chemistry of the scrubbant solution but instead keep most of reagent in fine solid slurry form and avoid contact between wet material and the wall of the reaction vessel.**

[154] **Dry scrubbing is a particularly appropriate technology for the proposed kiln as it will be a relatively small unit, with a nominal heat input capacity of only 125 mmBtu/hour. The scale of an $SO_2$ control device affects the consequences of operational problems with a smaller unit. For example, the narrower piping of a small unit is more quickly blocked by scaling. This cannot be compensated for increasing the diameter of the piping as it would reduce the flow velocity through the piping, as also relevant to scaling and precipitation.**

[155] The overall $SO_2$ control efficiency initially required by the issued permit for the proposed kiln is 90 percent, when appropriately calculated comparing the amount of $SO_2$ that is allowed to be emitted and the amount of $SO_2$ that would be formed by the sulfur entering the kiln in fuel and limestone.

After accounting for sulfur in fuel and stone feed, the "theoretical" uncontrolled $SO_2$ emission rate is 1124 pounds per hour, based a total of 562 pounds of sulfur per hour amount available for conversion to $SO_2$. The amount of sulfur entering the kiln with solid fuel would be 400 pounds per hour, based on usage of 5 tons of fuel per hour and a sulfur content of 4 percent by weight. The amount of sulfur entering with the limestone is 162 pounds, based on a feed rate of 54 tons per hour and a sulfur content of 0.15 percent by weight. (The fuel only contains 71 percent of the total sulfur entering the lime kiln.) The permitted $SO_2$ emissions are 108 pounds per hour, based on the appropriate BACT limits for calculation of efficiency, i.e., 2.0 lb per ton, 30-day average. (54 tons x 2 lb/ton = 108). The resulting control efficiency is nominally 90 percent. ($1 - 108/1124 = 0.904, \approx 0.90$)

The permit also provides that the SO2 limits of the kiln may be reduced after an evaluation period, with a "target" or "default" reduction to 1.5 pounds per ton of stone feed, 30-day average, unless Vulcan shows that this limit is not achievable. With the default limit, the nominal $SO_2$ control efficiency for the kiln would be 92.8 percent. ($1 - 81/1124 = 0.904, \approx 0.9279$)

**overall control required on the kiln by the issued permit is nominally 90 percent.[156] This is at the lower end of the range of the performance of dry scrubbing on boilers, as noted in this comment. However, it is appropriate to set BACT at this level given the limited experience with use of add-on $SO_2$ scrubbers on lime kilns, where they must confront much higher loadings of dust than are present for scrubbers installed on coal-fired boilers.**

**Also, notwithstanding the assertion made in this comment, it is not "commonly known" that wet scrubbers achieve 98 percent control of $SO_2$ emissions. When considering the performance of scrubbers for control of $SO_2$, one should differentiate based on the type of unit to which the scrubber is applied. For example, there are a number of proposed new coal fired boilers burning high-sulfur coal, for which the design level of efficiency of the scrubbers is nominally 98 percent. This does not mean that this level of efficiency is achievable for boilers burning low-sulfur coal, given the lower concentration of $SO_2$ in the exhaust of a boiler fired with low-sulfur coal. Likewise, this does not mean that 98 percent control of emissions is achievable for a lime kilns after natural absorption of $SO_2$ from the exhaust has been accounted for. Nonetheless, in response to this point, the issued permit now also includes a BACT limit for the kiln's $SO_2$ emissions that applies on a 30-day, i.e., 2.0 pounds of $SO_2$ per ton of stone feed, 30-day average. (The associated target limit for SO2 emissions following evaluation of performance, is 1.5 pounds per ton of stone feed.) The longer averaging period of this limit is consistent with the averaging periods commonly used for $SO_2$ limits from coal-fired boilers. This additional "long-term" limit will better portray and address the overall effectiveness of the $SO_2$ control system. It will also facilitate more direct comparison of the $SO_2$ control requirements for the proposed kiln with requirements set for coal-fired boilers. In this regard, the initial limit reflects a nominal overall $SO_2$ control efficiency of 90 percent and the target limit reflects 92.8 percent control, both consistent with the performance of dry scrubbers as noted by this comment.**

73. The proposed $SO_2$ BACT limit, which reflects use of a dry scrubber, appears to be much less than the maximum achievable degree of control. Compared to the tested $SO_2$ emissions of the kiln in its historic configuration without a scrubber, 5.5 to 7.0 lbs/ton of stone feed, as discussed in the Project Summary, the proposed BACT limit, 2.2 lbs/ton, only reflects an $SO_2$ reduction of between 60 and 68 percent from the addition of a dry scrubber. These are far less than the efficiency that is possible. For example, in applications on coal-fired boiler, dry-scrubbers are expected to have 90 to 95 percent efficiency. It is not clear why these higher levels of efficiency, with far lower limits for $SO_2$, were not considered in the BACT determination. For example, with 5.5 lbs $SO_2$/ton stone and 95 percent efficiency from the dry scrubber, the $SO_2$ limit would be 0.275 lbs/ton stone feed.

**This comment inappropriately relies upon a significant reduction in the kiln's $SO_2$ emissions due to the natural adsorption of $SO_2$ by dust, overlooking the fact that the control train for the kiln must control emissions of both particulate and $SO_2$. When**

**[156] On page 11, Vulcan's Updated BACT Analyses, November 2008 misleadingly indicates that the overall $SO_2$ control efficiency achieved with spray dryer absorber would be 91.5 percent (see page 11. However, this value for control efficiency also considered a reduction in $SO_2$ emissions from the historical rate based on the installation of the preheater.**

**this is considered, $SO_2$ BACT limits are appropriately set considering the level of overall control for $SO_2$ emissions, without any reliance on any reduction in $SO_2$ emissions by adsorption on dust.[157] This is because it cannot be assured that the kiln will continue to perform as it did historically, with the same degree of natural adsorption, given the changes that will and must be made to the kiln. In particular, the BACT determination for particulate will act to reduce the thickness of the dust cake on the filter bags, negatively affecting adsorption of $SO_2$. This is a consequence of using filter fabric designed for very effective control of particulate, with membrane filtration, as desirable to address emissions of filterable $PM_{2.5}$. In traditional dry scrubber installations, conventional filter fabrics, which are not so designed, are used so $SO_2$ reduction occurs not only in the dry scrubber itself, but also as the flue gas passes through the lime laden dust cake. The addition of preheater tower, as desirable for improved energy efficiency and reduction in $CO_2$ emissions, also may affect the extent of natural adsorption. The preheater, which is at the feed end of the kiln, will increase the attrition of limestone and the loading of limestone dust to the baghouse. To the extent that the natural adsorption is a consequence of lime dust, rather than limestone dust, this may also negatively affect natural adsorption of $SO_2$ as contact with the lime will be obstructed by the limestone.**

74. Nine years ago, the Illinois EPA considered BACT for this kiln and observed the following:

> This BACT determination is totally inadequate since there are a number of stack tests given in the Emission Factor Documentation for AP-42, Section 11.15 Lime Manufacturing that have shown lower emissions. At least two of these plants (Dravo Lime, Saginaw, Al and Martin-Marietta, Calera, AL), if not more, are producing dolomitic lime. The following tables give a comparison of Vulcan's proposed BACT and what has actually been achieved at other plants:[158]

At least five of the listed lime plants are achieving a lower $SO_2$ emission rate than proposed in the draft permit. At least one of those plants, Dravo Lime, Saginaw, Alabama, produces dolomitic lime, and has an emission rate more than an order of magnitude lower than the proposed $SO_2$ limit of 2.2 pounds per ton of stone.

**This comment, which addresses a predecisional memorandum prepared by a staff member of the Illinois EPA in 2000, does not provide a basis to set a lower $SO_2$ BACT limit for the kiln than set in the issued permit. The cited document is a historic document associated with the previous issuance of a revised construction permit for Vulcan's Manteno lime plant in October 2002. With respect to $SO_2$, the memorandum was prepared in response to Vulcan's initial proposal in 2000 for a**

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[157] **This approach is not appropriate for evaluating cost-effectiveness of the scrubber. This is because it would overstate the baseline emissions, as it is reasonable to expect that some natural adsorption would continue to occur. For that purpose, the future level of natural adsorption was set at 40 percent. When this value is used, compared to the "incremental $SO_2$ control efficiencies" stated in this comment, the long-term $SO_2$ limits established set for the kiln actually require efficiencies of about 83 and 88 percent. For example, for the limit of 2.0 lb/ton stone feed, 83 percent incremental control compared to 90 percent overall control. $(0.1/(1 - 0.4) = .833, \approx 83$ percent.).**

[158] Memorandum, November 14, 2000, "BACT Determination for Vulcan Materials Dolomitic Lime Kiln," by John Reed, Illinois EPA, to Robert Smet, Illinois EPA. The memorandum lists the results of 11 separate $SO_2$ emissions tests at lime kilns, as available from emission test data for lime kilns compiled by USEPA as part of its development of emission factors in AP-42. The results of the 11 tests range from 0.013 to 12 lbs $SO_2$ per ton.

**revised $SO_2$ BACT limit for the kiln, i.e., 31.4 lbs/ton of stone feed. The memorandum does not recommend that a particular limit be set for $SO_2$ BACT, only arguing that the $SO_2$ limit then proposed by Vulcan should not be accepted as BACT.[159] It was not.[160] At the same time, this memorandum lists test results from lime plants whose specific circumstances, e.g., type of limestone feed and lime product, are not fully known. As such, the listed test results cannot be correlated to the $SO_2$ emissions of the proposed Vulcan lime kiln and cannot be used as a basis to set an $SO_2$ BACT limit for the proposed kiln.**

**Incidentally, the cited memorandum does not show that five lime plants are achieving $SO_2$ emission rates that are lower than proposed in the current draft permit, 2.2 lbs/ton feed, as claimed in this comment. The cited memorandum actually lists the results of 11 separate emission tests at five plants. The results of five of the tests, not five of the plants, are lower than 2.2 lbs/ton. However, one of these tests, the one that is more than an order of magnitude lower than the proposed $SO_2$ limit (the single test at Dravo Lime) cannot be considered credible.[161] For the other four plants, only one plant, for which there is also only a single test, "consistently" has an $SO_2$ emission rate that is less than 2.2 lbs/ton. The results of the testing for Martin Marietta, which is identified as a dolomitic lime plant, are all higher than the BACT limit set for the proposed plant (three tests, at 4.6, 4.6 and 11 lbs/ton).[162]**

**The emission factors in AP-42 are not an appropriate basis to establish BACT limits for the $SO_2$ emissions of this lime kiln.[163] This is because the composition of limestone**

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[159] For $SO_2$, the cited memorandum lists the results of 11 separate emission tests at five lime plants. All emission tests show emission rates that are lower than 31.4 lbs/ton, the limit then proposed by Vulcan. The highest rate listed is 12 lbs/ton.

[160] The revised permit for this lime plant issued on October 2002 set $SO_2$ BACT at 2.76 pounds per ton of stone feed, 3-hour average. In the current draft permit, this limit was proposed to be lowered to 2.2 pounds per ton to account for the reduction in fuel usage that will accompany installation of a pre-heater on the kiln. As already discussed, the issued permit also includes a lower BACT limit for $SO_2$, 2.0 lb/hr, that applies on a 30-day rolling average.

[161] For this plant, Dravo Lime, in Saginaw, Alabama (one test), the reported $SO_2$ emission rate is 0.013 lbs/ton. This rate is so low that the measurement cannot be given any credence, much less considered as informative for the kiln at the proposed plant given its tested $SO_2$ emission rate. In particular, with the $SO_2$ test method used in 1974 and 1975, limestone and lime dust captured by the filter at the front of the sampling train act to control SO2 emissions, potentially greatly reducing the measured $SO_2$ emissions, invalidating the accuracy of the measurement. The USEPA subsequently adopted Method 6C, an instrumental test method that enables this source of interference to be identified and appropriately addressed.

[162] Of the four lime plants with results that that cannot be rejected as not being credible, the tested $SO_2$ emission rates of two of the plants (four separate tests) are 3.1, 4.6, 4.6 and 11 lbs/ton, all higher than the primary BACT limit set in the issued permit, 2.2 lb/ton. The tested $SO_2$ emission rate of one of the plants (one test) is 0.37 lbs/ton, lower than this BACT limit. However, this kiln is likely either producing high-calcium lime or equipped with a wet scrubber for control of particulate matter, or both, so that the measured $SO_2$ emission rate should not be considered applicable for the proposed plant. For the fourth plant, the measured $SO_2$ emission rates (five tests) range from 0.15 to 12 lbs/ton. For this plant, Dravo Lime, in Saginaw, Alabama (one test), the reported $SO_2$ emission rate is 0.013 lbs/ton. This rate is so low that the measurement cannot be given any credence, much less considered as informative for the kiln at the proposed plant given its tested $SO_2$ emission rate. In particular, with the $SO_2$ test method used in 1974 and 1975, limestone and lime dust captured by the filter at the front of the sampling train act to control SO2 emissions, potentially greatly reducing the measured $SO_2$ emissions, invalidating the accuracy of the measurement. The USEPA subsequently adopted Method 6C, an instrumental test method that enables this source of interference to be identified and appropriately addressed.

[163] The emission factors in AP-42 for lime manufacturing (Section 11.17) should generally not be relied upon in the permitting of the "proposed plant" since reliable, site-specific emission data is available from the previous operation of the plant. Rather, the site-specific emission data should be relied upon.

The various limitations and qualifications that generally apply to emission factors in AP-42 are acknowledged by the USEPA. Most significantly, these emission factors represent an average of the available test data, with some consideration given to the quality of data. As such, these factors are unlikely to reflect the emissions of a particular source if there is variability in emissions of particular categories or subcategories of sources. As explained by USEPA,

"Average emissions differ significantly from source to source and, therefore, emission factors frequently may not provide adequate estimates of the average emissions for a specific source. The extent of between-source variability that exists, even

**differs from quarry to quarry in ways that have an effect on a lime kiln's $SO_2$ emissions. The sulfur content of the limestone contributes to the uncontrolled emissions of $SO_2$. The composition of the limestone also affects the ease with which $SO_2$ is naturally adsorbed in the dust cake in the baghouse. Dolomitic limestone ($CaMg(CO_3)_2$) is a different mineral than "ordinary limestone" or calcium carbonate ($CaCO_3$). Dolomitic limestone and dolomitic lime are less reactive than ordinary, high-calcium limestone and lime.[164, 165] The emission factors listed in AP-42 do not account for the effect of the type of limestone, high-calcium or dolomitic, on $SO_2$ emissions. This is recognized in the narrative in AP-42, "Because of differences in the sulfur content of the raw material and fuel and in process operations, a mass balance on sulfur may yield a more representative emission factor for a specific facility than the $SO_2$ emission factors presented in Tables 11.17-5 and 11.17-6." AP-42, Section 11.17, page 11.17-5.**

75. While the BACT determination in the draft permit for $SO_2$ provides that the $SO_2$ limit may be reduced to 1.8 lb/ton stone feed in the future "...based on evaluation of the actual operation...," this is an ephemeral expectation, and not consistent with BACT.

**This provision in the draft permit, which is carried over to the issued permit, is fully consistent with BACT. This provision specifically addresses certain factors that make it uncertain whether a lower $SO_2$ emission rate, while likely to be met, will be "achievable" by the proposed plant. Under the PSD program, a limit set as BACT by a permitting authority must be "achievable" by the control technology for pollutant. That is, if the control technology is properly designed, constructed, operated and maintained, it will enable the BACT limit to be consistently met considering normal variability in the operation of the emission unit and the associated control technology. BACT limits should not be set at a level at which there is uncertainty whether the limit will be achievable. However, when there is significant uncertainty about the demonstrated performance of an "innovative" control technology, it is also accepted practice to set BACT limits that may be lowered based on the demonstrated performance of control technology during the initial operation of an emission unit. For planned control technology, which has not yet been applied in similar circumstances, this maintains a balance between the need to set limits that are achievable while at the same time obtaining the maximum degree of emission reduction that is achievable once such technology is constructed and operated.**

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**among similar individual sources, can be large depending on process, control system, and pollutant. Although some of the causes of this variability may be considered in emission factor development, this type of information is seldom included in emission test reports used to develop AP-42 or L&E emission factors. As a result, some emission factors are derived from tests whose results may vary by orders of magnitude. Even when the major process variables are accounted for, the emission factors developed may be the result of averaging source test results that differ significantly."**
**Page 2-4, *Procedures for Preparing Emission Factor Documents*, USEPA, OAPS, 1997, EPA 454/R95-015, revised**
**In addition, Section 11.17 of AP-42, Lime Manufacturing, is now over ten years old, and even if representative of the proposed plant, is not reliable. None of the factors are rated as being of excellent quality . Only two of the factors are of average quality. More than 80 percent of the factors are rated as below average and poor quality. This is because of the poor quality of emission tests that are the basis for the factors, which may be poorly documented, out-of-date, use non-standard methods, so as to make the data such suspect. In addition, there may be reason to suspect that the available testing does not represent a random sample of the industry or there is evidence of variability within the source category population.**

**[164] Add-on $SO_2$ emission control systems utilizing dry lime injection technology use high-calcium lime, not dolomitic lime.**

**[165] The inherent or natural adsorption of $SO_2$ on limestone dust in a high-calcium lime kiln is normally expected to provide over 90 percent control of $SO_2$ emissions. In contrast, the inherent adsorption of $SO_2$ on dolomitic limestone dust at this plant, as shown by emissions testing, was only about 70 percent.**

**There are a number of factors that make it uncertain whether the addition of $SO_2$ scrubbing technology to the proposed kiln will achieve the lower "target limit." First, there is limited experience with use of scrubbers to control $SO_2$ emissions of lime kilns. Then, the proposed kiln is processing dolomitic limestone, which is significantly less reactive than high-calcium limestone in adsorbing $SO_2$. The presence of this dust in the flue gas may affect the capability of both the scrubber and the filter cake on the baghouse to control $SO_2$. In the scrubber, this dust may affect the ability to introduce lime reagent for control of $SO_2$ without the exceeding the constraints inherent in operation of a dry scrubber. In the baghouse, the presence of a dust cake made up of both dolomitic limestone dust and "scrubbing lime" may also reduce the effectiveness of the dust cake to adsorb control $SO_2$. In addition, the use of the preheater, as it increases the attrition of limestone during processing, will increase the amount of dust that is generated and collected by the baghouse. Finally, the Illinois EPA's historic experience with this plant, for which the limit originally set as BACT for $SO_2$ emissions was not met, also dictates proceeding with additional care with respect to $SO_2$ BACT in the current permitting action.**

76. In the Project Summary, the Illinois EPA asserts that Selective Catalytic Reduction (SCR) "…is not feasible for a lime kiln given the operating temperatures at the locations at which reagent could be injected," because "outlet temperature of the fabric filter would be lower than the minimum operating temperature of an SCR system." This analysis is deficient because there is no analysis of a "high dust" SCR.

**The application also addressed installation of a so-called "high dust" SCR system. (See Updated BACT Analyses, November 2008, pages 15 and 16.) Vulcan proposed that the use of high-dust SCR be rejected because of technical infeasibility. In particular, the levels of dust in the exhaust from the kiln and its composition are inconsistent with effective operation on an SCR system. The Illinois EPA agreed with Vulcan's conclusions.**

77. It is not clear from Illinois EPA's assertion in the Project Summary that SCR is "not feasible" whether it referring to infeasibility due to technical issues or cost. However, it cannot be the former as there is nothing technically infeasible about the application of SCR for the kiln – whether after the baghouse (where the dust loading and temperatures are lower) or before (where the temperature is in the proper range but the dust loading is higher).

**The use of high dust SCR, located before the particulate matter control system, is rejected by the Illinois EPA based on technical infeasibility. This approach to SCR systems, as used on coal-fired utility boilers, was not being addressed in the Project Summary. The use of low-dust or "tail-gas" SCR, which would be located after the particulate control system, as was being addressed in the Project Summary, is rejected based on its economic impacts (costs) and environmental impacts and due to concern about feasibility or commercial availability.[166]**

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**[166] The Illinois EPA is unaware of the installation a clean-side, low dust SCR system on a lime kiln in the United States, much less such a system installed on a commercial basis on a coal-fired boiler. For stationary sources, the continuing work on SCR catalysts is focused on catalysts for higher-temperature applications, not for tail-gas applications. Extending the**

**As a general matter, there is a mismatch between SCR technology, which has been developed for use on boilers and heat recovery steam generators, and use of SCR technology on lime kilns, as discussed in the application.[167]**

78. The BACT analysis and Illinois EPA's independent review should contain a thorough discussion of the design and operating aspects of SCR in each of these configurations, supported by vendor (i.e., SCR and catalyst manufacturers and suppliers) discussions. For example, SCR systems are now routinely used in high dust configurations in coal-fired boilers, before the particulate control device, even in conjunction with coals that have significant ash and calcium contents.

**The BACT analysis for SCR systems was reasonably developed given the status of SCR technology as applied to lime kilns. It is not necessary or realistic to expect Vulcan to obtain meaningful information from vendors of SCR systems or suppliers of catalysts to support this discussion. As applied to lime kilns, SCR technology cannot be considered a commercial technology, i.e., SCR systems are not being sold for use on lime kilns. There are differences in the dust loadings of coal-fired boilers and lime kilns that mean that established SCR technology cannot be directly transferred to lime kilns. As such, vendors do not have a reasonable expectation of actually being able to sell an SCR system to Vulcan or any interest in providing Vulcan information to support its application.[168] SCR vendors also do not have experience under the conditions that would be present with installations on lime kilns.[169]**

**The comment reflects a lack of understanding of the quantitative and qualitative differences in the dust loadings of coal-fired boilers and lime kilns, which are why SCR is used on coal-fired boilers but not on lime kilns. The dust loadings in the flue gas of the proposed kiln should be expected to be at least five times higher than the "high dust" loadings in the flue gas of coal-fired boilers. This is because the limestone feed, as well as fuel ash, contribute to the dust loading for the kiln.[170] The particle size**

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**temperature of SCR technology upwards will provide more flexibility in the placement of SCR systems on coal-fired boilers, for which tail-gas SCR is not a consideration.**

**167 SCR technology relies on beds of catalyst that are subject to obstruction (plugging) and poisoning by the dust entrained in the flue gas. The operating temperature range of SCR technology is also between 575 and 800 °F (ideally, flue gas temperature above 650 °F). As potentially applied to a lime kiln, the flue gas leaving the kiln is too hot and contains too much dust for SCR technology. And the flue gas after being cleaned by the particulate matter control device is too cold.**

**168 USEPA has not targeted lime kilns as a significant source of NOx emissions like it has done for coal-fired utility boilers. Accordingly, work on developing SCR technology for coal-fired applications has focused on coal-fired generating units. Not only has USEPA has targeted these units as a significant source of NOx, these units are much larger than lime kilns, so they are a more profitable market for vendors of SCR systems.**

**169 Vendors would have to undertake research and pilot trials to assess the feasibility of existing catalysts systems on lime kilns. For a low-dust SCR system, providing reasonable information for such a system would also entail preliminary engineering design of additional components, i.e., ductwork or stack modifications and a burner system, that are not part of their existing designs for SCR systems used on coal–fired boilers, for which hot-side SCR systems are used.**

**170 As compared to a coal-fired boiler, the limestone feed would increase the mass of dust in the flue gas of the proposed kiln by a factor of 7 times while the calcination process would only increase the volume of flue gas by about a third, increasing the overall concentration of dust in the flue gas by 5 times. Considered on an hourly basis, the proposed kiln would now nominally fire 5 tons of fuel per hour. The firing of this amount of fuel in a boiler would contribute to a dust loading of about 1140 pounds of flyash (assuming 12 percent ash and 95 percent loss as flyash) in 1,330,000 to 1,500,000 scf of flue gas (assuming between 12,500 and 14,000 Btu/pound and standard 10,640 scf per mmBtu for coal). In the proposed kiln, the fuel ash would contribute 1,200 pounds of dust (as a countercurrent system, all ash should be assumed to be lost as flyash). In addition, the stone feed to the kiln would contribute between 5,400 pounds of dust (54 tons of stone per hour and a loss rate as dust of 5 percent). The $CO_2$ generated by calcination would only add about 500,000 scf of flue gas (54 tons of stone, losing 50 percent by weight as $CO_2$ during calcination). As the mass of dust in the flue gas would increase by a factor of**

**of the dust is also larger as the dust is formed by mechanical processes, i.e., removal of dust and attrition of limestone as it moves through the kiln system. The higher dust loading and its larger particle size pose physical challenges for the operation of an SCR on the kiln, as accumulation of dust will interfere with flow of flue gas through the catalyst bed. In addition, the levels of certain constituents in the dust that act as poisons to the catalysts, i.e., calcium and sodium, will be higher in the dust of the proposed kiln. The main component of the flyash of coal-fired boilers is usually silicon oxide, with calcium, as calcium oxide, making up between 1 and 10 percent of the dust. Even with dolomitic limestone, the dust from a lime kiln would contain 20 to 30 percent calcium.[171] Considering the higher mass dust loadings, the levels of calcium in the flue gas of the proposed kiln will be significantly higher than in the flue gas from coal-fired boilers. The sodium content of the dust would also be higher.**

79. In the low-dust, "clean-side" or "tail-gas" application of SCR, where the temperature is too low for effective application of SCR, there are several engineering approaches to increasing the gas temperature. Reheat could occur with natural gas, a gas-to-gas heat exchanger, or potentially other options. The use of low-temperature catalysts should also be documented. To the extent that the Illinois EPA means economically infeasible, it fails to support such conclusion.

**The potential for use of a tail gas SCR system on the proposed kiln has been adequately evaluated. As this comments suggests firing of natural gas to reheat the flue gas before entering the SCR, this would consume significant quantities of natural gas. The "additional" cost for SCR for reheat fuel would be in excess of $2,000/ton of NOx potentially controlled.[172] Even without consideration of additional costs for the innovative nature of tail- gas, the cost of natural gas fuel for reheat could double the cost for SCR compared to direct installation of SCR systems on existing units where SCR is installed with the need for reheating.[173]**

**The use of a clean-side SCR with a gas-to-gas heat exchanger is rejected because of technical infeasibility. The feasibility of a gas-to-gas heat exchanger is pure science fiction. As a practical matter, the dust loading on the hot side of the heat exchanger would clog or foul the gas passages preventing reliable operation of the heat exchanger. Combination of reheat and heat exchangers would combine disadvantages and obstacles without solving the underlying technical issues.**

**It is not reasonable to expect SCR catalysts to become available that would enable SCR technology to operate in a lower temperature regime. SCR technology already uses "low temperature" catalysts and research is focused on higher temperature catalysts as is desirable for increased flexibility in the applications where SCR is**

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**over five while the volume of flue gas would only increase by about a third, the overall dust loading of the proposed kiln would be four times higher than that of a coal-fired boiler.**

**[171] The dust from a lime kiln contains 40 to 60 percent calcium, as calcium carbonate.**

**[172] To raise the temperature of the flue gas from 300 to 650 °F, as needed for effective operation of SCR, would require 30 mmBtu/hour, with an annual cost of over $2,000,000. (30 mmBtu/hr x 8,760 hours/year x 47.71/mmBtu = $2,026,188/year) This would represent an additional, fuel-related cost for SCR, which is not incurred with traditional applications of SCR, of over $2,000/ton. ($2,000,000 ÷ (946 x 0.9) = $2,349/ton)**

**[173] The use of natural gas for reheat would also be accompanied by emissions of over 15,000 tons/year of $CO_2$. (30 mmBtu/hr x 117.6 lb $CO_2$/mmBtu x 8,760 hr/yr ÷ 2000 lb/ton = 15,452 tons)**

**already in use.**

80. The BACT analysis for the kiln for NOx is also deficient because there is no analysis of a tail gas SCR following reheat of the exhaust to temperatures necessary for the SCR. Tail gas reheat is commonly considered in applications for other proposed projects, including the BACT analyses for proposed circulating fluidized bed boilers.

**As discussed, tail gas SCR was considered. It has been rejected because of its cost and environmental impacts. There is also concern whether it is a commercially available control technique as applied to a lime kiln. Certainly, the fact that tail-gas SCR systems are "evaluated" in the BACT evaluations for certain other proposed projects does not show that these systems are a demonstrated approach to control of NOx emission, as such systems are ultimate rejected in BACT determination.**

81. The BACT analysis for the kiln for NOx is also deficient because there is no analysis of NOx control options other than SCR. These options should include Selective Noncatalytic Reduction ( SNCR), which involves injecting a reagent into the flue gas stream without use of a catalyst, low NOx burners, and flue gas recirculation.

**The BACT analysis considered options for control of NOx emissions besides SCR. The Project Summary discussed SCR because it was the control technique for NOx that, if appropriate, would result in the lowest levels of NOx emissions of the proposed kiln. This is because SCR, as an add-on control technology, would provide additional control of NOx beyond that achievable by process techniques that reduced the formation of NOx.**

**NOx control techniques other than SCR, as listed by this comment, were considered in the determination of BACT. As a general matter, SNCR is not feasible because a location at which the flue gas is above 1600 ˚F is not present in which to inject a reducing reagent.[174] The temperature of the flue gas at the exit of the kiln proper is only about 1400 ˚F. "Low NOx burners, as used on boilers" are not transferable to lime kilns without fundamental changes to the design of a kiln. (The BACT determination does require "low-NOx combustion technology."[175]) Flue gas recirculation, which is used to control NOx emissions of industrial boilers, is infeasible because of the layout of a lime kiln and level of dust in the hot exhaust of the kiln.[176]**

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**[174] The flue gas temperature range needed for SNCR to function is 1600 to 1900 °F. These temperatures only occur in the middle of the lime kiln. Injection of reagent outside this temperature range would not control NOx. Instead the injected reagent would contribute to additional emissions of NOx or be emitted as ammonia. SNCR is technically infeasible for lime kilns. Incidentally, the reagents used in SNCR systems are not "catalysts" as indicated in this comment, as they do not return to their original chemical state after the reduction reactions but are consumed by the reaction.**

**[175] The BACT determination would also allow operation of the kiln to maintain the oxygen level in the discharge from the kiln to more than 1.25 percent oxygen. The use of low excess air or excess of oxygen to minimize NOx formation has been recognized for over 30 years. It is a well established NOx control technique for lime kilns.**

**[176] Vulcan's BACT analysis (for example, Updated BACT Analyses, November 2008) considered the following NOx control techniques with the following conclusions: 1) SCR (never applied to a lime kiln); 2) SCONOx™ catalytic absorption system (never applied to a lime kiln); 3) SNCR (applied to other rotary lime kilns with lower capacity but has not been validated in that application); 4) Low NOx burners (not applicable to a lime kiln without fundamental changes to the design); 5) Overfire air (never applied to a lime kiln); 6) Flue gas recirculation (never applied to a lime kiln); 7) Gas reburning (never applied to a lime kiln); and 7) Combustion controls and low oxygen firing (historically applied to lime kilns).**

82. Illinois EPA notes in the Project Summary that the NOx emissions from the kiln are "...minimized by the design of the burner and combustion system of the kiln..." However, the specifics of this different design of burner and combustion system are not discussed. What aspects of design of the burner and combustion system serve to reduce NOx, and do so in a predictable and reliable manner are not spelled out. Thus, it is difficult to properly evaluate the proposed NOx benefits.

**The key aspect of the design of the burner and combustion system as related to minimizing NOx emissions is the ability to operate at low excess air, so as to minimize the formation of NOx. This is addressed in the application and the BACT determination as an alternative BACT limit is set for the kiln, i.e., operation with no more than 1.25 percent oxygen in the exhaust from the kiln.**

83. For ease of comparison, the NOx BACT limit should be expressed in terms of pounds per ton of lime produced. For example, the AP-42 Table 11.17-6 provides emission factors for coal-fired rotary lime kiln in pounds per ton of lime produced.

**The BACT limits for the proposed kiln are expressed in terms of stone feed to the kiln for consistency with the form of limitation in the NSPS for Lime Manufacturing Plants, 40 CFR 60, Subpart HH, and the NESHAP for Lime Manufacturing Plants, 40 CFR 63, Subpart AAAAA. These standards limit particulate matter emissions from lime kilns to in terms of pound per ton of stone feed (40 CFR 60.342(a)(1) and 40 CFR 63.7090(a) and Table 1).**

**In addition, it is easier to measure the amount of limestone fed to a kiln, at a single point on feed belt when the material is at ambient temperature. The amount of activity or "work" that a kiln is engaged in is also better represented by the amount of stone fed to the kiln, which is then processed in the kiln to produce lime.**

84. The proposed NOx BACT limit of 4.5 pound per ton of stone feed is inappropriate,[177] even based on the proposed NOx control technology. It does not consider that current BACT limits, even without SCR, based on data in the USEPA's RBLC, appear to be 3.5 lb/ton or lower and have been for the last several years. For example, a search of the RLBC for lime kilns (Process Code 90.019) revealed NOx BACT determinations of 3.65 lb/ton throughput (Determination WI-0233, for Cutler-Magner in Superior, Wisconsin, August 2006) and 3.50 lb/ton (Determination AR-0082, for Arkansas Lime, in Batesville, Arkansas, August 2005).

**This comment fails to consider the various factors that may affect the fuel consumption and heat rate of rotary lime kilns and thus lead to differences in achievable $NO_x$ emission rates.[178] Because of these considerations, the achievable**

[177] The draft permit would also provide that the NOx BACT limit "...may be subject to a downward adjustment (as low as 3.5 lb NOx/ton of stone feed) ... ."

[178] **The use of a preheater system on a lime kiln has an obvious and very significant effect on the heat rate of a kiln. The moisture content of the stone affects the heat input to the kiln needed to dry the limestone before calcination can occur. The friability of the limestone affects the rotational speed at which the kiln can be operated and amount of tumbling of feed stone that occurs in the kiln, which affects the efficiency with which heat is transferred to the stone. The more friable the stone, the more "gently" the stone must be handled in the kiln to prevent attrition and produce lime in the desired size range. As the size of the desired products increase, the amount of time for the calcination reaction to take place also**

**NOx rate the proposed plant, even with a preheater, would be higher than the NOx rates set for the high-calcium lime kilns cited in this comment. In particular, the heat rate of rotary lime kilns can range from 4 to 8 million Btu/ton of stone feed to a kiln.[179] As the proposed plant would produce dolomitic lime for use in the metallurgical industry, it would be using dolomitic limestone, which is commonly more friable than high-calcium limestone. It would also be producing larger "pebble" lime, with the preferred size not passing through a ¾ or 1 inch screen, as needed for lime that is to be directly charged to iron or steel furnaces. As such, even with use of a pre-heater, the heat rate of the proposed kiln should be expected to be higher than the kilns cited in these comments. Those kilns are processing high-calcium limestone, rather than dolomitic limestone, to produce lime to supply their local markets, which do not include the steel markets in the Greater Chicago Area that are being targeted by Vulcan. Given these considerations, the limits set as BACT for NOx for the proposed plant should be expected to be higher than those of the cited plants.**

85. The NOx BACT limit proposed in the draft permit, 4.5 pound per ton of stone feed, is not appropriate considering the factor in AP-42. In AP-42, AP-42 Section 11-17, Table 11.17-6, the NOx emission factor for a coal-fired rotary kiln is 3.1 pounds per ton of lime produced.

**As discussed by USEPA in the introduction to AP-42, emission factors from AP-42 are generally not an appropriate basis to set BACT limits.[180] This is because of the nature of the standard emission factors in AP-42, which are an average of tested emission rates and do not reflect an analysis of the emission rate that is achievable by a particular project. This is certainly the case for emission factors for lime kilns given the basis of those factors, as previously discussed. In particular, given the differences between lime plants, based on their feed material and intended product, a standard emission factor should not be relied upon as the basis to set the NOx BACT limit for the proposed plant.**

86. In a 2000 memorandum, the Illinois EPA identified a number of lime manufacturing plants achieving NOx emission rates lower than 4.5 lb/ton.[181]

**This comment, which also addresses a predecisional memorandum prepared by a staff member of the Illinois EPA in 2000, does not provide a basis to set a lower NOx BACT limit for the kiln than set in the issued permit. The memorandum is a historic**

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**increases, as more time is needed for the calcination temperature to be reached throughout the stone feed to the kiln. At the same time as the product size increases, the transfer of heat to the limestone feed also becomes less efficient. This is because the ratio of the surface area of the stone feed to the volume of the stone feed is also lower, with less surface area to heat compared to the amount of heating that is need. Similarly, the size of the kiln also affects the heat rate, as thermal losses become less significant as the size of the kiln increases.**

[179] **See Vulcan submittal, "Prevention of Significant Deterioration (PSD) Construction Permit Application," February 14, 2002, Table 2-4.**

[180] **"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." AP-42, page 2**

[181] Memorandum, November 14, 2000, "BACT Determination for Vulcan Materials Dolomitic Lime Kiln," by John Reed, Illinois EPA, to Robert Smet, Illinois EPA. The memorandum lists the results of five separate emission tests for NOx, one each at five different lime plants. The tested NOx emission rates ranged from 1.1 to 5.3 lbs/ton of stone.

**document associated with the previous issuance of a revised construction permit for Vulcan's Manteno lime plant in October 2002. With respect to NOx, the memorandum was prepared in response to Vulcan's initial proposal in 2000 for a revised NOx BACT limit for the kiln, i.e., 9.7 lbs/ton of stone feed. The memorandum does not recommend that a particular limit be set for NOx BACT, only arguing that the NOx limit then proposed by Vulcan, 9.7 lbs/ton, should not be accepted as BACT.[182] It was not, as the permit eventually issued in 2002 set NOx BACT at 4.5 lbs/ton. At the same time, this memorandum lists test results from lime plants whose specific circumstances, e.g., type of limestone feed and lime product, are not fully known. As such, the listed test results cannot be correlated to the NOx emissions of the proposed Vulcan lime kiln and cannot be used as a basis to set a NOx BACT limit for the proposed kiln.[183]**

**The test that is relevant to establishing NOx BACT limits for the proposed kiln is the one that was performed on the kiln itself, when it historically operated.[184] The NOx emissions of the kiln measured by this test were 3.45 pounds per ton of stone feed. The various limits for NOx set as BACT all relate to this solid reference point for the NOx emissions of the proposed kiln.[185] At least initially, a limit higher than the tested emission rate must be set to provide an operating margin to address normal variation in the operation of the kiln.[186]**

87. There is no technical reason why low-NOx burners cannot be retro-fit to an existing lime kiln. In fact, almost ten years ago, the Illinois EPA rejected this argument by Vulcan, asserting "USEPA lists low-NOx burners for NOx control which was given a minimum discussion but was dismissed because '…the technology had not been validated by source testing after the kiln was built…' Hardly a convincing argument that it cannot be applied."[187]

**This comment does not show that the proposed plant is not being required to use "low-NOx combustion technology," as appropriate for control of the NOx emissions of the kiln. The quoted statement and the cited memorandum as a whole should be considered in context. A distinction, which was not made by the author of the**

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**[182] For NOx, all the tests show emission rates that are lower than 9.7 lbs/ton, the BACT limit then proposed by Vulcan.**
**[183] In this regard, the test results for Martin-Marietta, 5.3 lbs/ton, one of the plants that is identified as a dolomitic lime plant, is higher than the short-term limit now initially being set as BACT, 4.5 lbs/ton. The results for the other four plants, 1.1, 2.1, 3.2 and 3.6 lbs/ton, given the range of the results, do not suggest that a particular NOx emission rate is achievable by the proposed lime kiln on a short-term basis.**
**[184] Mostardi Plant, stack test report, January 29, 1999, "Gaseous Emissions Compliance Study: Prepared for Vulcan Materials Company at the Manteno Plant, Lime Kiln Stack, Manteno, Illinois."**
**[185] The revised permit for this lime plant issued on October 2002 set NOx BACT at 4.5 pounds per ton of stone feed, 24-hour average. In the draft permit and the permit that has now been issued, this limit is accompanied by provisions for a lower limit, as low as 3.5 pounds per ton, that will apply unless Vulcan demonstrates that it cannot be met. This lower limit accounts for the reduction in fuel usage and NOx emissions that should accompany installation of a pre-heater on the kiln. In particular, if the preheater achieves the expected reduction in fuel usage, the kiln should be able to maintain NOx emissions at the level of the measured emission rate, without the need for a compliance margin from that rate.**
**The issued permit also includes additional limits for NOx that are still lower and apply on a 30-day average, 4.0 and, alternatively, 3.0 lbs NOx/ton, respectively. These 30-day limits are lower than the 24-hour limits, as they do not need to include as large a margin for variation in operation. As such, they also more closely reflect the typical performance of the control measures for NOx.**
**[186] The NOx limits must be set with an appropriate compliance margin on a project-specific basis, with consideration for the feedstock and intended product from this particular kiln.**
[187] Memorandum, November 14, 2000, "BACT Determination for Vulcan Materials Dolomitic Lime Kiln," by John Reed, Illinois EPA, to Robert Smet, Illinois EPA.

**memorandum, should also be made between the specific use of "low-NOx burners" and the use of "low-NOx combustion technology" generally. As such, the quote should be construed as stating that the NOx limit then being proposed by Vulcan, 9.7 lbs per ton of stone feed, was too high and would not reflect the use of "low-NOx combustion technology" as is applicable for lime kilns. (Indeed, the NOx emissions of the kiln as measured were only 3.45 lbs/ton.) The statement does not demonstrate that the BACT determination is flawed or that conventional low-NOx burners, as are routinely used on boilers, should be retrofit and used on this kiln.**[188]

**Incidentally, this comment again misrepresents the cited memorandum as an action by the Illinois EPA. The memorandum was a predecisional document prepared by a staff member of the Illinois EPA and was not a determination made by the Illinois EPA.**

88. In the event that Vulcan would argue that low-NOx burners should not be considered because the kiln is already constructed, this argument should not be relied upon. Vulcan constructed a kiln that could not operate within its permit limits and was agreed to shut down for an indefinite period. Vulcan is proposing to restart this lime plant and the plant must be considered a new project. Letting Vulcan avoid a full top-down BACT analysis would ignore USEPA's policy on treating a proposal to restart a source as a new source, rather than as a modification, and would reward Vulcan for its past failure to build a plant that can comply with BACT.

**This comment is not necessary or relevant as Vulcan has not argued that it is not appropriate to consider low-NOx burners or other additional control measures for the kiln because the kiln is already constructed. In addition, the Illinois EPA has not used this argument to avoid performing a full BACT determination for the plant.**[189]

89. There is no top-down analysis and very little to support the proposed CO BACT limit of 11.48 pounds per ton.

**There was a top-down BACT analysis for CO. (For example, refer to the Updated BACT Analyses, November 2008.) The analysis for CO considered various approaches to control of CO, including use of excess air, add-on thermal and catalytic oxidation, and good combustion practice. The BACT limit for CO emissions of the kiln is appropriately set following this top-down BACT analysis relying on good combustion practices. Options other than good combustion practices are rejected by the Illinois EPA. This was because of concerns about increases in emissions of other**

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**188 While low-NOx combustion technology is applicable for lime kilns, low-NOx burners as used on boilers are not applicable. This is because "boiler-type" low-NOx burners rely on the design and features of the burner itself to provide off-stoichiometric combustion and separation of combustion air. This is not feasible in the proposed kiln because secondary combustion air can only be introduced through the open end of the kiln and not through separate ductwork and nozzles. Instead low-NOx combustion technology must be used on the kiln, in which NOx emissions are minimized by maintaining a low, overall level of excess air, with complete combustion achieved through a long flame and the residence time in the kiln.**

**189 At the same time, the fact that an existing facility is at issue may have some relevance to the BACT determination. First, Vulcan is proposing to develop a lime plant that would utilize an existing reserve of dolomitic limestone that it owns and is of appropriate quality for making a dolomitic lime product for use in metallurgical application. Second, Vulcan seeks to do so with an existing kiln that was properly permitted. While the kiln did not comply with the case-by-case BACT limits set for certain pollutants that noncompliance was appropriately addressed in an enforcement action and need not be further addressed in the current permitting action. Lastly, the historical operation of the plant provides information on emissions of the plant that is appropriately considered and relied upon.**

**pollutants and the feasibility of actually achieving further reduction in CO emissions.[190]**

**In particular, the CO BACT limit for the proposed kiln considers the historic CO emissions of this kiln as measured in 1999, i.e., 4.76 pounds per ton of stone feed.[191] As CO is controlled by good combustion practices, it is appropriate for the CO BACT limit to be set with a significant margin of compliance to address normal variability in operation. Accordingly, the BACT limit is set at 11.48 pounds per ton. No adjustment is made for the pre-heater tower. While the pre-heater tower would reduce the firing rate of the kiln, this may not act to lower CO emissions on a short-term, 24-hour average basis, as the size of the burner and intensity of combustion are reduced.**

**The BACT limit was also set also considering the conflicting relationship between NOx and CO emissions during combustion processes and the BACT determination for NOx. In order to set a low BACT limit for NOx, it is necessary for the kiln to be able to operate at low levels of excess air, which may be accompanied by higher levels of CO than if NOx was not being minimized. (The NOx BACT limit only has a 30 percent margin of compliance from the measured NOx emissions of the kiln.[192]) A limit of 11.48 pounds per ton of stone ensures that the BACT limit for CO will not interfere with effective control of NOx.**

**Finally, the CO BACT limit is consistent with recent CO BACT determinations for certain new lime kilns. In particular, the equivalent CO emission factors represented by the BACT limits set for new two lime kilns proposed by Graymont (PA), Inc., at its plant in Bellefonte, Pennsylvania, are 13.25 and 19.0 pounds per ton.[193]**

90. In proposing a CO BACT limit of 11.48 pounds per ton, the Illinois EPA has not even considered the lower emission rates documented in its own permit file.[194]

**The Illinois EPA has considered the key document in its files related to CO emissions of the proposed plant, i.e., the report for emission testing of gaseous pollutants that**

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**[190] Thermal oxidation without a catalyst would greatly increase fuel consumption and increase emissions of pollutants other than CO. An oxidation catalyst system would pose technical obstacles that are similar to those of SCR, as it would rely on operation of a catalyst for a dust-laden flue gas or involve a "clean-side" installation. In addition, given the temperature and residence time provided by lime kilns, it is questionable that oxidation systems would achieve significant lower CO emissions from the proposed kiln. In this regard, the CO BACT limit is set with a compliance margin to address variability in the fuel combustion process and NOx emissions. As shown by the historic testing of the kiln's emissions, CO emissions of the kiln during typical operation will be significantly lower than the numerical limit set as BACT.**

**[191] The CO emissions of the kiln measured during testing in January 1999 were 4.76 pounds per ton, based on the average of three one-hour test runs. The results of the individual runs were 5.11, 5.99 and 3.3 pounds per ton of stone.**

**[192] The NOx emissions of the kiln, which were measured in 1999 at the same time as CO, were 3.45 pounds per ton, based on the average of three one-hour test runs. The results of the individual runs were 3.22, 3.76 and 3.37 pounds per ton of stone.**

**[193] Refer to Condition 14 of Plan Approval 14-00002A, issued on July 8, 2004, to Graymont (PA), Inc., by the Pennsylvania Department of Environmental Protection for the construction of two new rotary lime kilns, Kilns #6 and #7. The BACT limits, which apply on an hourly basis, are set at 1431 and 1800 pounds per hour, respectively. Based on the design capacity of the kilns, the equivalent hourly CO emission rates, in pounds per ton of stone feed, are 13.25 and 19.0 pounds per ton of stone feed, respectively. While that permit includes "adjustment provisions" for CO like those in the issued permit for the proposed plant for emissions of $SO_2$ and NOx, the permit is a statement of the emission limits that have been found achievable for CO.**

[194] A memorandum prepared by John Reed of the Illinois EPA in November 2000 cites the results of five emission tests for CO from 1974 and 1975 for four lime kilns, which show CO emissions ranging from 0.12 to 52 pounds per ton of stone. (The results of two tests are reported for one kiln, 0.9 lb/ton and 2.7 lb/ton.)

**was conducted when the plant previously operated. The measured CO emission rate during this test was 4.76 lbs/ton feed.[195] The CO limit now proposed by Vulcan and set in the issued permit, 11.48 lbs/ton, reflects a reasonable margin of compliance from this measured emission rate to account for normal variation in operation of the kiln, including operating practices to reduce NOx emissions that are accompanied by an increase in CO emissions.[196]**

**The document cited by this comment does not provide a basis to set a lower CO BACT limit for the kiln than set in the issued permit. As previously explained, the cited document is a historic document associated with the previous issuance of a revised construction permit for this lime plant in October 2002. The document was predecisional in nature. With respect to CO, this document was prepared in response to Vulcan's proposal at that time for a CO BACT limit, i.e., 61.4 pounds per ton of stone feed.[197] The document does not recommend a particular limit be set for CO BACT, only advocate the position that the CO limit then being proposed by Vulcan should not be accepted as BACT. In this regard, the highest test cited in the document indicates CO emissions of 52 pounds per ton of lime produced. However, as the cited historic test data is now 30 years old and must be considered of poor quality, the data should not be relied upon to set a CO BACT limit.[198]**

91. Section 165(e)(2) of the Clean Air Act makes clear that the required ambient air quality for a proposed PSD project[199] must be conducted at the proposed site and affected areas specifically for the purpose of PSD permitting. The plain language of the Clean Air Act does not allow monitoring data gathered for a different purpose (such as state air quality planning) to be substituted.[200]

**Given the ambient monitoring stations operated by the Illinois EPA in the general region in which the proposed plant would be located and the nature of this region, there is not a need for Vulcan to conduct on-site preconstruction ambient monitoring**

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**[195] Mostardi Plant, stack test report, January 29, 1999, "Gaseous Emissions Compliance Study: Prepared for Vulcan Materials Company at the Manteno Plant, Lime Kiln Stack, Manteno, Illinois."**
**[196] If Vulcan had not proposed a limit of 11.48 lbs/ton, the Illinois EPA would likely have set the BACT limit at 12.0 or 14.0 lbs/ton, reflecting a factor of 2.5 or 3 times the measured CO emission rate.**
**[197] The revised permit for this lime plant issued on October 2002 set CO BACT at 43.2 pounds per ton of stone feed.**
**[198] Testing conducted in the mid-seventies would not account for changes in lime manufacturing technology, especially emissions control practices for NOx, in the intervening years. In addition, improvements have occurred in emission test methods, especially for CO, which in the mid-seventies would have been measured from a grab sample of gas.**
[199] A PSD permit application must contain an analysis showing protection of NAAQS and PSD increments with the proposed project. In this regard, Section 165(a)(7) of the Clean Air Act requires an applicant for a PSD permit to "... conduct such monitoring as may be necessary to determine the effect which emissions from any such facility may have, or is having, on air quality in any area which may be affected by emissions from such source." (Post-construction monitoring may be required as well to ensure that no air quality violations occur.) Section 165(e)(1) of the Clean Air Act further specifies that issuance of a PSD permit must "... be preceded by an analysis ... by the State ... or by the major emitting facility applying for such permit, of the ambient air quality at the proposed site and in areas which may be affected...." Section 165(e)(2) of the Clean Air Act then specifies that this "preconstruction" analysis "shall include continuous air quality monitoring data gathered for purposes of determining whether emissions from such facility will exceed the [NAAQS or PSD increment]." and this data "... shall be gathered over a period of one calendar year preceding the date of application for a permit under this part unless the state determines that a complete and adequate analysis for such purposes may be accomplished in a shorter period." The PSD rules also require an applicant to submit a pre-application analysis of ambient air quality in affected areas that includes at least one year of representative ambient air quality monitoring data. The NSR Manual further explains that compliance with the NAAQS "...is based upon the total estimated air quality which is the sum of the ambient estimates resulting from existing sources of air pollution (modeled source impacts plus measured background concentrations) and the modeled ambient impact caused by the applicant's proposed emissions increase... and associated growth." NSR Manual, page C.3.
[200] See also U.S. v. Louisiana Pacific Corp., 682 F. Supp. 1141, 1146 (D. Colo. 1988).

**to support its air quality analysis for the proposed plant. The ambient monitoring stations operated by the Illinois EPA provide the necessary data to support this analysis.**

**The interpretation of the Clean Air Act put forward by this comment, i.e., that ambient monitoring data must be collected specifically for the purpose of a proposed plant, is not supported by relevant rules, USEPA guidance, long-standing practice in PSD permitting, and decisions of the EAB.[201] It is also not supported by a careful reading of the Clean Air Act. In particular, it does not consider the interrelationship between Sections 165(a)(2) and (e)(2) of the Clean Air Act or the full implications of the language of Section 165(e)(2) of the Clean Air Act. Section 165(a)(7) clearly states that permit applicants must "...conduct such monitoring as may be necessary to determine the effect which emissions for such facility may have, or is having on air quality..." [emphasis added]. While Section 165(e)(2) provides that a PSD applicant may be required to conduct site-specific pre-construction ambient monitoring for up to one year to support the air quality analysis for a proposed project, the relevant criteria for the actual extent of any continuous ambient monitoring is whether such monitoring is needed for a complete and adequate analysis of the impacts of the proposed project.**

92. Section 165(e)(2) of the Clean Air Act also makes clear that the required ambient air quality monitoring must occur for at least 12 months unless, pursuant to the applicable USEPA regulations, a shorter period is allowed.

**The ambient monitoring data used to determine background concentrations for the air quality analysis for the proposed plant satisfies this requirement. The ambient monitoring stations have been operated for many years.[202] This provides greater information on background ambient air quality than would be provided by project-specific monitoring conducted for only a single year.**

93. Project-specific ambient monitoring was not conducted for purposes of assessing the potential air quality impacts of the proposed plant. Rather, the air quality analysis used data collected at existing ambient air quality monitors,[203] which are operated by the Illinois EPA. This reliance on regional monitoring, which is conducted for purposes other than permitting of this proposed project, is not appropriate.

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**[201] For example, refer to the recent decision of the EAB in the case of Northern Michigan University, "At the outset, we reject Sierra Club's contention that the plain language of the CAA and implementing regulations mandate the use of site-specific, sole-purpose preconstruction ambient air quality data. *See* Pet'n at 46-48 (quoting CAA § 165(a)(7), (e)(1)-(2), 42 U.S.C. § 7475(a)(7), (e)(1)-(2); 40 C.F.R. § 52.21(m)(1)(i), (iii)-(iv)); Reply to MDEQ at 25-26. In so arguing, Sierra Club overlooks statements of congressional intent to the contrary. H.R. Rep. No. 95-294, at 171 (1977) ("preconstruction, onsite air quality monitoring may be for less than a year if the basic necessary information can be provided in less time, or it may be waived entirely if the necessary data [are] already available"); H.R. Rep. No. 95-564, at 152 (1977) (Conf. Rep.) (one-year monitoring requirement "may be waived by the [s]tate"). EPA has long implemented the PSD program pursuant to the understanding that representative data may be substituted where circumstances warrant, *see*, *e.g.*, NSR Manual at C.18-.19; *Ambient Monitoring Guidelines* § 2.4, at 6-9, and the Board and its predecessors have long upheld the Agency's guidance to that effect. *E.g.*, *Knauf*, 8 E.A.D. at 145-48; *Haw. Elec.*, 8 E.A.D. at 97-105; *Hibbing*, 2 E.A.D. at 850-52. Sierra Club has failed to persuade us to deviate from these precedents here." *See* Northern Michigan University Ripley Heating Plant, agency's 14 E.A.D. __, Slip Op. at 62-63 (EAB Feb. 18, 2009), pages 62 and 63.**

**[202] The ambient monitoring stations in the Illinois EPA's monitoring network are operated at the same locations for many years. This is done to collect data from fixed locations year after year to be able track trends in air quality. It is also necessary to evaluate air quality in the terms of the certain NAAQS that apply over a period of three years.**

[203] Background air quality concentrations were determined from ambient monitoring stations located in Braidwood (for NOx and CO), Midlothian ($PM_{10}$) and Joliet ($SO_2$).

**The reliance on air quality data collected at existing ambient monitoring stations operated by the Illinois EPA is fully appropriate. USEPA guidance provides that project-specific ambient monitoring is not needed when other acceptable ambient data is available. In particular, the NSR Manual, page C-19, states "If existing data are not available, or they are judged not to be representative, then the applicant must proceed to establish a site specific monitoring network."[204] However, in this case the Illinois EPA found that available data, as collected at the existing ambient monitoring stations, was representative so that site-specific ambient monitoring was not required for the proposed plant.**

94. Without conceding that the Clean Air Act requires preconstruction ambient monitoring, the existing regional ambient monitors used for the air quality analysis for the proposed plant do not meet the regulatory requirements for a waiver of preconstruction ambient monitoring. To receive approval to use data from a regional monitoring station, an applicant typically files a waiver request. A waiver request may only be granted if the applicant shows that valid, sufficient, and representative ambient air quality data already exists from regional monitoring stations. NSR Manual, pages C. 18 - 19. This is a difficult showing to make, requiring specific demonstrations on specific factors; it would only be possible in very limited circumstances.

**This comment refers to the formal process whereby a permitting authority may allow or accept use of ambient monitoring data from a regional ambient monitoring station, by "waiving" the requirement for project-specific ambient monitoring. As already discussed, the Illinois EPA believes that such action is appropriate for the proposed plant.**

**As the comment claims that it is difficult to make the necessary showing for reliance on data from regional ambient monitoring stations, this claim is unsupported. USEPA's guidance on this subject, as summarized in the NSR Manual, only requires that the regional monitoring stations must provide data that is representative, of appropriate quality and current. These criteria are readily satisfied for the proposed project, as well as for most proposed PSD projects in Illinois. This is because of the nature of Illinois' ambient monitoring network. Ambient monitoring stations are sited to provide representative data for air quality in Illinois, as needed to support air quality planning and management in Illinois. These stations are also operated in accordance with quality assurance procedures so as so collect accurate data that can properly be relied upon for these purposes.**[205, 206]

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**[204] The NSR Manual also explains "...if the location of the proposed source or modification is not affected by other major stationary point sources, the assessment of existing ambient concentrations may be done by evaluating available monitoring data. It is generally preferable to use data collected within the area of concern; however, the possibility of using measured concentrations from representative 'regional' sites may be discussed with the permitting agency. The <u>PSD Monitoring Guideline</u> provides additional guidance on the use of such regional sites." NSR Manual, page C.18.**

**[205] The reliance on regional ambient monitoring in PSD permitting in Illinois is also facilitated by the topography of Illinois, which is generally flat, with limited terrain features.**

**[206] It is also noteworthy that as new ambient air quality standards have been adopted that apply on more than an annual basis, the requirements of the Clean Air Act with respect to preconstruction ambient monitoring are inconsistent with those standards. That is, a single year of ambient monitoring cannot fully assess the status of a proposed site or area with respect to a NAAQS like the one for PM10, for which measurements must be conducted over a period of three years. Regional monitoring networks, as they have stations operating for many years at a given location, are designed and operated to address these newer ambient air quality standards.**

**Incidentally, as this comment refers to a "waiver process," the comment acknowledges that it is accepted practice in PSD permitting to use ambient data from regional monitoring stations in place of project-specific monitoring data. Indeed, it refers to provisions of the NSR Manual that address this subject.**[207]

83. Under USEPA guidance, existing monitoring data from regional sites is only sufficient in place of site-specific monitoring when specific determinations are made as to the data's adequacy. These determinations include: (1) monitor location; (2) quality of the data; and (3) currentness of the data. NSR Manual at page C.19, citing the *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*, EPA-450/4-87-007, May 1987 (*Ambient Monitoring Guidelines*)**102**[208]; See also In re Northern Michigan University Ripley Heating Plant, agency's 14 E.A.D. __, Slip Op. at 62-63 (EAB Feb. 18, 2009) (remanding due to failure to explain how monitoring data from existing regional monitors satisfy the Clean Air Act or USEPA monitoring guidance); Hibbing Taconite, Slip Op. at 20 ("EPA allows substitution of existing representative data in lieu of having the source generate its own preconstruction monitoring data, provided these data meet the criteria in the 'Ambient Monitoring Guidelines for the Prevention of Significant Deterioration' (July, 1980)". If existing data are not "representative" based on the criteria in USEPA's guidelines, "...the applicant must proceed to establish a site-specific monitoring network." NSR Manual, page C.19. See also Louisiana Pacific, 682 F. Supp. At 1153 (USEPA refused to waive pre-construction monitoring required by 40 CFR 52.21(m)).

**The ambient monitoring stations used to provide background levels of air quality meet these criteria. The monitors are sited to provide data that is representative of the project site. The monitoring was conducted to satisfy USEPA's requirements for quality of data. Lastly, the data is representative of current air quality at the project site.**

95. The ambient monitoring data used for background concentrations do not fulfill the requirements of USEPA's guidance. To use data from existing ambient air quality monitors to determine baseline air quality for PSD permitting, USEPA's *Ambient Monitoring Guidelines,* Section 2.4.1, specify that the data must be representative of three specific areas: (1) the location(s) of maximum concentration increase from the proposed project; (2) the location(s) of the maximum air concentration from existing sources; and (3) the location(s) of the maximum impact area, i.e., where the maximum pollutant concentration would hypothetically occur based on the combined effect of exiting sources and the proposed project.[209]

**The ambient monitoring stations used to provide background levels of air quality meet this criterion. For the proposed project, a single value for ambient background**

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[207] **The claim in this comment that PSD applicants typically file "waiver requests" related to ambient monitoring is also not supported. In Illinois, the approach to ambient monitoring for a proposed project is commonly handled as part of the pre-application discussions about the modeling for a proposed project. In these discussions, a "modeling protocol" is commonly submitted by the modeling consultant for a proposed project for review and comment by the Illinois EPA. There is not a separate, distinct waiver request.**

[208] The USEPA's *Ambient Air Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*, EPA–450/4–87–007, USEPA, OAQPS, 1987, are referenced in 40 CFR Part 51 Appendix W, Guideline on Air Quality Models, which is in turn referred to by the PSD rules, 40 CFR 52.21(l)(1).

[209] See also Hibbing Taconite, 2 E.A.D. at 850.

**can be considered representative for all three locations. These criteria do not require the use of different values for background air quality at these locations.**

96. Section 2.4.1of USEPA's *Ambient Monitoring Guidelines* provides that when a proposed project would be in an area that has multiple sources and flat terrain, the applicant can only use representative monitoring data that is from (1) a nearby monitoring site, within 10 km of the points of emissions; or (2) from a monitor that is no more than 1 km away from either the maximum air pollutant concentration from existing sources or from the area(s) of combined maximum impact from existing and proposed sources. These criteria also were not met.

**The proposed plant is more appropriately addressed as if its situation is that addressed by Case I in the *Ambient Monitoring Guidelines*, not Case II, as assumed by this comment. Case I addresses the situation where a proposed project is located in an area that is generally free from the impact of other point sources and area sources associated with human activities. In this situation, monitoring data from a regional ambient monitor, which may be characteristic of air quality across the region, may be used as representative data.[210] While there are some sources in the vicinity of the proposed project site, their impacts are more than adequately addressed by the combination of the selected background monitors and modeling of existing point sources. The proposed project is not located in an area in which the number and nature of the existing sources already in the area are such that existing, background air quality cannot be reasonably be determined with sufficient accuracy to be protective of the NAAQS without conducting project-specific ambient monitoring.**

**In addition, based on the regulatory discussion of background concentrations in Section 8.2 of the Guideline on Air Quality Models, 40 CFR 51, Appendix W, it is not clear that regional monitoring is subject to the criteria referred to in this comment,.[211] When regional monitors are used to determine background**

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**[210] In particular, Section 2.4.2(a) of the *Ambient Monitoring Guidelines* provides that the background monitoring site "... could be outside of the maximum impact area but must be similar in nature to the impact area. This site would be characteristic of air quality across a broad region including that in which the proposed source or modification is located. The intent of EPA is to limit the use of the 'regional' sites to relatively remote areas and not to use then in areas of multisource emissions or areas of complex terrain."**

**[211] Appendix W to Part 51—Guideline on Air Quality Models**

***8.2 Background Concentrations***

**8.2.1 Discussion**

**a. Background concentrations are an essential part of the total air quality concentration to be considered in determining source impacts. Background air quality includes pollutant concentrations due to: (1) Natural sources; (2) nearby sources other than the one(s) currently under consideration; and (3) unidentified sources.**

**b. Typically, air quality data should be used to establish background concentrations in the vicinity of the source(s) under consideration. The monitoring network used for background determinations should conform to the same quality assurance and other requirements as those networks established for PSD purposes.[83] An appropriate data validation procedure should be applied to the data prior to use.**

**c. If the source is not isolated, it may be necessary to use a multi-source model to establish the impact of nearby sources. Since sources don't typically operate at their maximum allowable capacity (which may include the use of "dirtier" fuels), modeling is necessary to express the potential contribution of background sources, and this impact would not be captured via monitoring. Background concentrations should be determined for each critical (concentration) averaging time.**

**8.2.2 Recommendations (Isolated Single Source)**

**a. Two options (paragraph (b) or (c) of this section) are available to determine the background concentration near isolated sources.**

**b. Use air quality data collected in the vicinity of the source to determine the background concentration for the averaging times of concern. Determine the mean background concentration at each monitor by excluding values when the source in question is impacting the monitor. The mean annual background is the average of the annual concentrations so determined**

**concentrations, the current or "background" impacts of existing major sources in the vicinity of the proposed project must be conservatively evaluated using dispersion modeling rather than data from ambient monitoring to assess their impacts. In addition, general background data for the area is evaluated in an appropriate form of maximum monitored air quality, rather than typical or actual air quality, as would be measured by a project-specific monitor.**

97. The ambient monitoring stations at Braidwood, Midlothian, and Joliet do not meet the "location" criteria of the *Ambient Monitoring Guidelines*. Braidwood is about 20 miles from Manteno. Midlothian and Joliet are both more than 25 miles from Manteno. These locations are nowhere near the location of the maximum increase in ambient PM, NOx, $SO_2$, or CO concentrations from the proposed kiln, the maximum impact from existing sources nearby to the proposed kiln, or the location of the maximum impact from existing sources and the proposed kiln, as required to substitute existing monitoring data. In fact, the modeling for the proposed plant did not extend to the areas where the Braidwood, Midlothian and Joliet monitors are located. Instead, maximum impacts were expected to occur much closer. In short, the preconstruction monitoring does not meet the location criteria and the permit cannot be issued.

**As discussed, the ambient monitoring stations used to provide background concentrations meet the relevant location criteria of the *Ambient Monitoring Guidelines.* The fact that these monitors are some distance from Manteno does not preclude their use. Indeed, it is consistent with the fact that they are regional monitors, which were sited to collect monitoring data for northeastern Illinois, focusing on air quality in the Greater Chicago Metropolitan Area, where industry and population are concentrated.**

**The acceptance of data from the selected monitoring stations as suitable for the air quality analyses for the proposed plant reflects the Illinois EPA's knowledge of air quality in Northeastern Illinois and the character of the particular areas surrounding each monitoring station. The Braidwood monitor is at a site that is very similar to Manteno, as it is an agricultural area is which air quality is determined either by general background air quality, when the wind is toward the Chicago area, or urban transport, when the wind is coming from the Chicago Area. The Joliet monitor is at a site that is significantly more developed than the Manteno area, being in an industrial area on the edge of Joliet, an industrial-suburban city with a population of about 150,000 in the Greater Chicago Area. The Midlothian monitor is about 15 miles south of the Chicago loop, in an area that is significantly more developed than Manteno, in a community with a population of about 15,000. Given the character of Joliet and Midlothian, data from these monitoring stations in these communities are a conservative representation of background air quality in Manteno, which is likely significantly lower than measured at these stations.**

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**at each monitor. For shorter averaging periods, the meteorological conditions accompanying the concentrations of concern should be identified. Concentrations for meteorological conditions of concern, at monitors not impacted by the source in question, should be averaged for each separate averaging time to determine the average background value. Monitoring sites inside a 90° sector downwind of the source may be used to determine the area of impact. One hour concentrations may be added and averaged to determine longer averaging periods.**

**c. If there are no monitors located in the vicinity of the source, a "regional site" may be used to determine background. A "regional site" is one that is located away from the area of interest but is impacted by similar natural and distant man-made sources.**

98. Even if the existing ambient monitoring could be used to provide background data for the air quality analysis for the proposed lime plant under limited circumstances, this monitoring must meet the same quality requirements as project-specific monitoring.[212] It is not clear that this is the case.

**Illinois's ambient monitoring network is operated to meet the applicable "quality requirements" for ambient monitoring. This is a necessary aspect of the operation of this network, as collected data is relied upon for designations of attainment and nonattainment, development of attainment strategies, and general air quality planning. Compliance with these quality requirements is confirmed by periodic audits conducted by USEPA.[213]**

99. It is not clear that "current" monitoring data, within the meaning of the applicable minimum standards, was used for the air quality analysis. To be current, the data must have been collected within the most recent three years. The application for the proposed lime plant has dragged on for almost a decade. More recent submissions refer back to earlier submissions. It is unclear what data, from what time period, was used. Unless current data is used, as documented in the record, the preconstruction monitoring is deficient.

**The air quality analyses used appropriate background monitoring data that satisfies the applicable requirements of the USEPA's *Ambient Monitoring Guidelines*.[214] The ambient monitoring data is representative of current background air quality in the Manteno area. Moreover, the general trend in Illinois is improving air quality over time. Ambient concentrations are decreasing as federal and state regulatory programs are put in place for existing sources as part of emission control programs to bring urban areas into compliance with NAAQS and generally improve air quality in urban areas. For example, since 2002 when the initial application submittal was made, the relevant background concentrations for $PM_{10}$ have gone down by about 10 percent.[215] Continuing improvements in ambient air quality should be expected given continued improvements in emission control on both existing stationary and mobile sources. Accordingly, the period of time from which ambient monitoring data was collected should not be a significant factor for the modeling conducted for the proposed plant.[216]**

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212 These minimum requirements for ambient monitoring include: 1) Continuous instrumentation monitoring; 2) Documented quality control, including calibration, zero and span checks, and control checks; 3) Use of calibration and span gases certified by comparison to reference materials prepared by the National Bureau of Standards; and 4) Minimum 80 percent data recovery.

213 **In addition, the Illinois EPA also operates certain automated ambient monitors using non-reference methods, notably for particulate, as indicator monitors. This is done to collect data to make forecasts of air quality under the Air Quality Index program and to issue air quality advisories.**

214 **When addressing currentness of data, the *Ambient Monitoring Guideline* provide that "The air quality monitoring data should be current. Generally, this would mean for the preconstruction phase that data must have been collected in the 3-year period pre ceding the permit application, provided the data are still representative of current conditions." Ambient Monitoring Guidelines, Section 2.4.3, Currentness of Data**

215 The background values for $PM_{10}$ used in the ACT 2006 analysis (from 2001 through 2003) were 64 and 26 $\mu g/m^3$, for 24-hour and annual averages, respectively. If data from the most recent three year period available (2006 through 2008) were used instead, the background values would be 54 and 24 $\mu g/m^3$, for the 24-hour and annual averages, respectively.

216 In addition, since 2002, the modeled air quality impacts of the proposed plant have also gone down, as Vulcan has made improvements to its plans for the plant. In particular, in 2006, the modeled maximum $PM_{10}$ impacts from the proposed plant with the planned configuration at that time were 27.2 $\mu g/m^3$, 24 hour average, and 6.26 $\mu g/m^3$, annual average. With the changes to the plant configuration made in 2008, its maximum modeled impacts are now 21.9 $\mu g/m^3$, 24 hour average,

100. The Project Summary prepared by the Illinois EPA, which accompanied the release of the draft permit, reports on the results of NAAQS modeling conducted for the proposed plant in Section VIII, Air Quality Analysis. The 24-hr PM10 and annual NO2 impacts are reported to be at 99.2 and 98 percent of the NAAQS, respectively. (Project Summary, Section VIII, Table 3A.)

**Even though the maximum impacts for $PM_{10}$ and $NO_2$ reported in the Project Summary are more than one would like, they nevertheless show that the proposed plant would not be accompanied by exceedances of the NAAQS for $PM_{10}$ and $NO_2$. The impacts reflect a conservative evaluation of the impacts of the proposed plant, consistent with standard practices in modeling. For example, all sources are assumed to be operating continuously, the background concentrations reflect maximum monitored concentrations, and immediate conversion of NOx to $NO_2$ is assumed.** [217] **In practice, actual concentrations should be less than the levels reported in the Project Summary. In addition, the maximum concentrations in the vicinity of the proposed plant will be less than the reported impacts as the maximum concentrations, as predicted by modeling, occur in the vicinity of certain existing sources, not near the proposed plant.**

101. For the $SO_2$ NAAQS analyses, the Project Summary initially observes that there were modeled violations of the 3-hour and 24-hour $SO_2$ NAAQS from the proposed plant and other nearby sources. These modeled NAAQS violations are downplayed, as they are attributed to deficiencies in emission inventories and other modeling inputs for existing sources.[218] However, meeting air quality standards through correct modeling is a prerequisite to issuing a permit. Having deficient data is not a reasonable or lawful basis to revise the modeling assumptions until a project passes modeling and to therefore issue the permit. The Illinois EPA must either obtain the necessary data or deny the permit.

**This comment misrepresents the basis upon which the Illinois EPA proposed to issue a permit for the proposed plant, as discussed in the Project Summary. The existence of certain flaws in the data in the inventory for existing sources, including erroneous emission rates and stack heights, which would act to overstate impacts from existing**

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and 3.44 μg/m$^3$, annual average. (In this regard, the Project Summary incorrectly stated that there would be an increase in the emissions of material handling operations at the proposed plant.)

[217] **In addition, for $NO_2$, this comment addresses the results of modeling performed by URS and submitted with the original application for a revised permit filed in 2002. These results overstate the maximum ambient concentrations that would occur with the restart of the lime plant, given the subsequent changes in the plans for the plant. This was shown in subsequent modeling conducted by Air Control Techniques (ACT) in 2004, when Vulcan proposed to install a dry scrubber instead of a wet scrubber. ACT, Vulcan's new modeling consultant, conducted modeling for the lime kiln by itself for gaseous pollutants, including $NO_2$. This modeling showed that the impacts of the kiln would be less with the dry scrubber than with the wet scrubber previously proposed. In particular, the maximum $NO_2$ impact of the kiln was predicted to be 3.1 ug/m$^3$, rather than 16.22 ug/m$^3$ (See Table 1 in the Project Summary). Since the impact of the kiln would be less than with the previously proposed configuration and the previous modeling by URS showed compliance, further regional modeling was not needed for $NO_2$. However, when reporting overall impacts in Table 3A of the Project Summary, which is addressed by this comment, this meant that it was necessary to report the results of the previous analysis by URS.**

[218] "The Illinois EPA's conducted a detailed review of URS's and ACT's results, which confirmed that the lime plant does not cause or contribute to any exceedances. The modeled exceedances also appear to result from deficiencies in the emission inventories for existing sources, such as lack of unit-specific stack parameters, which require assumptions that overstate impacts of existing sources. It was not feasible to attempt to correct these deficiencies for this analysis, given the number and location of the existing units. In particular, the emission inventory for modeling the lime plant extended out for a number of miles around the plant. These deficiencies in the inventory data are more effectively corrected as part of routine processing of the permits for the exiting sources or future air quality analysis for projects at those sources." Project Summary, Section VIII, Air Quality Analysis.

**source, was not a basis upon which a permit was proposed to be issued to the plant. As related to impacts on air quality, the Illinois EPA proposed to issue a permit to the proposed plant and has now issued that permit because the proposed plant would not have a significant contribution to the modeled exceedances of the $SO_2$ NAAQS. This approach to the modeled exceedances was clearly explained by the Illinois EPA in the Project Summary.**[219]

**As the Project Summary also stated that the modeled exceedances were likely due to errors in inventory data, and as such likely do not reflect actual violations of the $SO_2$ NAAQS, this statement was intended to provide further background or explanation for why the modeling showed exceedances of the NAAQS. It was believed appropriate to provide this information so that individuals would not mistakenly believe that the modeling was proof of actual violations of the $SO_2$ NAAQS.**

**The Illinois EPA has appropriately addressed modeled exceedances predicted to occur far from the Manteno plant and near to other sources for which Illinois EPA recognizes there are issues with the quality of emission and stack data. Given the circumstances, the Illinois EPA's current resources do not justify special action to address the deficiencies in the data.**

102. The background concentrations used by the Illinois EPA in its alternative analysis for air quality impacts also have no basis. Illinois EPA assumes that the peak $SO_2$ and $PM_{10}$ impacts from non-Vulcan sources are equal to the background concentrations at the locations of the ambient monitors. However, the background concentrations come from Joliet ($SO_2$) and Midlothian ($PM_{10}$) monitors, both of which are more than 20 miles from Manteno. The Illinois EPA did not determine whether the measured concentrations at these monitors are in any way correlated to the peak modeled impacts from non-Vulcan sources that contribute to the areas of highest impact from the proposed plant. Indeed, due to their location, it is inconceivable they are so correlated. For example, there are five $PM_{10}$ sources within two miles of the proposed plant site.

**The basis for the alternative air quality analysis is both clearly stated and reasonable. As explained, the analysis "double counts" the monitored background concentrations. It counts them once as the ambient background and counts them a second time to further account for impacts of existing sources. Effectively, the monitored concentrations are assumed to be equal to the contributions of existing sources. This is reasonable as ambient monitors directly measure the aggregate impact of existing sources and are not subject to distortion due to any errors in emission rates or stack**

**[219] In this regard, Section VIII of the Project Summary explains, "The maximum air quality impacts predicted by these analyses are shown in Table 3A. While the results show modeled exceedances for certain NAAQS standards (3-hour and 24-hour SO2 and 24-hour and annual PM10), URS and ACT demonstrated that Vulcan Manteno lime plant did not cause or significantly contribute to any exceedances of the NAAQS. The Illinois EPA conducted a detailed review of URS's and ACT's results, which confirmed that the lime plant does not cause or contribute to any exceedances. The modeled exceedances also appear to result from deficiencies in the emission inventories for existing sources, such as lack of unit-specific stack parameters, which require assumptions that overstate impacts of existing sources. It was not feasible to attempt to correct these deficiencies for this analysis, given the number and location of the existing units. In particular, the emission inventory for modeling the lime plant extended out for a number of miles around the plant. These deficiencies in the inventory data are more effectively corrected as part of routine processing of the permits for the existing sources or future air quality analysis for projects at those sources."**

**parameters contained in an inventory of data for existing sources. Accordingly, this alternative evaluation presents more realistic information on local air quality impacts than an analysis driven by a flawed inventory. At the same time, as measured concentrations are counted twice, both as "background" and as the impact of existing sources, the alternative analysis is still conservative. Lastly, as noted by this comment and previously discussed, the monitoring stations used for $SO_2$ and $PM_{10}$ are located in metropolitan areas. As such, they should be expected to have higher ambient concentrations than the proposed plant site, which is much less developed. The Braidwood monitoring station is located in an area that is more similar to Manteno.**

103. Instead of confronting the modeled exceedances, the Illinois EPA conducted an alternative evaluation, which doubled the monitored background concentrations and removed all non-Vulcan sources from the modeling analyses. As explained in the Project Summary, Section VIII, Air Quality Analysis:

> A more realistic evaluation of the impact of Vulcan's Manteno lime plant on air quality in the vicinity of Manteno is provided in Table 3B. This alternative evaluation uses the maximum modeled impacts of the lime plant and other new sources in the area. However, these analyses assumes that other existing sources contribute to ambient air quality in an amount equal to the monitored background concentration.

This doubling of background concentrations and removing sources that already show modeled NAAQS violations is outside of recognized modeling guidelines or practice. There is no basis for this assumption, other than Illinois EPA's belief that it will be realistic — a belief that has no basis in the record. There is no support for this unique methodology in the USEPA's *Guideline on Air Quality Modeling* or any other similar guidance documents. It appears that Illinois EPA developed this method specifically for the proposed plant, solely to be able to model concentrations less than the NAAQS and issue the permit for the plant. In other words, Illinois EPA's "more realistic evaluation" cannot be used as a basis for issuing a construction permit for the proposed plant.

**This comment misrepresents the Illinois EPA's review of the air quality impacts of the proposed plant and its approach to modeled exceedances of the NAAQS. In fact, the Project Summary discussed the fact that the air quality conducted for the proposed plant identified modeled exceedances of the NAAQS. The Project Summary then proceeded to explain why those modeled exceedances should not prevent issuance of a permit for the proposed plant. For this purpose, it explained that the modeled impacts or contribution of the proposed plant to those exceedances was not significant, i.e., the contributions were less than the SILs.**

**As such, the subsequent, father discussion in the Project Summary, which is the focus of this comment, is not the legal basis on which the permit has been issued. Rather, this further discussion provided information about the maximum air quality impacts that would likely potentially occur in the area around the plant, as might be of interest to residents of Manteno. This information about local air quality impacts is not contained in the modeling results that were provided earlier in the Project Summary, which addressed the points of maximum impacts. This was because those points of maximum impact occurred in the vicinity of existing sources, which are at**

**some distance from Vulcan's Manteno quarry.**

104. Vulcan's modeling consultant, ACT, used an improper approach to escape the conclusion that modeled impacts are above the NAAQS:

> The NAAQS analysis showed some exceedances of the 3-hour and 24-hour sulfur dioxide (SO2) standards. However, the contribution of the proposed plant was below the significance air quality impact level at the time and location of each of the predicted violations.[220]**108**

**Neither ACT nor the Illinois EPA "escaped" the conclusion that certain modeling for the proposed plant showed concentrations above the NAAQS. The approach used by both ACT and the Illinois EPA to address certain modeled exceedances of the $SO_2$ NAAQS is consistent with administrative guidance issued by USEPA. As expressed in guidance prepared in 1998,[221] this guidance provides that a PSD permit may be issued when a proposed source will not have significant impact at the points and times of the modeled violations. The circumstances of the modeled $SO_2$ exceedances for the proposed plant are the second of three possible outcomes of modeling by a permit applicant, as addressed by this guidance.[222] Incidentally, the USEPA in the course of formal rulemaking in 2005 confirmed the continued applicability of this guidance.[223]**

105. Since the Illinois EPA remains silent on ACT's method of addressing a modeled NAAQS

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[220] See Vulcan submittal "Sulfur Dioxide, Nitrogen Dioxide, and Carbon Monoxide Air Quality Net Impact Analyses – Vulcan Manteno Lime Kiln Facility," November 2008, p. 8.

[221] **Memorandum, Gerald Emison, USEPA, Director, OAQPS, to Thomas Maslany, USEPA, Director, Air Management Division , July 5, 1988, "Air Quality Analysis for Prevention of Significant Deterioration (PSD)."**

[222] **"(b) Second, a modeled violation of a NAAQS or PSD increment may be predicted within the impact area, but, upon further analysis, it is determined that the proposed source will not have a significant impact (will not be above de minimis levels) at the point and time of the modeled violation. When this occurs, the proposed source may be issued a permit (even when a new violation would result from its insignificant impact), but the state must also take appropriate steps to substantiate the NAAQS or increment violation and begin to correct it through the State implementation plan." Emison Memorandum, page 2.**

[223] **In November 2005, USEPA completed rulemaking to update 40 CFR 51, Appendix W, Guideline on Air Quality Models (Final Rule, Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions, 70 FR 68,217 (November 9, 2005) ). This guidance confirms the continued applicability of the cited 1988 memorandum by Gerald Emison. It addresses the $SO_2$ exceedances identified in ACT's modeling, which is the subject of this comment, as the second possible outcome of an air quality analysis.**

**"In implementing the changes to the Guideline, we recognize that there may arise occasions in which the application of a new model can result in the discovery by a permit applicant of previously unknown violations of $SO_2$ NAAQS or PSD increments due to emissions from existing nearby sources. This potential has been acknowledged previously and is addressed in existing EPA guidance ("Air Quality Analysis for Prevention of Significant Deterioration (PSD)," Gerald A. Emison, July 5, 1988). To summarize briefly, the guidance identifies three possible outcomes of modeling by a permit applicant and details actions that should be taken in response to each:**

**1. Where dispersion modeling shows no violation of a NAAQS or PSD increment in the impact area of the proposed source, a permit may be issued and no further action is required.**

**2. Where dispersion modeling predicts a violation of a NAAQS or PSD increment within the impact area but it is determined that the proposed source will not have a significant impact (i.e., will not be above de minimis levels) at the point and time of the modeled violation, then the permit may be issued immediately, but the State must take appropriate actions to remedy the violations within a timely manner.**

**3. Where dispersion modeling predicts a violation of a NAAQS or PSD increment within the impact area and it is determined that the proposed source will have a significant impact at the point and time of the modeled violation, then the permit may not be issued until the source owner or operator eliminates or reduces that impact below significance levels through additional controls or emissions offsets. Once it does so, then the permit may be issued even if the violation persists after the source owner or operator eliminates its contribution, but the State must take further appropriate actions at nearby sources to eliminate the violations within a timely manner." 70 FR 68,225 and 68,226**

violation, it is reasonable to assume that the Illinois EPA does not agree with this approach.

**As already discussed, the Illinois EPA was not silent on the approach that it took to modeled violations of the NAAQS. As such, the commenter should not assume that the Illinois EPA disagrees with the approach taken by ACT. In fact, as already discussed, the Project Summary explained that the air quality analysis conducted for the proposed plant identified modeled exceedances of the $SO_2$ NAAQS. The Project Summary then proceeded to explain why those modeled exceedances did not preclude issuance of a permitting for the proposed plant, explaining that the modeled contributions of the plant to those exceedances was not significant, i.e., the contributions were less than the SILs.**

106. The use of Significant Impact Levels (SIL) to address NAAQS violations, as proposed to be relied upon for the proposed plant, is flawed and inappropriate. The concept of NAAQS SILs, as set forth by USEPA rules, is found at 40 CFR 51.165(b)(2).[224]

> A major source or major modification will be considered to cause or contribute to a violation of a national ambient air quality standard when such source or modification would, at a minimum, exceed the following significance levels at any locality that does not or would not meet the applicable national standard…

This rule does not provide for the exemption of modeled violations when a proposed project's contribution is below the significance threshold at the time and location of a predicted violation.[225]

**As already discussed, the use of SILs in conjunction with modeled exceedances of NAAQS is well established. The cited rule provides a regulatory basis for SILs. The USEPA guidance already discussed provides further guidance on the practical implementation of the principal established by the rule.**

107. ACT only modeled certain, limited, receptor locations on a grid surrounding the Vulcan Manteno site. To determine whether the project contribution is below the significance threshold at the time and location of each of the predicted violations, ACT would have to model infinitely more receptors to identify all possible source to receptor combinations. This was not done, nor is it feasible to do.

**The approach taken in the modeling of the proposed plant was consistent with well-established methodology for modeling. Receptor grids are developed to identify areas of maximum impacts. Receptors are located closer together in areas where high concentrations are likely. Additional receptors added to the receptor grids as needed to confirm that maximum impacts are identified.**

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[224] 40 CFR 51.165(b)(2) also sets the numerical levels of the SILs. For example, the SILs for $SO_2$ are 1, 5 and 25 $\mu g/m^3$, for annual, 24-hour and 3-hour average impacts, respectively.

[225] This rule says nothing about matching time to a location as an exemption. The rule also specifies "locality," not location. In dispersion modeling, location refers to a receptor – a specific x and y coordinate used to determine the relationship to the emission sources. However, the term "locality" clearly applies to a broader region, such as the zone of impact or even the air quality control region, not a specific modeled receptor. This is an important distinction because modeling receptors are spaced on a grid and do not capture each point in space—meaning the highest impacts and all areas of violations are not necessarily found by the model.

108. Dispersion models are more reliable for estimating longer time-average concentrations than for estimating short-term concentrations at specific locations. Dispersion models are also reasonably reliable in estimating the magnitude of highest concentrations occurring sometime, somewhere within an area. For example, errors in highest estimated concentrations of ± 10 to 40 percent are found to be typical, certainly well within the factor-of-two accuracy often quoted for modeling. However, estimates of concentrations that occur at a specific time and site, are poorly correlated with actually observed concentrations and are much less reliable.[226]

**While this comment correctly describes certain general attributes of dispersion modeling, those attributes are not relevant to the issue at hand. Modeling is widely recognized as an appropriate method to evaluate air quality impacts. Modeling is also an essential tool of the PSD program. The air quality impacts of proposed projects, which do not yet exist, can only be evaluated and quantified for comparison to applicable air quality standards by mathematical predictions, i.e., by computer dispersion modeling. While modeling may both underestimate and <u>overestimate</u> impacts, the results of modeling must be relied upon in making decisions about the quantitative air quality impacts of proposed projects.**

109. The exemption of modeled violations, when the proposed project's contribution is below the significance threshold at the time and location of each of the predicted violations is relying on a situation where model performance is particularly poor. In essence, model performance is generally reliable in a given locality, but is not as reliable at a specific paired time and location. Therefore, the USEPA's guidance for SILs speaks in terms of locality, but not a specific paired time and location.

**This comment also does not consider the full implications of the attribute of dispersion modeling that is being raised. From a technical perspective, it should not be presumed, as this comment does, that dispersion modeling is able to adequately or reliably predict an exceedance of the NAAQS but not able to then also evaluate the culpability or contribution of different sources to that exceedance. Either dispersion modeling is able to adequately predict air quality impacts and exceedances of the NAAQS or it is not. If it is able to adequately predict air quality impacts and NAAQS exceedances, it is implicit that modeling can also provide further information on the contribution of different sources to such exceedances. This is inherent in the methodology by which NAAQS exceedances are predicted, i.e., by summing the contribution or impacts of different sources on air quality at a specific receptor for a particular period of time. If the commenter believes that modeling cannot be used to address the culpability or individual contribution to NAAQS exceedances, the commenter is essentially arguing that modeling is not sufficiently reliable to predict NAAQS exceedances. This is clearly not the case, as modeling is routinely relied upon to both identify NAAQS exceedances and evaluate the culpability of different sources or emission units in contributing to those exceedances.**

**Accordingly, it was not necessary for USEPA guidance for dispersion modeling to address "paired locations and times" of air quality impacts or exceedances and**

[226] USEPA, *Guideline on Air Quality Models*, November 9, 2005, Section 9.1.2.a.(1).

**contributions of different sources to exceedances. It is inherent in dispersion modeling that the results of modeling, i.e., modeled concentrations or air quality impacts, are "paired," providing data for specific receptor locations and periods of time.**

110. The idea that modeled NAAQS exceedances can be addressed or justified by having project impacts below the SIL at a specific time and receptor location is not supported by rule.[227]

**As already discussed, the role of SILs in addressing air quality impacts is supported by both law and rule. Moreover, SILs are essential from a practical perspective. This is because proposed projects could never be approved if there were not SILs. Given the nature of emissions and dispersion in the atmosphere, every source contributes not only to the loading of pollutants in the local airshed, but also to the loading of pollutants in the atmosphere on a regional, national, and global level. Dispersion modeling conducted for proposed projects that shows acceptable impacts in the area in which they would be located would also predict very small but nevertheless quantifiable impacts on regional, national and global air quality, including quantifiable impacts on distant nonattainment areas. As proposed projects would be considered to contribute in some small but quantifiable degree to nonattainment, the projects could not proceed unless there were a formalized understanding of the levels of impacts that are so small that they are not of concern. The SILs are the formal statement by USEPA of such levels of impacts. They are used to both define the geographical extent of the "significant impact area" within which PSD air quality analyses must address air quality and to address the relative role of individual sources within this area to air quality.**

111. To the extent that the Illinois EPA would rely on the NSR Manual to show that use of SILs to address NAAQS exceedances is acceptable (see NSR Manual at page C.52), the NSR Manual is incorrect on this point. While the NSR Manual is valuable and has become the authoritative document on PSD permitting by practice, it does not and was not intended to supersede statutory and regulatory requirements. As the preface to the NSR Manual states,

> This document was developed for use in conjunction with new source review workshops and training, and to guide permitting officials in the implementation of the new source review (NSR) program.... Should there be any apparent inconsistency between this manual and the regulations (including any policy decisions made pursuant to those regulations), such regulations and policy shall govern.

**This comment does not show that it is inappropriate to rely on the NSR Manual as support for the use of SILs in the manner in which they were used for the air quality analyses for the proposed plant. As discussed in other comments, SILs are supported by USEPA rule and policy and are an essential component of air quality analyses for PSD permitting. Moreover, this comment does not explain or demonstrate or why it is appropriate to deviate from the explicit guidance in the NSR Manual. It merely**

[227] To the extent that the Illinois EPA would rely on the NSR Manual to show that use of SILs to circumvent NAAQS is acceptable (see NSR Manual at C.52), the NSR Manual is incorrect on this point. While the NSR Manual is valuable and has become the authoritative document on PSD permitting by practice, it does not, cannot, and is not intended to supersede statutory and regulatory requirements.

**notes that the NSR manual itself observes that, with appropriate explanation or justification, it may be appropriate to proceed in a manner that is different from that indicated in the NSR Manual.**

112. Applied to the proposed lime plant, the attempt to use SILs to avoid NAAQS violations ignores the real possibility that the proposed plant, in conjunction with existing sources, would create NAAQS violations. This undermines key provisions of the Clean Air Act, which requires specific mitigation strategies for identified NAAQS violations.

**This comment does not accurately describe what is occurring with the modeling conducted for the proposed plant. The modeling for the proposed plant identified certain exceedances of the NAAQS that should be considered theoretical or "paper" violations of the NAAQS. The exceedances are in the immediate vicinity of existing sources, not the proposed lime plant. The exceedances are likely the result of errors in the inventory data used for modeling of existing sources.**

**While an appropriate approach to address or resolve these paper exceedances may be a matter for discussion, the resolution would not involve the proposed lime plant. It would involve the existing sources whose emissions, as modeled based on current inventory data, are directly causing exceedances. As such, the permitting of the proposed plant should not and need not be delayed pending resolution of those modeled exceedances.**

113. The Vulcan $PM_{10}$ emissions impact analyses reflect an error in the emission calculations for unpaved roads, which result in an underestimation of the project's air quality impacts. $PM_{10}$ modeling was conducted with emission rates calculated by ACT for onsite unpaved roadways that assume 90 percent control efficiency from watering.[228] While ACT states that it has performed emissions testing at limestone plants showing 90 percent control by watering, reports for this testing were not included with the application and likely did not address continuous worst-case conditions. Therefore, the claimed 90 percent control cannot represent the worst-case conditions that must be assumed for modeling.

**This comment does not identify a flaw in the $PM_{10}$ modeling for the proposed plant. The permit for the plant sets specific limit on the amount of particulate matter emissions from roadways (Condition 2.4.6) that reflect the emissions rates and calculations in the application accompanied by provisions to verify compliance with those limits.[229] The permit does not rely on representations by ACT about the levels of emissions will be achieved.[230]**

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[228] See Vulcan submittal, "PM10 Particulate Matter Emissions Impact Analysis," January 21, 2009, Section 3.2.1.

[229] **Specific limits on the particulate matter emissions from roadways, which reflect the emissions data in the application, are set in Condition 2.4.6 of the permit. The permit also includes provisions to assure that plant roadways are appropriately controlled to maintain particulate matter emissions within these limits. Roadways are subject to requirements for regular watering and other dust control measure to minimize dust emissions (Condition 2.4.3-2). It also requires measurements of silt loading on plant roadways to develop site-specific emission factors and confirm the effectiveness of the dust control program (Condition 2.4.8-2). Recordkeeping is also required to verify the actual emissions from roadways from the plant, including records for the implementation of the road dust control program, the amount of road traffic at the plant, and the amount of particulate matter emissions (Condition 2.4.9).**

[230] **ACT indicates that the dust emissions from unpaved roads at mineral industry facilities, like Vulcan's Manteno quarry have been well characterized. The information shows that emission rates of 0.26 to 0.28 lbs per VMT, as used in the modeling for the proposed plant, are achievable. These emission factors represent a nominal 90 percent control from the uncontrolled emissions that would be predicted based on the emission estimation methodology in AP-42.**

114. Dust emissions from unpaved roads, as well as possible control approaches, have been widely studied. Based on various references, use of watering for control of dust will typically yield short-term control efficiencies on the order of 50 percent.[231] Note that these are short term efficiencies and frequency and time between applications of the control measure (watering, chemical suppressants, and/or sweeping) are critical. The 90 percent control efficiency assumed by ACT is almost certainly unachievable, even if water were continuously applied, which is not required by the permit. The practice of continuous watering is impractical or impossible (especially during winter when watering is prevented by ice formation).

**There are a number of factors that will contribute to the effectiveness of fugitive dust control at the proposed plant. Most significantly, it will be a private facility and Vulcan will have control of essentially all aspects of the roadways at the plant. Water can be applied at regular intervals with adjustment made to the schedule made as needed to respond to weather conditions and the volume of vehicle traffic. The customer lime trucks will be designed for travel on public highways. Accordingly, they will travel on plant roads at relatively slow speeds due to the layout of the roads, the short distance that must be travelled, and the nature of the trucks.[232] The trucks will be enclosed so that lime will not be lost from the bed of the vehicles. The limestone for the lime plant will be received by conveyor.[233]**

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**In this regard, ACT indicates that since the early 1990s, considerable data has been gathered on fugitive $PM_{10}$ emissions from unpaved roads at mineral industry facilities similar to the proposed plant site. The unpaved road emission factor data set maintained by the USEPA in the current background document for AP-42, which was last compiled in 1998, contains six emission tests of stone crushing plants. In addition, the National Stone, Sand & Gravel Association (and its predecessor organization) undertook a cooperative emission testing program with the USEPA. As part of that program, for which ACT was a consultant and conducted testing, 65 test runs were conducted for unpaved roads at non-metallic mineral industry facilities in the period from 1995 to 2005 (34 test runs in Georgia two studies and 31 test runs in California). All of these tests were conducted standard USEPA methodology, with testing procedures described in protocols submitted in advance to the USEPA. While all of the data has been provided to the USEPA, most of these tests were not completed until after USEPA summarized the unpaved road emission factor database in 1998. The controlled fugitive dust emission rates measured in these studies were consistently in the range of 0.1 to 0.4 lbs per VMT.**

**The wet suppression techniques used on roadways at the tested facilities were less rigorous than the requirements imposed on the Manteno plant by the issued permit. In addition, some of the emission tests were conducted in an arid portion of the central valley region of California, an area where unpaved roads are much more prone to drying quickly after watering. The emission factors in the Manteno emission inventory, which were calculated based on a 90 percent wet suppression efficiency, ranged from 0.26 to 0.28 lbs per VMT. This is similar to emission rates measured by ACT in the tests in Georgia.**

[231] The Midwest Research Institute indicates short-term 50 percent control for a water application intensity of about 0.2 gallon/yard$^2$/hour (C. Cowherd et al., *Final Report: Control of Open Fugitive Dust Sources*, Midwest Research Institute, September 1988, p. 5-10). Hesketh, in *Fugitive Emissions and Controls*, lists 60 to 80 percent control for unpaved road with non-water wetting agents and 85 to 90 percent control with paving and sweeping (Howard Hesketh and Frank Cross, *Fugitive Emissions and Controls*, 1983, p. 42. 11-15). The South Coast Air Quality Management District suggests control efficiencies of 34 to 68 percent for watering of unpaved roads (South Coast Air Quality Management District, CEQA Air Quality Handbook, April 1993, pp. 11-15). The WRAP Fugitive Dust Handbook lists control efficiencies of 10 to 74 percent for watering of unpaved roads (Western Governor's Association, WRAP Fugitive Dust Handbook, November 15, 2004, p.3).

[232] **The USEPA accounted for vehicle speed in an earlier version of its methodology for calculating emissions from unpaved roads. Even though USEPA methodology does not currently account for vehicle speed in its methodology for, it is an important factor affecting emissions, as anyone who has driven down a dirt road can confirm.**

[233] **ACT also indicates that there are a variety of factors that contribute to the effectiveness of fugitive dust control on roadways at mineral industry facilities. Vehicles travel over defined lanes compacting the road, producing a hard surface that resembles that of a paved road. This compaction is caused, in part, by the nature of limestone and frequent watering. The slow speed of vehicles entering and leaving the plant inherently reduces the tangential velocity of the vehicle wheels and thereby reduces emissions. The low vehicle speed also reduces the undercarriage turbulence and thereby reduces dust reentrainment from the road surface. The tires on the vehicles serving mineral industry facilities, which are designed for travel on public highway, are also different than those used on dedicated haul trucks at iron and steel plants and at surface coal mines. The average speed of these trucks will be significantly less than those of the off-road haul trucks on the long, open unpaved roads in the USEPA referenced studies.**

**It is also recognized that effective control of roadways at the plant will necessitate application of water or other treatment at an appropriate frequency given the conditions experienced by the roadway.[234] However, this will not require "continuous watering." The proposed lime plant will have a relatively low volume of truck traffic, compared to plants handling more material or transporting it over longer distances.[235] This means that less frequent watering will be needed to maintain an adequate level of moisture on the surface of the roadways. While winter weather can make appropriate levels of treatment more challenging, it does not prevent applications of water or alternative treatments to roadways as necessary for control of dust during periods when control is not provided by a natural coating of snow or ice.**

**The various references cited by this comment do not demonstrate that the emission rates required on roadways at the plant will be impossible to obtain. In this regard, the cited study by Cowherd and others is over 20 years old and does not address roadways at limestone and lime plants but public roadways.[236, 237]**

115. At best, fugitive $PM_{10}$ emissions from roadways at the plant should be calculated based using 75 percent control. (Even this is generous, as it is not feasible on a long-term basis.) This increases the $PM_{10}$ emissions of roadways by a factor of 2.5. Using these adjusted emission rates, the $PM_{10}$ air quality impacts from these roadways would also increase by a factor of 2.5.

**The suggested revisions to the emissions calculations made by this commenter are not justified. They would increase emissions from plant roadways above the rates**

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**[234] For unpaved roads, relationships between the frequency of watering, the rate of drying, the volume of traffic and the level of control are well recognized. For example, in the Background Document for Section 13.2.2 of AP-42, USEPA states "Watering increases the moisture content, which conglomerates particles and reduces their likelihood to become suspended when vehicles pass over the surface. The control efficiency depends on how fast the road dries after water is added. This in turn depends on (a) the amount (per unit road surface area) of water added during each application; (b) the period of time between applications; (c) the weight, speed and number of vehicles traveling over the watered road during the period between applications; and (d) meteorological conditions (temperature, wind speed, cloud cover, etc.) that affect evaporation during the period." Page 13.2.2-1 1, USEPA Background Document for Section 13.2.2.**

**[235] According to ACT, the volume of traffic at the plant will be as much as 100 times lower than those of the plants tested in the studies of emissions of industrial unpaved roads that are the basis of AP-42, Section 13.2.2. As such, the levels of vehicle traffic, which contribute to drying of the road surface, will be much lower at the proposed plant and the effectiveness of control between application of water will be higher.**

**[236] In addition to being over 20 years old, the cited portion of the study by C. Cowherd and others addresses control of particulate matter emissions from "public roadways." As observed in the study, public roadways are distinguished from "industrial roadways," given the difference in ownership and supervisory control of roadways, but also the presence of curbs and relatively light traffic loadings. These are factors that constrain the numerical effectiveness of control of fugitive emissions from such roadways. In contrast, for industrial roads, the study observes that "Mitigative measures may be more practical for industrial plant roads because (1) the responsible party is known; (2) the roads may be subject to considerable spillage and carryout from unpaved areas; and (3) all affected roads are in relatively close proximity, thus allowing a more efficient use of cleaning equipment." Cowherd Study, page 2-11.**

**[237] ACT also indicates that this comment misrepresents the cited documents. Only the study conducted by the Midwest Research Institute by Cowherd and others should be considered a primary reference. The other cited documents are secondary references that summarize the results generated by the actual researchers. That is, neither Howard Hesketh nor Frank Cross actually conducted research of fugitive dust emissions from unpaved roads. ACT also is not aware of any unpaved road emission tests conducted independently by the South Coast Air Quality Management District or the WRAP Association. As such, these other documents appear to simply summarize data first published by others without any independent confirmation. The original research appears to have been focused on the impact on regional air quality of roadways, especially public roadways that were not subject to targeted cleaning programs. The documents do not specifically address roadways at plants in the limestone and lime industry.**

**requested by Vulcan in its application and used by Vulcan in its modeling.**

116. The $PM_{10}$ air quality impact analyses for the proposed plant reflect errors in the $PM_{10}$ emission calculations for wind erosion from the flue dust storage pile and the dispersion parameters used in modeling. These errors resulted in an underestimation of this pile's air quality impacts and thus the plant's impacts. For example, the emission calculations only address emissions of dust from wind erosion. Emissions of dust from other activities or causes, i.e., loading to and unloading from this pile are absent. Then, ACT calculated emissions from wind erosion assuming that emissions only occur with winds speeds greater than 12 miles per hour. The active area of the pile used for emissions calculations is consistent with the dispersion parameter that was used.[238]

**There were several errors in the emissions calculations and the modeling of the "old" flue dust storage pile in the application for the plant. However, the errors are not significant. This is because this pile will not be a source of emissions. This pile will not be used for storage or disposal of the flue dust from the kiln when the plant resumes operation. Instead flue dust will be sent off-site for disposal or beneficial use.[239, 240] As the modeling for the proposed plant addresses this pile as a source of emissions, with additional impacts on air quality, the modeling overstates the plant's air quality impacts.**

117. I calculate the $PM_{10}$ emissions of the flue dust storage pile due to wind erosion to be at least 10 times more than those calculated by ACT. My calculations are based upon 100 percent silt and no control, as is appropriate as the application does not support different values. In addition, the draft permit would not require any control of emissions from this pile, much less achievement of 90 percent control as ACT used in its emissions calculations.

**The evaluation performed by this commenter is not relevant. As discussed, since the flue dust storage pile will not be used and has been out of service for over five years, it need not be addressed in the modeling for the proposed plant. Moreover, given the age of this pile, it does not need to be included in the modeling as a "continuing" historic source that would have emissions. This pile has now not been used for over five years, without any shielding from precipitation, and emissions due to wind erosion should not be present in the future. This is because, given the nature of the material in the pile, the surface of the pile has crusted and hardened over, with the dust agglomerated and cemented together, with the lime present in the dust helping to facilitate this process.[241]**

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[238] See Vulcan submittal "PM10 Particulate Matter Emissions Impact Analysis," January 21, 2009.

[239] **Vulcan does not plan to load or unload material from the "historic" flue dust storage pile. This pile, at which Vulcan previously disposed of the collected flue dust collected by the baghouse on the kiln, has been inactive since May 2003 when the lime plant last operated. The new configuration of the plant eliminates this emission unit. Collected flue dust will be conveyed to a holding silo, transferred to trucks in a baghouse-controlled loading operation, and shipped offsite.**

[240] **As this pile would not be used in the future, the absence of $PM_{10}$ emissions from transfer of material to and from this pile was not one of those errors. As such, it was not necessary to address emissions.**

**The threshold wind speed above which wind erosion is presumed to occur (12 miles per hour) was also not an error. It is a constant in the equation that was used to calculate wind erosion emissions from the pile (see page 4-17, *Control of Open Fugitive Dust Sources*, EPA-450-3-88-008, USEPA, Office of Air Quality Planning & Standards, September, 1988).**

[241] **While the formation of a hardened crust on this pile is to expected, at it is made up mainly of limestone with lesser amounts of flyash and lime, this phenomenon is a recognized factor that may affect dust emissions from wind erosion from many types of storage piles, when exposed to the weather. As USEPA explains in AP-42, Section 13.2.5, Industrial Wind**

**Incidentally, ACT was attempting to address the crust on the pile when it used a factor of 90 percent control in its emissions calculation for the pile. To avoid misleading this commenter, it would have been preferable if ACT had applied "100 percent control" to completely eliminate the pile as a source of emissions, accurately reflecting the future status of the pile.**

118. The $PM_{10}$ air quality impact analyses for the proposed plant reflect errors in the calculations of $PM_{10}$ emission for roadways in the "pit area," which result in an underestimation of the plant's air quality impacts.[242] ACT modeled unpaved roads in the pit area using $PM_{10}$emission rates that w assumed 90 percent control efficiency for watering. As already discussed, 75 percent control for watering of unpaved roads is a generous but more reasonable assumption for the control efficiency that will be achieved on these roads with watering.

**For the reasons that were already discussed for the plant roadways that serve the lime plant, it was also appropriate for ACT to use 90 percent control efficiency when calculating PM10 emissions from roadways in the pit area.**

119. ACT used 90 percent control efficiency for its calculation of $PM_{10}$ emissions from the storage piles located in the pit.[243] However, the draft permit would not set requirements for control of $PM_{10}$ emissions from these piles. Absent permit requirements sufficient to maintain a minimum, worst-case control efficiency, modeling should be conducted with uncontrolled emission rates. If $PM_{10}$ emissions were appropriately calculated without any control, the emissions associated with these piles, including load-in to the limestone pile, load-out of the oversize and undersize stone piles, and unloading to the coal and coke piles, would increase by a factor of 10

**As with roadways, the permit sets limits on the emissions of the storage piles addressed by this comment (See Condition 2.2.6(a)). These limits reflect any assumptions that ACT made about the emissions control efficiency that will be achieved for these piles. Vulcan must maintain the piles and carry out the operations associated with each pile to comply with these limits. Vulcan must also maintain records to confirm implementation of any additional control measures that are needed to comply with such limits.**[244]

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**Erosion, "Dust emissions may be generated by wind erosion of open aggregate storage piles and exposed areas within an industrial facility. These sources typically are characterized by nonhomogeneous surfaces impregnated with nonerodible elements particles larger than approximately 1 centimeter [cm] in diameter). Field testing of coal piles and other exposed materials using a portable wind tunnel has shown that (a) threshold wind speeds exceed 5 meters per second (m/s)(11 miles per hour [mph]) at 15 cm above the surface or 10 m/s (22 mph) at 7 m above the surface, and (3) particulate emission rates tend to decay rapidly (half-life of a few minutes) during an erosion event. In other words, these aggregate material surfaces are characterized by finite availability of erodible material (mass/area) referred to as the erosion potential. Any natural crusting of the surface binds the erodible material, thereby reducing the erosion potential.)" Section 13.2.5, page 13.2.5-1.**

[242] **Most of the lime plant's fugitive emissions units are located in the pit area where the kiln will be located. The pit is located on a "shelf" in the northwest corner of the quarry and is only about 50 feet below grade level. ACT modeled the pit as an area that is about 725 feet by 1100 feet (about 220 by 335 meters).**

[243] I note that ACT applied zero percent control to wind erosion from storage piles within the pit, although this is undocumented.

[244] **ACT indicates that the $PM_{10}$ emissions associated with these piles were calculated without reliance on any "extra control" of emissions beyond that which should be present given the nature of the materials being handled. This is because active control should not be needed to minimize emissions given the nature of the materials that are being handled. As such the "corrections" made by this commenter were not necessary. In particular, the limestone arriving at the feed pile has already been handed in the adjacent crushing plant, which is equipped with a wet suppression system that adds moisture to**

120. ACT incorrectly calculated fugitive $PM_{10}$ emissions from material handling within the pit area. ACT assumed, without any supporting documentation, that wind speeds within the pit average only 5 miles per hour. This assumption significantly underestimates emissions from the various limestone piles and the coal and coke piles, and associated transfer of material. ACT used AP-42, Section 13.2.4, Aggregate Handling and Storage Piles, to calculate $PM_{10}$ emissions from these units.[245] The formula for calculating fugitive $PM_{10}$ emissions requires a value for mean windspeed. The pit is approximately 725 feet by 1100 feet, while being only about 50 feet below grade. The size to depth ratio for the pit is too large to affect wind speeds, particularly at the downwind end of the pit. Also, the emission units are not on the pit floor, but are elevated sources. In particular, the stockpiles are likely to approach or exceed the pit grade. There is not a simple equation for calculating the effect of the pit on wind speed. Meteorological monitoring was not conducted to empirically address wind speed in the pit. In summary, there is no basis to choose a 5 mph default wind speed for calculating fugitive emissions from operations located in the pit.

**The fact that wind speed in a quarry pit with vertical walls would be less than the unobstructed surface wind speeds reflects everyday experience with the effect of obstructions on wind speed. The 5 mph wind speed used by ACT in the emissions calculations to account for this effect is reasonable. The average surface wind speed at the surface above the pit is 10.1 mph. The surface wind passes over the open quarry area, it gradually mixes with the air in the quarry causing the wind in the quarry.[246] This mixing is a gradual process and the wind speeds at the floor of the pit are a fraction of the surface winds. Accordingly, it is reasonable to presume that this acts to reduce the wind speed in the pit by a factor of one half compared to the surface winds, i.e., 5 mph compared to 10 mph, and to calculate emissions**

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**the stone as necessary to supplement natural moisture to control dust during crushing. Additional wet suppression control should not be needed at the lime plant. Moreover, spraying unnecessary water on the limestone feed pile or the over- and under-sized return piles is not prudent. Additional water on the feed pile would increase the moisture content of the limestone feed to the kiln, which would increase fuel requirements and associated emissions. Similar concerns apply to the fuel piles. Spraying unnecessary water onto the over- and under-sized limestone piles would results in agglomeration and "stickiness," which would creates operational problems in the subsequent handling of this material without any further meaningful reduction in emissions.**

245 See "PM10 Particulate Matter Emissions Impact Analysis," January 21, 2009.

246 **While the effect of surface windbreaks on wind speed should not be directly compared to the effect of the wall of a quarry pit, surface wind breaks do provide insight into the effect of obstructions on the speed of the wind. With a surface wind break, an obstruction interferes with the free passage of the wind, resulting in turbulence, increased velocity over the top of the obstacle, and lower pressure after the obstacle, with gradual mixing of the air downstream of the obstacle until the original or base wind speed is restored. Experience with surface wind breaks indicates that the effect of the windbreak extends for a distance downwind of the obstacle that is 20 or 30 times the height of the obstacle, with the extent of reduction in wind speed depending upon the base wind speed and the density of the obstacle. For example, with a base wind speed of 20 mph and a substantial windbreak, at a distance downwind that is five times the wind break height, the wind speed is about 5 mph. The wind reaches 10 mph at a distance that is about 12 times the height of the obstacle. Reductions in wind speed are also experienced for much shorter distances upwind of the wind break. (Refer to "How Windbreaks Work," University of Nebraska Extension, EC 91-1763-B.)**

**This provides insight for the behavior of the wind in a quarry pit with essentially vertical walls, as is the case at Vulcan's Manteno quarry. The "obstruction" provided by the vertical quarry walls does not block the normal passage of the wind over the flat surface of the earth, which occurs unimpeded over the top of the pit at the level of the earth's surface. Increased velocity of wind, turbulence and lower pressure are not generated by as wind it passes over the upwind quarry wall, as would occurs with an obstruction on the surface of the earth and provide a driving force for mixing of the air after the obstruction. Without this driving force, the mixing of the surface air mass into the volume of the quarry pit and the gradual development of wind in the pit will be a much slower process than the restoration of the base wind speed downwind from an obstruction on the surface of the earth. Mixing of air and development of wind in the quarry pit will also be impeded because of the "second" quarry wall at the downwind end of the pit.**

**accordingly as sources are located in the pit.**[247]

121. I recalculated the $PM_{10}$ emissions from material handling emission units within the pit using a mean wind speed of 10.11 miles per hour. Using a wind speed of 10.11 miles per hour, instead of 5 miles per hour, increases the emissions from these units by a factor of 2.5.[248]

**This "correction" to the emission calculations for the storage piles was neither needed nor justified. As already discussed, ACT used a reasonable approach in its emissions calculations to address the actual windspeed in the pit. The proposed correction does not provide any consideration for the effect of the pit on wind speed and particulate matter emissions.**

122. In making my correction to the emission calculation for the storage piles in the pit area, I also used a mean wind speed of 10.11 miles per hour for the five year period evaluated by the modeling, rather 5 miles per hour as used by ACT to adjust for variation in windspeed. This is because the "mean windspeed" used in emission calculation should really be the mean windspeed within the averaging period that is being modeled. Therefore annual mean wind speed can only be used to model annual impacts. 24-hour impacts should be modeled with the highest 24-hour mean wind speed in the data set. However, I used a value that is favorable to Vulcan to show that, even with this assumption, the resulting emission rates would cause air quality impacts that exceed the standards. Correcting for highest 24-hour mean windspeed would show even higher impacts.

**This "correction" to the emission calculation for emission units in the pit area also was not justified. It is accepted practice in calculation of fugitive emissions to use average wind speeds. Calculations are not performed using the in the highest 24-hour windspeed in the meteorological data set for which modeling will be conducted.**

123. The increment modeling upon which Illinois EPA would propose to issue a permit is flawed. My modeling results with corrected $PM_{10}$ emission rates show highest-second-high 24-hour average $PM_{10}$ concentrations would greatly exceed the applicable increments, with impacts that are over twice the Class II PSD increment of 30 $\mu g/m^3$. The corrected impacts reflect corrections to $PM_{10}$ emissions rates for roads, the flue dust storage pile, and operations in the quarry pit. I used AERMOD, Version 07026, and the same five years of meteorological data, 2003 through 2007, and other inputs modeled by ACT.

**The further modeling performed by this commenter was not necessary. It reflects revisions to the $PM_{10}$ emission rates for certain emission units that were not appropriate, as discussed in responses to the specific comments concerning the calculation of $PM_{10}$ emissions from those units. It also reflects inappropriate adjustment relative to the windspeeds that were used. The modeling submitted by Vulcan as part of its application reasonably addresses the $PM_{10}$ impacts of the**

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[247] **This wind speed adjustment is also appropriate for the limestone storage pile, the top of which may extend above grade level. This is because the bulk of the pile would be below grade level. Incidentally, the pile would be another obstruction to wind that would actually be located in the pit.**

[248] Fugitive emissions from material handling are exponentially related to windspeed (WS). With WS in miles per hour, the relationship is $(WS/5)^{1.3}$. Thus doubling the wind speed, increases emissions by a factor of 2.5. [$(10.11/5)^{1.3} = 2.50$, compared to $(5/5)^{1.3} = 1.00$.] Refer to AP-42, Section 13.2.4, Aggregate Handling and Storage Piles.

**proposed plant. Moreover, the claim that "better meteorological data would further increase the modeled results" is wholly unsupported.**[249]

124. The air quality modeling for the proposed plant used five years of meteorological data (2002 through 2006) collected by the National Weather Service (NWS) from the Rockford Airport, near Rockford, Illinois (Rockford Airport). Use of the meteorological data from this airport is unacceptable for a number of reasons.

**The air quality modeling appropriately used meteorological data from the Rockford Airport, as well as data for certain meteorological parameters collected by the NWS at the Lincoln Logan County Airport in Illinois. This data can be considered representative of the meteorology at the site of the proposed plant site. That is, this airport and the proposed plant are both at rural sites, on the outskirts of secondary cities, with similar surrounding land use, in a region of relatively flat terrain such that meteorology is not influenced by nearby landforms. The USEPA's Guideline on Air Quality Models (40 CFR Part 51, Appendix W, Section 8.3.1.2) indicates that five years of off-site, data, as were used for the modeling of the proposed plant, are acceptable for air quality modeling when the NWS data would be representative of the site of a proposed project.** [250]

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[249] While "better" meteorological data might affect the precision of the modeling, with slightly higher or lower impacts indicated, it would not change the conclusions from the modeling. Moreover, as the claim is made is made in this comment that better date would result in higher impacts, it clearly demonstrates bias on the part of the commenter.

[250] Refer to USEPA's Guideline on Air Quality Models, Appendix W to Part 51

"8.3 Meteorological Input Data

a. The meteorological data used as input to a dispersion model should be selected on the basis of spatial and climatological (temporal) representativeness as well as the ability of the individual parameters selected to characterize the transport and dispersion conditions in the area of concern. The representativeness of the data is dependent on: (1) The proximity of the meteorological monitoring site to the area under consideration; (2) the complexity of the terrain; (3) the exposure of the meteorological monitoring site; and (4) the period of time during which data are collected. The spatial representativeness of the data can be adversely affected by large distances between the source and receptors of interest and the complex topographic characteristics of the area. Temporal representativeness is a function of the year-to-year variations in weather conditions. Where appropriate, data representativeness should be viewed in terms of the appropriateness of the data for constructing realistic boundary layer profiles and three dimensional meteorological fields, as described in paragraphs (c) and (d) below.

b. Model input data are normally obtained either from the National Weather Service or as part of a site specific measurement program. Local universities, Federal Aviation Administration (FAA), military stations, industry and pollution control agencies may also be sources of such data. Some recommendations for the use of each type of data are included in this subsection.

c. Regulatory application of AERMOD requires careful consideration of minimum data for input to AERMET. Data representativeness, in the case of AERMOD, means utilizing data of an appropriate type for constructing realistic boundary layer profiles. Of paramount importance is the requirement that all meteorological data used as input to AERMOD must be both laterally and vertically representative of the transport and dispersion within the analysis domain. Where surface conditions vary significantly over the analysis domain, the emphasis in assessing representativeness should be given to adequate characterization of transport and dispersion between the source(s) of concern and areas where maximum design concentrations are anticipated to occur. The representativeness of data that were collected off-site should be judged, in part, by comparing the surface characteristics in the vicinity of the meteorological monitoring site with the surface characteristics that generally describe the analysis domain. The surface characteristics input to AERMET should be based on the topographic conditions in the vicinity of the meteorological tower. Furthermore, since the spatial scope of each variable could be different, representativeness should be judged for each variable separately. For example, for a variable such as wind direction, the data may need to be collected very near plume height to be adequately representative, whereas, for a variable such as temperature, data from a station several kilometers away from the source may in some cases be considered to be adequately representative. ...

8.3.1 Length of Record of Meteorological Data

8.3.1.1 Discussion

a. The model user should acquire enough meteorological data to ensure that worst-case meteorological conditions are adequately represented in the model results. ...

8.3.1.2 Recommendations

125. The dispersion modeling for the proposed plant should use site-specific meteorological data rather than data from the Rockport Airport, which is located roughly 95 miles northwest of the proposed plant site.

**The air quality analysis for the proposed plant was properly conducted using meteorological data from the Rockford Airport rather than data from a site-specific monitoring station set up in the vicinity of the proposed plant site. Even though the Rockford Airport is not close to the proposed plant site, meteorological data from the Rockford Airport can be used in a manner that is adequate to assess the potential air quality impacts from the proposed plant. Among other things, as discussed, this is because of the topography and weather patterns of the geographical region in which both the plant site and Rockford Airport are located, which result in similar weather from year to year at both locations. The use of five full years of meteorological data, rather than the one year of data that would be used if a site-specific data were collected, ensure that the full range of meteorological conditions that would be experienced at the project site are modeled.**

126. Meteorological data from the Rockford Airport data is not appropriate for dispersion modeling of the proposed plant. The Rockford Airport is almost 100 miles from the proposed plant site and the quality of the data is also not acceptable for modeling. The application for the proposed plant, which uses this data for modeling, is therefore flawed. The distance between the Rockford Airport and the plant site near Manteno makes the airport data clearly not site-specific, with numerous land use classifications existing between Manteno and the Rockford Airport.

**As discussed, the distance between the Rockford Airport and the plant site do not result in the meteorological data from the Rockford Airport being unsuitable for the permitting of the proposed plant. The variety of weather experienced at the Rockford Airport over the course of five years would be similar to the variety of weather at the Manteno plant site. Indeed, the Illinois EPA recommended use of data from the Rockford Airport based on its understanding of the meteorological data and**

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**a. Five years of representative meteorological data should be used when estimating concentrations with an air quality model. Consecutive years from the most recent, readily available 5-year period are preferred. The meteorological data should be adequately representative, and may be site specific or from a nearby NWS station. Where professional judgment indicates NWS-collected ASOS (automated surface observing stations) data are inadequate {for cloud cover observations}, the most recent 5 years of NWS data that are observer-based may be considered for use....**

**8.3.2 National Weather Service Data**

**8.3.2.1 Discussion**

**a. The NWS meteorological data are routinely available and familiar to most model users. Although the NWS does not provide direct measurements of all the needed dispersion model input variables, methods have been developed and successfully used to translate the basic NWS data to the needed model input. Site specific measurements of model input parameters have been made for many modeling studies, and those methods and techniques are becoming more widely applied, especially in situations such as complex terrain applications, where available NWS data are not adequately representative. However, there are many model applications where NWS data are adequately representative, and the applications still rely heavily on the NWS data. ...**

**8.3.2.2 Recommendations**

**a. The preferred models listed in Appendix A all accept as input the NWS meteorological data preprocessed into model compatible form. If NWS data are judged to be adequately representative for a particular modeling application, they may be used. ...**

**the representativeness of the Rockford Airport to Manteno. Even though data is available from NWS stations in the Greater Chicago area that are geographically closer, data from those stations was rejected because the data collected at those site would not have been as representative. This is because of the effects of urban land use on wind speed and direction, as well as other aspect of meteorology.**

127. The quality of the meteorological data collected at the Rockford Airport is such that is not acceptable for air dispersion modeling for the proposed plant. The modeling for the proposed plant must be redone to determine with more representative meteorological data. This is because there are significant differences in land uses comparing this airport and the proposed plant site. The Rockford Airport is comprised of concrete runways, parking lots, passenger terminals, and other structures associated with air travel activities. These surface and building characteristics, in turn, affect the boundary layer meteorology present at the airport. In addition, landings, takeoffs, and idling of airplanes affect the site-specific conditions at the airport such that the meteorological conditions are not representative of the area surrounding the proposed plant.

**The Rockford Airport data is representative and was appropriate used in the modeling conducted for the proposed plant. At airports, meteorological data is collected at weather stations that are sited to avoid influence from the various features and activities listed in this comment, as their purpose is to collect data that is representative of a region, including data for aircraft, i.e., aircraft in flight approaching or departing from the airport. The data is also collected above ground level on elevated towers to avoid the influence of surface effects. If weather data were collected that was influenced by surface effects, structures, or operation of aircraft on the ground, the data would not serve its intended purposes, which in fact go beyond aircraft operations.[251] Moreover, the Rockford Airport extends over almost three thousand acres with only a portion of that area actually developed. The use of NWS data is routinely considered acceptable by USEPA for modeling unless complex terrain is present.[252] The duration of the period addressed by modeling (five years) ensures that worst-case meteorological conditions are modeled to appropriately identify maximum air quality impacts of a proposed project.**

128. Vulcan performed supplemental AERMOD dispersion modeling to assess PM10 impacts from a revised project description. As part of this analysis, either ACT or the Illinois EPA (the record is unclear), prepared AERMOD input meteorological data using surface

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**251 The meteorological station at the Rockford Airport has been part of the NWS Automated Surface Observation System (ASOS) since 1995. As explained the NWS on its website, the purpose and design ASOS stations are not limited to aircraft operations, "The ASOS systems serve as the nation's primary surface weather observing network. ASOS is designed to support weather forecast activities and aviation operations and, at the same time, support the needs of the meteorological, hydrological, and climatological research communities." (http://www.weather.gov/ost/asostech.html)**

**252 USEPA guidance of air quality modeling accommodates the routine use of NWS data for modeling. The use of NWS data is addressed in Section 8.32 in the "Guideline on Air Quality Models," 40 CFR Part 51 Appendix W, which states "The NWS meteorological data are routinely available and familiar to most model users. Although the NWS does not provide direct measurements of all the needed dispersion model input variables, methods have been developed and successfully used to translate the basic NWS data to the needed model input," Section 8.3.2.1(a). It is also accommodated by the "AERMET User's Guide," (AERMET is the meteorological data processer used in conjunction with the AERMOD model.) This guide explains that "AERMET is designed to be run as a three-stage process (Figure 1.1) and operate on three types of data -- National Weather Service (NWS) hourly surface observations, NWS twice-daily upper air soundings, and data collected from an on-site measurement program such as from an instrumented tower." USEPA, *User's Guide for the AERMOD Meteorological Preprocessor (AERMET)*, EPA 454/B-03-002, November 2004, Page 1-1.**

characteristics surrounding the airport site. (See "PM10 Particulate Matter Net Impact Analysis," January 21, 2009, pages 11-12) However, ACT only examined the surface characteristics at the airport, and not at the project site. It did not verify that the surface characteristics of the Rockford Airport, such as surface roughness,[253] are representative of the proposed plant site in Manteno, as should have occurred.

The AERMOD Implementation Guide clearly provides dispersion modeling must be conducted with representative meteorological data, with consideration of the difference in the character of the site of the proposed project and the site at which meteorological data was collected.[254] When using NWS data an applicant must determine whether the surface characteristics are representative of the project location being modeling with AERMOD. Just as important, the applicant needs to determine just how sensitive the modeled impacts are to differences in the surface parameters, such as surface roughness. Relevant USEPA guidance indicates that if the data comes from a station with surface characteristics that are not representative of the project site, then it is likely that a better data set will be required. In practice, that would mean collecting site-specific data for the modeling for a proposed project.

Vulcan did not prepare any analyses to determine whether the surface characteristics for the Rockford Airport are representative of the proposed plant site. It is very unlikely that the same set of weather and sector-specific surface conditions found at the Rockford, Illinois Airport exist at the Manteno site. Since modeled impacts are highly dependent on surface characteristics, Vulcan did the applicant failed to determine how the modeled project impacts are affected by the Rockford Airport surface parameters. It should be obvious that a quarry and lime plant will have very different surface roughness, Bowen Ratio, and albedo conditions than at the Rockford Airport. Moreover, simply comparing satellite photos of the two locations through Google Maps shows very different surrounding areas. By relying solely on Rockford Airport data and surface

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[253] Surface roughness, denoted as z0, is an essential parameter in estimating turbulence and diffusion. Technically, surface roughness or z0 is the height above the ground that the log wind law extrapolates to zero. z0 is a measure of how much the surface of the earth interferes with the wind flow. Very smooth surfaces, like short grass or calm ponds, have very low values of z0, on the order of 0.01 meters. Tall and irregular surfaces, which are a greater obstacle to wind flow, have higher values f z0, up to 1.0 meter or more for forests.

[254] When discussing the representativeness of meteorological data, USEPA states:

**"3.1.1 Meteorological data representativeness considerations:**

When using National Weather Service (NWS) data for AERMOD, data representativeness can be thought of in terms of constructing realistic planetary boundary layer (PBL) similarity profiles and adequately characterizing the dispersive capacity of the atmosphere. As such, the determination of representativeness should include a comparison of the surface characteristics (i.e., z0, *Bo* and *r*) between the NWS measurement site and the source location, coupled with a determination of the importance of those differences relative to predicted concentrations. Site specific meteorological data are assumed by definition to be representative of the application site; however, the determination of representativeness of site-specific data for AERMOD applications should also include an assessment of surface characteristics of the measurement and source locations and cannot be based solely on proximity. The recommendations presented in this section for determining surface characteristics for AERMET apply to both site-specific and non-site-specific (e.g. NWS) meteorological data.

The degree to which predicted pollutant concentrations are influenced by surface parameter differences between the application site and the meteorological measurement site depends on the nature of the application (i.e., release height, plume buoyancy, terrain influences, downwash considerations, design metric, etc.). For example, a difference in z0 for one application may translate into an unacceptable difference in the design concentration, while for another application the same difference in z0 may lead to an insignificant difference in design concentration. If the reviewing agency is uncertain as to the representativeness of a meteorological measurement site, a site-specific sensitivity analysis may be needed in order to quantify, in terms of expected changes in the design concentration, the significance of the differences in each of the surface characteristics.

If the proposed meteorological measurement site's surface characteristics are determined to NOT be representative of the application site, it may be possible that another nearby meteorological measurement site may be representative of both meteorological parameters and surface characteristics. Failing that, it is likely that site-specific meteorological data will be required."
AERMOD Implementation Guide, Last Revised: January 9, 2008, pp. 3 - 4

characteristics, without any consideration of the surface characteristics at the Manteno site, Vulcan did not show that data from the Rockford Airport is representative of the Manteno site.

**Meteorological data from the Rockford Airport is representative of the Manteno project site. Both Rockford and Manteno are located well inland from the Greater Chicago Metropolitan Area and Lake Michigan. The Rockford Airport, which is actually located about 6 miles south southwest of downtown Rockford, is located in a rural area with surrounding terrain, land use and other characteristics that are sufficiently similar to those surrounding the site of the proposed plant to enable meteorological data from the Rockford Airport to be used for modeling of the proposed plant. Evaluation of relevant characteristics of the respective locations, i.e., albedo, Bowen ratio, and surface roughness, confirms the similarity of the two locations is such that the meteorological data from the Rockford airport can appropriately be used for air quality modeling of the proposed plant in Manteno.[255] In this regard, the issue is the surface characteristics surrounding the project site, not the surface characteristic of the project site itself. [256]**

**This comment does not demonstrate that the meteorological data collected at the Rockford Airport is not representative of the proposed site due to differences in the two sites, including surface roughness. "Representativeness" does not require that the weather in the area at which the meteorological data was collected and the proposed project must be coinstantaneous, always having the same weather at the same time. Representativeness only requires that the weather, as would occur at both sites, be sufficiently similar that the collected meteorological data would cover or portray the range of weather at the project site, on both a short-term and annual basis.**

129. Another problem with the meteorological data from the Rockford Airport is its low quality. Because of this, the modeling for the proposed plant does not adequately ensure that the plant would comply with NAAQS and PSD Increments. In particular, calms make up 10.1 percent of the Rockford data set, which is an unacceptably large percentage. When properly measured with modern anemometers, there are typically only a few calm hours per year. For example, the monitoring data set for the proposed Newmont coal-fired power plant in Nevada has five calm hours in the one-year period spanning 2003 and

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**[255] The relevant characteristics of the Rockford Airport and the Manteno project site can be readily compared using USEPA's AERSURFACE software.**

**As indicated by ACT, the Bowen ratios for the two locations are identical, 0.58. The albedo for Manteno, 0.18, is essentially the same as the albedo for the Rockford Airport, 0.17 within both a 3 and 1 km radius. The surface roughness for Manteno, 0.124, is comparable to the surface roughness for the Rockford Airport, 0.104 for a 1 km radius and 0.064 for a 3 km radius. That is, they all round to 0.1 with one significant digit. In this regard, the range for the surface roughness parameter is from 0.0001 to 1.0 (open sea to developed urban area or forest). A value of 0.1 is representative of an area that can be characterized as having low crops and scattered obstacles.**

**The Illinois EPA has also run AERSURFACE for the area surrounding the Rockford Airport and the Manteno project site. The analysis confirmed that the differences in surface characteristics of the two sites are not significantly different.**

**[256] For a more qualitative assessment of the two sites, consider aerial views of the areas within one or two miles of the sites. Both show similarity of land use in both areas, with mostly agricultural fields, some land having trees, and occasional structures.**

2004.[257] The use of a meteorological data set with such a high percentage of calm hours means that the modeling tended to disregards periods where the air quality impacts may be greatest. This is because AERMOD "skips over" calms, identified as hours when the reported wind speed is 0.0 meter/second. However, at airports any wind speed less than three knots (1.54 meters/second) is regarded as calm. Low wind speeds are of concern for air quality modeling, as the highest air impacts can often occur during the lowest wind speeds. Using data with no wind speeds less than three knots biases the modeling in a way that avoids identifying the highest impacts. Measurements of wind speeds are needed down to 0.5 meter/second, greatly increasing the number of hours included in the modeling analyses. The Rockford Airport data also lacks data for 2.3 percent of the hours. Together, the calm and missing hours make up over 12 percent of the total data set, so the modeling analysis is based on only 88 percent of the possible data (which I know excludes the data that would show the highest impacts).

**This comment does not show that the meteorological data from the Rockford Airport was inadequate for the purpose for which it was used, i.e., the modeling of the proposed plant to demonstrate that it would not threaten the NAAQS or PSD Increments. The Rockford Airport data was collected by the NWS, which is an authoritative source for such data, as it is an government agency that specializes in the collection of weather data. The data collected by the NWS at Rockford Airport meets USEPA's criteria for acceptable data as the percentage of missing data is within 10 percent. Beyond this, USEPA's formal guidance concerning dispersion modeling clearly shows that NWS data is generally acceptable, subject to considerations of representativeness, and does not identify concerns with the quality of NWS data. [258]As such, data from the NWS weather station at the Rockford Airport, a site whose weather would be similar to and representative of weather at the location of the proposed project, can be relied upon for modeling of the proposed plant. [259] As AERMOD is an approved model for PSD modeling, the manner in which it currently addresses calms does not alter this conclusion. [260, 261, 262]**

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[257] For example, the 10-meter pre-construction monitoring data set for the Newmont Nevada proposed coal-fired power plant has five calm hours in the one-year period from 9/1/2003 through 8/31/2004.

[258] **USEPA also addresses use of meteorological data from the National Weather Service (NWS) in its *Meteorological Monitoring Guidance for Regulatory Modeling Applications*, EPA 454/R-99-005. February 2000**
**"Section 8.3.2.1**
**a. The NWS meteorological data are routinely available and familiar to most model users. Although the NWS does not provide direct measurements of all the needed dispersion model input variables, methods have been developed and successfully used to translate the basic NWS data to the needed model input. Site specific measurements of model input parameters have been made for many modeling studies, and those methods and techniques are becoming more widely applied, especially in situations such as complex terrain applications, where available NWS data are not adequately representative. However, there are many model applications where NWS data are adequately representative, and the applications still rely heavily on the NWS data.**
**b. Many models use the standard hourly weather observations available from the National Climatic Data Center (NCDC). These observations are then preprocessed before they can be used in the models."**

[259] **Calms and missing data would also be present if meteorological data was collected by a site-specific monitoring station. In addition, concerns could be present about the data collected at such a station as it would be operated for a limited period of time at a remote, unmanned site, by a contractor working for Vulcan.**

[260] **The occurrence of calms is addressed in Section 8.3.4.2(a) of 40 CFR 51, Appendix W. "Hourly concentrations calculated with steady-state Gaussian plume models using calms should not be considered valid; the wind and concentration estimates for these hours should be disregarded and considered to be missing. Critical concentrations for 3-, 8-, and 24-hour averages should be calculated by dividing the sum of the hourly concentrations for the period by the number of valid or non-missing hours. If the total number of valid hours is less than 18 for 24-hour averages, less than 6 for 8-hour averages or less than 3 for 3-hour averages, the total concentration should be divided by 18 for the 24-hour average, 6 for the 8-hour average and 3 for the 3-hour average. For annual averages, the sum of all valid hourly concentrations is divided by the number of non-calm hours during the year. AERMOD has been coded to implement these instructions."**

**Moreover, the wind speed data collected for the proposed Newmont Nevada Energy power plant project near Dunphy Nevada, which is the only factual support provided with this comment, should not be considered to be indicative of wind speeds in Illinois. That project would be located in the high desert of north central Nevada, an area that is not at all representative of the meteorology in Illinois. The percentage of calm winds in the Rockford Airport data is more similar to the levels recorded at weather stations in central Illinois.**

130. As well as base meteorological data, the data used for modeling of the proposed plant must also include data for multiple elevations above the ground. Using NWS surface observations for the vertical wind and turbulence profile, as was done, may be acceptable for specific low-level releases (less than the anemometer height), but is not acceptable for the elevated stacks[263] that would be present at the proposed plant.[264] The AERMOD profile data will contain only one "upper air" profile, and it will use the exact same values as the surface data collected at the Rockford Airport. In other words, the modeling for the proposed plant uses surface data instead of profile data, thus completely invalidating the assessment of the impacts from the kiln.[265] Data for wind speed, direction, and temperature measured only 10 meters above the ground is not reliable for use in a sophisticated boundary layer characterization model, such as AERMOD.

**The factors discussed in this comment to do not invalidate the modeling that was conducted for the proposed plant, as they are addressed by the "design" of AERMOD model and how metrological data is handled by the model. In particular, the model does not require meteorological data collected at multiple heights.[266] Use of meteorological data collected from only a single height, instead of data from multiple heights, leads to conservative, i.e., high, modeled impacts. This is because AERMOD uses a conservative assumption for the vertical temperature gradient in the absence of measured data from multiple elevations. In addition, the effect of using a single wind direction, rather than different wind directions at different elevations, is to**

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[261] **While AERMOD is mathematically capable of calculating concentrations for wind speeds of less than 1 meter per second, it has not been validated for wind speeds less than 1 meter per second. USEPA is working with modelers to develop refinements to AERMOD that would improve the way in which calms to enable validation of AERMOD at lower windspeeds. USEPA is also working with modelers to improve the way that missing data is handled.**

[262] **This comment is incorrect in stating that windspeeds less than three knots (1.54 meters per second) are regarded as calms. As an ASOS station, windspeeds greater than two knots are measured and recorded and are not reported as calms. Refer to the ASOS Users Guide. Section 3.2.1 of the Users Guide states that "the sensor's starting threshold for response to wind direction and wind speed is 2 knots. Winds measured at 2-knots or less are reported as calm." (http://www.nws.noaa.gov/asos/pdfs/aum-toc.pdf).**

[263] **The stack on the kiln, which has it base in the quarry, would extend about 27 meters above the level of the land surrounding the quarry.**

[264] This is because the data lacks both a vertical wind profile and any measurements of the fluctuating components of the wind. Examining the applicant's AERMOD profile data, it is clear that the "upper air" observations that were used were not upper air at all, but are instead the surface winds measured near ground level with a single anemometer located at an elevation of 10 meters.

[265] As meteorological data at the Rockford Airport is collected only at a single elevation 10 meters above the ground, the data does not include measurements of fluctuating components of the wind. These are measured as standard deviations of either wind speed or wind direction, in both the vertical and horizontal planes. These data (along with other parameters such as wind speed, direction, and temperature) are necessary to characterize plume dispersion, and must be measured at various heights to give a meaningful depiction of the plant's elevated emission plumes.

[266] **The exception is "upper air data," which is also needed for modeling and includes upper air soundings and mixing height above the ground surface. Data for these parameters cannot be collected by weather towers, given the heights at which the measurements must be made. Upper air data is instead obtained by other methods, i.e., weather balloons. The nearest NWS site that collects upper air is located in Lincoln, Illinois.**

**combine impact for all plumes in one direction rather than spreading them out as wind direction differs based on elevation above the ground. In this regard, given the meteorology that was used for the modeling for the plant, the modeling did not rely on the capability of AERMOD to be used as a "sophisticated boundary layer characterization model," which would have shown lower air quality impacts from the plant. However, as the modeling for the plant was conducted in a manner that provided conservative, i.e., high, results, those results can properly be relied upon for the permitting of the proposed plant and are not meaningless.**

131. For purposes of air dispersion modeling, airport data is the least desirable because it suffers problems related to location and quality. The USEPA's *Meteorological Monitoring Guidance for Regulatory Modeling Applications*[267] notes the general concern about airport data:

> For practical purposes, because airport data were readily available, most regulatory modeling was initially performed using these data; however, one should be aware that airport data, in general, do not meet this guidance. Guidance, Page 1-1

Modeling for the proposed project was conducted with the AERMOD model, which requires specific data to characterize the atmospheric boundary layer and upper air dispersion. The meteorological data collected at the Rockford Airport is not adequate to provide AERMOD with the necessary data to provide realistic results, that is, the results of AERMOD with airport data are not the most representative of real conditions. Airport data (like that from the Rockford Airport) is not collected for purposes of air dispersion modeling. For example, the data is recorded and reported once per hour, based on a single visual reading (usually) taken in the last ten minutes of each hour. This does not meet USEPA's recommended practice of automatically recording data multiple times per hour to calculate hourly-averaged data. Additionally, data collected at the Rockford Airport is not subject to the recommended system accuracies. The USEPA recommends that meteorological data be collected with equipment sensitive enough to measure all conditions needed to verify compliance with the NAAQS and PSD increments.[268]

**While meteorological data collected at the Rockford Airport may have certain deficiencies, as noted by this comment, this data is still appropriately used for the air quality analysis conducted for the proposed project.[269, 270] Moreover, this comment**

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[267] USEPA, Meteorological Monitoring Guidance for Regulatory Modeling Applications, EPA-454/R-99-05, February 2000, p. 1-1 (*available at* http://www.epa.gov/scram001/guidance/met/mmgrma.pdf).

[268] For example, low wind speeds (less than or equal to 1.0 meter per second) are usually associated with peak air quality impacts, as impacts are inversely related to wind speed. USEPA guidance provides that anemometers to measure wind speed should have a starting threshold of no more than 0.5 meter per second and measurements should be accurate to within plus or minus 0.2 meter per second, with a measurement resolution of 0.1 meter per second. However, the Rockford Airport is not in 0.1 meter per second increments but instead in whole knots. This was confirmed by an examination of the meteorological data files for the Rockford Airport. The data for wind speed was originally in whole knots, not to the nearest tenth of knot. The hourly data from the Rockford Airport was then converted from knots to meters per second. Data meeting USEPA's guidance would not have whole knot values for each hour. The data in whole knots does not meet USEPA's guidance and also does not account for the low wind speeds that are associated with the highest air quality impacts.

[269] **The comment regarding "rounding" of data with 3 knots, if accurate, is neither appropriate or relevant. The data for wind speed from the Rockford Airport were provided by the National Data Climatic Center and were directly input to AERMET without further conversion or rounding.**

[270] **The comment stating that Rockford NWS only records a "snapshot" of the windspeed once per hour is incorrect. As an ASOS-qualifying station, data for windspeed and direction is measured much more frequently and compiled to produce data for average windspeed and direction.**

does demonstrate that the presence of any such deficiencies in the meteorological data affected the results of the modeling for the proposed project in any meaningful way. As a general matter, the presence of any deficiencies in the meteorological data is addressed by the fact that the dispersion modeling was conducted over a period of five years rather than for a period of one year, as would otherwise be acceptable if site-specific meteorological data had been collected for the proposed project. This increase in the breadth of the duration of the modeling simulation compensates for the difference in the quality of meteorological data that might have been available if a site-specific meteorological data had been collected.

In this regard, this comment selectively quotes from the cited USEPA document, overlooking statements in that document confirming the acceptability of meteorological data collected at airports, as well as the need to routinely rely on certain meteorological data that is typically only available from the NWS. Stations at airports In particular, in the cited document, USEPA specifically addresses meteorological data collected at airports, confirming that it is generally acceptable for modeling.[271] Moreover, it is also relevant that the cited document is specifically directed at appropriate practices for collection of meteorological data when a project-specific weather station is established for the specific purpose of collecting data to support development of regulations.[272] The document does not directly address the collection of meteorological data for support of PSD applications, much less appropriate procedures for performance of PSD modeling. These are the subject of different guidance documents prepared by USEPA, notably USEPA's various guidelines on air quality modeling. In this regard, in accordance with USEPA's current Guideline on Air Quality Models, as already discussed, USEPA has specifically considered and allowed for the use of NWS meteorological data, as collected at airports, with AERMOD.

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[271] In Section 6.7 of *Meteorological Monitoring Guidance for Regulatory Modeling Applications*, USEPA states "Although data meeting this guidance are preferred, airport data continue to be acceptable for use in modeling. In fact observations of cloud cover and ceiling, data which traditionally have been provided by manual observation, are only available routinely in airport data; both of these variables are needed to calculate stability class using Turner's method (Section 6.4.1). The Guideline on Air Quality Models [1] recommends that modeling applications employing airport data be based on consecutive years of data from the most recent, readily available 5-year period."

[272] USEPA's *Meteorological Monitoring Guidance for Regulatory Modeling Applications,* EPA-454/R-99-005, USEPA, OAQPS, February 2000, as referenced by this comment, does not apply to collection of data by the NWS, which as already discussed, is acceptable for modeling if certain conditions are met, e.g., a full five years of data is modeled. Rather, this document provides guidance for meteorological monitoring programs under the control of a permit applicant or permitting authority. "Guidance is provided for the in situ monitoring of primary meteorological variables (wind direction, wind speed, temperature, humidity, pressure, and radiation) for remote sensing of winds, temperature, and humidity, and for processing of derived meteorological variables such as stability, mixing height, and turbulence." Page 1-1

## FOR ADDITIONAL INFORMATION

Questions about the public comment period and permit decision should be directed to:


Bradley Frost, Community Relations Coordinator
Illinois Environmental Protection Agency
Office of Community Relations
1021 North Grand Avenue, East
P.O. Box 19506
Springfield, Illinois 62794-9506

217-782-7027 Desk line
217-782-9143 TDD
217-524-5023 Facsimile

brad.frost@illinois.gov

Listing of Significant Changes between the Draft Permit and Issued Permit

**Condition 2.1.3-2(a)(ii):**

**This condition, which specified that the fabric filter for the kiln must use a PTFE membrane material for enhanced control of fine particulate, now provides that an equivalent fabric material may be used subject to approval by the Illinois EPA. While Vulcan intends to use a filter fabric with a PTFE or Teflon™ membrane, it is not appropriate that the permit restrict Vulcan to use of such material without any provision to accommodate equivalent, alternative technology. As improvements continue to be made in the design of filter fabrics, fabrics may become available that use other types of membranes or other approaches to address fine particulate. If those fabrics provide equal or better control of emissions, the permit should accommodate the use of those fabrics. If Vulcan would ever propose to use an alternative filter fabric, the performance of the proposed fabric could readily be compared to that of PTFE membrane fabrics. Laboratory methods, such as those used by USEPA's Environmental Technology Verification Program, are available that provide direct measurements of the performance of filter fabrics for control of particulate and enable objective comparisons of the performance of different fabrics to be made.**

**Condition 2.1.3(b)(i)(C):**

**This condition, which sets the BACT limits for the kiln for $SO_2$ emissions, now also includes a limit that would apply as a 30-day rolling average. In particular, the limit in the draft permit, 2.2 lbs/ton of stone feed, 3-hour average, is now accompanied by a second limit, 2.0 lb/ton, which applies on a 30-day rolling average. The new limit is lower as the control measures for $SO_2$ will be more effective when considered on a long-term, 30-day average basis.**

**This change was made in response to comments that the BACT limits for $SO_2$ should be more stringent than proposed in the draft permit. Those comments did not justify lowering the BACT limits in the draft permit, given the averaging time for those limits. However, as those comments pointed to performance of $SO_2$ scrubbers on coal-fired boilers, for which limits are routinely set with a 30-day averaging time, they suggested that a longer-term $SO_2$ BACT limit should also be set, applicable on a 30-day average. Such a limit would better reflect and address the typical performance of the $SO_2$ control measures on the kiln. This is because the longer averaging time of such a limit would reduce the effect of the normal variation in operation on the level at which the limit must be set. In other words, a short-term limit must consider the extremes of normal operation, as those extremes also occur on a short-term basis. The extent of normal variation that must be accommodated by a limit is lowered by using a longer averaging time. This lets a limit be set at a level that is not as influenced by variation and better addresses typical performance. As applied to the $SO_2$ emissions of the proposed kiln, it results in an $SO_2$ BACT limit that reflects 90 percent control by dry scrubbing, the primary control technology selected as $SO_2$ BACT for the kiln, without reliance on any control of $SO_2$ by natural adsorption on limestone dust. This level of control is comparable to the level of control achieved by dry scrubbers when installed on coal-fired boilers.**

**This condition also includes provision for lower $SO_2$ limits that would be set following evaluation of the actual performance of the kiln, as addressed by Condition 2.1.11. The "target limit" for this evaluation set by the draft permit, 1.8 lbs/ton of stone feed, 3-hour average, is now accompanied by a second target limit, 1.5 lb/ton, which applies on 30-day rolling average. The rationale for the additional limit is similar. The target limit reflects achievement of about 92.5 percent control for $SO_2$ by dry scrubbing, which is the mid-range of control achieved by dry scrubbers when installed on coal-fired boilers, as would be appropriate for transfer of this control technology to a different and potentially more challenging application.**

**Condition 2.1.3(b)(i)(D):**
**This condition, which sets the BACT limits for the kiln for NOx, now also includes a limit that would apply on a 30-day rolling average. In particular, the limit in the draft permit, 4.5 lbs/ton of stone feed, 24-hour average, is now accompanied by a second limit, 4.0 lb/ton, on a 30-day rolling average. The target limit in the draft permit, 3.5 lbs/ton of stone feed, 24-hour average, is now accompanied by a second limit, 3.0 lb/ton, on a 30-day rolling average. The circumstances are generally similar to those for $SO_2$, as discussed above. However, the 30-day average limits reflect the reduction in NOx emissions achieved by the addition of a preheater to the kiln, rather than by addition of a dry scrubber.**

**Condition 2.1.6(a):**
**In this condition, which sets limits on the mass emissions of the kiln, the annual limits for $SO_2$ and NOx are lower. The new limits are based on the 30-day average BACT limits for $SO_2$ and NOx. This change is the direct consequence of setting these additional BACT limits, which will further restrict the annual emissions of the kiln.**

**Condition 2.1.8(a)(v):**
**This condition, which addressed the possibility of future changes to the requirements for the kiln for continuous emissions monitoring, now only addresses CO. This is a consequence of setting BACT limits for NOx that apply on 30-day average. It is no longer appropriate to contemplate any changes to the monitoring requirements for NOx emissions. That is, as a NOx limit will now apply to the kiln on a 30-day average, continuous emissions monitoring will be needed to collect the necessary data so that a 30-day average emission rate can be calculated and compliance verified. Alternative approaches to compliance monitoring other than continuous emissions monitoring, such as monitoring for excess air, that might be feasible for a short-term limit, should no longer expected to be sufficient.**

**Condition 2.1.11(a)(ii):**
**This condition sets the "target limits" for $SO_2$ and NOx for the required evaluation of the actual performance of the kiln for these pollutants. The target limits would automatically take effect for $SO_2$ or NOx if Vulcan elects to not perform this evaluation, i.e., Vulcan does not complete the evaluation or submit a report for the evaluation for a pollutant. As BACT limits for $SO_2$ and NOx are now set that apply on a 30-day average, target limits are also set that apply on a 30-day average. Like the short-term target limits, they are significantly more stringent than the limits that would initially be applicable. This is because they would only take effect after the**

**emission performance of the kiln in its new configuration is demonstrated in actual practice.**

**Condition 2.1.11(a)(iv):**
**This new condition provides that the results of the performance evaluations for $SO_2$ or NOx, as they set a new lower 30-day average limit (or a target limit is otherwise automatically set), will also be accompanied by an equivalent downward adjustment to the permitted annual $SO_2$ or NOx emissions of the kiln, as addressed in Condition 2.1.6(a). This condition addresses the consequences for kiln's permitted annual emissions from a lower 30-day limit for $SO_2$ or NOx.**

**Condition 2.2.6:**
**The "Flue Dust Stockpile," also referred to as the "Flue Dust Storage Pile," is no longer addressed by this condition, which sets limitations on the particulate matter emissions from the different material handling and processing operations at the plant that are controlled by work practices. As the Flue Dust Stockpile would not be used in the future and has been idle for over five years, it should not have been addressed by the draft permit. This change is made in response to comments that indicated that this storage pile was improperly addressed in the application, understating both its emissions and air quality impacts. These comments triggered a reevaluation of the status of the pile. This led to the conclusion that limitations should not be set allowing emissions from the pile as this pile need not and should not be addressed as a permitted emission unit since it will not be used when the plant resumes operation. This change acts to lower the overall emissions of the various units addressed by Condition 2.2.6.**

**Table I (Finding 3(a)(i)):**
**The summary of the plant's permitted emissions on an annual basis is revised to be consistent with the changes that have already been discussed and to correct errors. The permitted emissions of the kiln for $SO_2$ and NOx are reduced to reflect the BACT limits that apply on a 30-day average, as now provided in Conditions 2.1.3-2(b)(i)(C) and (D). The permitted emissions of particulate matter from units controlled by work practices are lower as the Flue Dust Stockpile is not being permitted for operation. The permitted emissions of the kiln for PM and $PM_{10}$ are corrected to reflect the limits in Condition 2.1.6. (In the draft permit, these limits were transposed. The limit for filterable particulate matter was also incorrect.) Emissions totals are also adjusted to reflect the downward changes in permitted emissions for various units.**