

Illinois Environmental Protection Agency
Bureau of Air
Permit Section

December 2011

Responsiveness Summary For
Public Questions and Comments on the
Construction Permit Application from
Universal Cement LLC, for a
Portland Cement Manufacturing Plant in
Chicago, Illinois

Source Identification No.: 031600GVX
Application No.: 08120011

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DECISION

On December 20, 2011, the Illinois Environmental Protection Agency (Illinois EPA) issued an air pollution control construction permit/PSD approval to Universal Cement, to construct a cement manufacturing facility in Chicago. In response to public comments, the issued permit includes a number of additional requirements for the proposed project compared to the draft permit, as well as various clarifications to permit conditions.

Copies of the documents can be obtained from the contact listed at the end of this document. The permit and additional copies of this document can also be obtained from the Illinois EPA website www.epa.state.il.us/public-notices/.

BACKGROUND

On December 10, 2008, the Illinois EPA, Bureau of Air received a construction permit application from Universal Cement LLC, requesting a permit to construct a cement manufacturing plant and associated equipment in Chicago. The proposed plant would be used to produce cement for Ozinga, an existing concrete supply company in the Chicago, northern Indiana and southwest Michigan areas. The key emission units of the plant would be a cement kiln, clinker cooler, a natural gas-fired finish mill, fuel and material handling operations and various ancillary and support operations.

The construction permit issued for this project identifies the applicable rules governing emissions from the proposed kiln and other emission units that are part of the project, and establishes enforceable limitations on their emissions. The permit also establishes appropriate compliance procedures, including requirements for emissions testing, continuous emission monitoring, recordkeeping and reporting. Universal Cement will be required to carry out these procedures on an ongoing basis to demonstrate that the proposed cement manufacturing facility is operating within the limitations established by the permit and that emissions are being properly controlled.

COMMENT PERIOD AND PUBLIC HEARING

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

The public comment period began with the publication of a notice in the Southtown Star on September 4, 2011. The notice ran again in the Southtown Star on September 11 and 18. A public hearing was held on October 19, 2011 at the Olive-Harvey College to receive oral comments and answer questions regarding the application and draft construction permit. The comment period closed on November 18, 2011.

AVAILABILITY OF DOCUMENTS

The permit issued to Universal Cement and this responsiveness summary are available at the Illinois EPA's internet site at <http://www.epa.state.il.us/public-notices/>.¹ Copies of these documents may also be obtained by contacting the Illinois EPA at the telephone numbers listed at the end of this document.

¹ If necessary arrangements can be made with USEPA, this information may also be available on the Illinois Permit Database at <http://www.epa.gov/reg5oair/permits/ilonline.html>.

APPEAL PROVISIONS

The construction permit issued for the proposed project grants approval to construct pursuant to the federal rules for Prevention of Significant Deterioration of Air Quality (PSD), 40 CFR 52.21. Accordingly, individuals who submitted comments on the draft permit or participated in the public hearing may petition the United States Environmental Protection Agency (USEPA) to review the PSD provisions of the issued permit. In addition, any person who failed to file comments or failed to participate in the public hearing on the draft permit may petition for administrative review but only to the extent changes were made to the draft permit by the final permit decision.

As comments were submitted on the draft permit for the proposed project that requested a change in the 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, "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 for instructions (http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf). 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 AGENCY

1. The emissions of the proposed plant are very costly healthwise to children, contributing to health problems with asthma, as well as the cost to their families for medical care.

The analyses for the air quality impacts of the proposed plant show that it should not meaningfully affect local ambient air quality. At the same time, the presence in the area of children and adults with respiratory diseases, including asthma, and other diseases affected by air quality is an important issue. Improvements in local air quality generally require reductions in emissions from existing sources, by improvements in their emission controls or replacement with new, lower emitting sources. In addition, regulatory programs and initiatives are ongoing to further reduce the emissions from existing sources. These reductions in emissions will be accompanied by improvements in air quality.

At the same time, efforts also continue to be made to improve public awareness of daily air quality levels. This is particularly important for individuals with asthma or other chronic respiratory diseases because, in addition to other medical care and treatment, it allows such people to take appropriate measures to reduce any added risk to their health posed by poor air quality, by reducing time spent outdoors, avoiding physical exertion, and taking any extra medications that are prescribed during such conditions. To assist asthmatic individuals and others who are particularly sensitive to ambient air quality, the Illinois EPA uses the Air Quality Index (AQI) system to report air pollution levels on a daily basis. The Illinois EPA (as well as other states across the country) use the AQI System to provide "real-time" information on air pollution levels on a daily basis. Just like the weather, air quality is forecasted every

day for different regions. Based on the level of air quality, the daily air quality is ranked from good to unhealthy and a rating is assigned. This explains air quality in simple, qualitative terms and enables people who may be affected by poor air quality to appropriately plan and adjust their activities. AQI data for Illinois is posted on the Internet.² AQI data is also included in weather reports on some television channels.

2. I am concerned about the impact of the proposed plant on public health, especially of those living near the plant.

The various air quality analyses submitted with the application show that the proposed plant should not pose a threat to public health. In particular, the air quality should continue to comply with the National Ambient Air Quality Standards (NAAQS), standards for air quality that have been set by USEPA to protect public health and welfare.

3. My concern over this plant is that it will increase emissions of “precursor pollutants.” It will increase emissions of nitrogen oxides (NO_x), which is a precursor to formation of both ozone and fine particulate or PM_{2.5} in the atmosphere. It will also increase emissions of sulfur dioxide (SO₂), which is a precursor to fine particulate.

Coincidental with the development of the proposed plant, other actions will be taking place with reductions in emissions of these pollutants that far outweigh the increases from the proposed plant. In particular, USEPA recently adopted a new Cross-State Air Pollution Rule (CSAPR), 40 CFR Part 97, which establishes additional requirements for control of SO₂ and NO_x emissions from power plants in 27 states in the Eastern United States, including Illinois. USEPA projects that this rule will achieve overall reductions in annual emissions of SO₂ and NO_x that are on the order of 6 million and 1 million tons per year, respectively.³ On a local level, it has been reported that Dominion Resources will shortly be closing its coal-fired State Line Power Station, located in Hammond, Indiana, next to the Illinois-Indiana border. This would result in annual emission reductions of several thousand tons for both SO₂ and NO_x.⁴

4. The emissions of lead that would be allowed by the draft permit, 800 pounds of lead per year, are a concern. I think that the Holcim cement plant south of St. Louis, which is four times the size of the proposed plant, is only allowed to emit 260 pounds per year. Something seems wrong.

The concern raised by this comment has been addressed in the issued permit, which limits lead emissions to only 94 pounds per year. The emission data in the application, which was the basis of the limit in the draft permit, was incorrect, as suspected by this comment. The application was based on the emission factor in USEPA’s *Compilation of Air Pollutant Emission Factors*, AP-42, for a cement kiln equipped with an electrostatic precipitator (0.00071 lbs/ton of clinker) rather than the factor for a kiln with a baghouse (0.000075 lbs/ton). Universal Cement has acknowledged this error and the correct factor is the basis of the lead emission limit in the

² In addition to providing the current AQI index, the Illinois EPA’s Internet site also provides general background on the AQI System. Refer to <http://www.epa.state.il.us/air/aqi/index.html> (or <http://www.cleantheair.org/air-quality-information/air-quality-index>).

³ In addition, USEPA is working on a National Emission Standard for Hazardous Air Pollutant (NESHAP) for coal-fired utility boilers that would further reduce emissions of mercury and other hazardous air pollutants from coal-fired power plants.

⁴ Based on data from 2009 and 2010, the current SO₂ and NO_x emissions of the State Line Power Plant are averaging about 10,000 and 7,000 tons per year, respectively.

issued permit.

5. I am concerned about the plant's emissions of carbon dioxide or "carbon emissions."

Carbon dioxide (CO₂) in the open atmosphere does not pose a threat to human health. The presence of CO₂ in the atmosphere is also essential for humanity as plant life depends upon this CO₂.

CO₂ in the atmosphere is an environmental concern on a global level. Human activity, i.e., most significantly the combustion of fuel, is increasing the concentration of CO₂ in the atmosphere. This is causing global warming and climate change. However, from this global perspective, it is desirable that cement be produced by new modern kilns. This is because new kilns, like the kiln at the proposed plant, are more energy efficient than the existing, older cement plants. New kilns emit less CO₂ for the cement that they produce, compared to the older kilns that would otherwise be producing the cement.

6. Has use of natural gas been considered as a way to lower the emissions of nitrogen oxide (NO_x) from the proposed plant?

The use of natural gas was considered as an alternative to use of coal and petroleum coke. While use of natural gas would lower the plant's emissions of greenhouse gases (GHG), it would act to significantly increase NO_x emissions. This is because of the way that gaseous fuel combusts in a rotary cement kiln. Accordingly, the permit requires an add-on control technology, selective noncatalytic reduction (SNCR), be used on the kiln to control its NO_x emissions. SNCR is now a well-established emission control technology for preheater-precalsiner kilns, like the kiln at the proposed plant.

7. Drake Cement, a new cement plant in Arizona that came online this year has much more effective control for NO_x than is being proposed for this plant, which is yet to be built. The Drake plant has achieved 1.2 pounds NO_x per ton of clinker. The Drake plant is also fired on coal, with natural gas used for startup, like the proposed plant.

As observed by this comment, the new Drake cement facility in Arizona is effectively subject to a limit of about 1.2 pounds NO_x per ton of clinker.⁵ Based on initial emission data for the new Drake kiln, which only began operation very recently, this kiln is complying with this limit.⁶ Accordingly, in the issued permit, the permit limit for the kiln for NO_x is generally set at 1.2 lbs/ton of clinker, rather than 1.5 lbs/ton, as would have been set by the draft permit. In the absence of other relevant information to the contrary, the information for the demonstrated performance of the Drake kiln, as has only recently become available, provides sufficient evidence that a NO_x limit of 1.2 lbs/ton should be achievable by the proposed kiln. In this regard, Universal Cement has not supplemented its

⁵ Specific Condition 1.B.4(a), (b) and (c) of the permit for the new Drake permit, respectively, limit NO_x emissions to 95 lbs/hr (24-hour rolling average), 1.95 lbs/ton per ton of clinker (30-day rolling daily average), and, for the first 180 days of operation, 2.45/ton per ton of clinker (30-day rolling daily average). Based on a nominal production capacity of 2,000 tons clinker/day, 95 lbs/hr is equivalent to an emission rate of 1.14 lbs/ton. Based on actual production of 1,900 tons of clinker/day, 95 lbs/hr is equivalent to a NO_x rate of 1.2 lbs/ton. Arizona Department of Environmental Quality, Air Quality Class I Permit, Permit 1001770.

⁶ The Illinois EPA has contacted the Arizona Department of Environmental Quality and obtained information confirming that the initial measurements of NO_x emissions for the Drake kiln show that it is complying with a rate of 1.2 lbs/ton of clinker.

application with any information on this subject, to show that a NO_x emission limit of 1.2 lbs/ton would not be achievable by the kiln at the proposed plant or would be accompanied by undesirable side-effects.⁷

A limit of 1.5 lbs/ton of clinker would still apply for an initial “one-year period.” to provide Universal Cement with time to complete an extended shake-down of the new kiln and its emission control train, before it must begin complying with the 1.2 lb/ton limit. Because the proposed kiln would not be identical to the Drake kiln, e.g., it would use moderate sulfur feed material and have a scrubber system, it is appropriate to provide more time for this shake-down than provided the permit for the Drake kiln for its lb/ton limits.⁸

8. The draft permit would require the use of SNCR as LAER technology for NO_x emissions from the kiln even though SCR has been used on cement plants with success and has achieved higher NO_x reduction rates. USEPA has documented examples of SCR technology being used in commercially operating cement plants within the last decade. The USEPA’s findings are detailed in the report, *Alternative Control Techniques Document Update - NO_x Emissions from New Cement Kilns* (EPA-453/R-07-006, Nov. 2007).⁹ Specifically this report notes: “On a worldwide basis, three cement kilns have used SCR: Solnhofen Zementwerkes in Germany and Cementeria di Monselice and Italcementi Sarche di Calavino in Italy. The SCR system was operated at the Solnhofen plant from 2001 to January 2006, at which time the plant began using SNCR to compare the operational costs of SCR and SNCR to evaluate which technology is better and more economical.” (p.85) This example alone directly contradicts the Illinois EPA’s statement that SCR has not been successfully implemented on a cement kiln.

This USEPA report notes that testing of SCR on cement plants dates back to 1976 and pilot testing has reached NO_x removal efficiency of 98%. This reports that the commercial SCR installed at the Solnhofen plant in 2000 has reduced NO_x by up to 80% during typical operations. The report also highlights successful NO_x reduction at the larger Italian cement plant. ELEX constructed a full-scale SCR system at Cementeria di Monselice in Bergamo, Italy. The system began operation in June 2006 and was guaranteed by ELEX to reduce NO_x by 90 percent.

⁷ A concern for SNCR is effective utilization of ammonia in the process so that excess ammonia is not present in the exhaust gases. For this reason, it is generally desirable that SNCR systems on cement kilns be operated at about no more than 0.8 of the stoichiometric rate for theoretical conversion of all the NO_x in the exhaust gas stream back to nitrogen.

⁸ The need for a shake-down period for the initial 1.5 lb/ton limit has been dealt with by USEPA in its adoption of revised New Source Performance Standards (NSPS) for Portland Cement Plants, since 1.5 lbs/ton is also the standard that USEPA set for new cement kilns. For example, USEPA acknowledged a possible relationship between the efficiency of SNCR for NO_x control and the sulfur content of raw materials. In its preamble for the adoption of the revised NSPS, when responding to public comments related to NO_x emissions, USEPA explains that one commenter noted that, “[F]acilities with lower BACT emission limits are also those facilities with lower sulfur raw materials, notably plants located in Florida, thereby improving the efficiency of SCNR...Therefore, the industry commenter recommends that the NO_x standard be established at 1.95 lb/ton, which reflects a level of control achievable with the use of SNCR by all facilities without introducing the negative effects associated with pushing for high control levels.” However, after reviewing relevant data, USEPA adopted a NO_x limit for new kilns at 1.5 lb/ton, based on use of SNCR, explaining that at 1.5 lb/ton, “Given the breadth of the data, we find it unlikely that we have not sufficiently covered all the variables that affect NO_x emissions.” *National Emission Standards for Hazardous Air Pollutants From the Portland Cement Manufacturing Industry and Standards of Performance for Portland Cement Plants, Final Rule, Preamble*, 75 FR 55013 (September 9, 2010).

⁹ Available at http://www.epa.gov/ttn/catc/dir1/cement_updt_1107.pdf.

Due to the limited experience of using SCR in cement kilns, issues were raised on the applicability of SCR for cement kilns several years ago. The USEPA report however references a discussion in the Texas – Ellis County Report. This second report was produced for the Texas Commission on Environmental Quality by ERG in 2006 and titled *Assessment of NOx Emissions Reduction Strategies for Cement Kilns – Ellis County, Final Report*.¹⁰ On the Solnhofen experience with SCR, the Texas report states that it was successful and that technical issues on SCR use on cement kilns may have been resolved. The report states “SCR is, under certain conditions, a technically feasible alternative for significantly reducing NOx emissions from cement kilns.” Given that SCR is more effective than SNCR technology at reducing NOx, that LAER for NOx is required in this location, and that SCR technology has been proven on commercial cement making plants with preheaters more than five years ago, why is the Illinois EPA not requiring SCR technology to be used at this kiln if it is more effective in reducing NOx than SNCR technology?

The Illinois EPA has carefully reviewed the circumstances of the cement kilns in Europe that are or were using with SCR technology. They do not demonstrate that SCR should be considered a feasible technology for the kiln at the proposed plant. The European kilns have older kiln designs, which are less efficient and process feed materials with a low levels of sulfur and other undesirable constituents. This makes those kilns amenable to use of SCR. In addition, even with these advantages, the initial system For this, and other reasons, the SCR technology used on the European kilns would not be directly or readily transferable to the proposed kiln. Moreover, as acknowledged by the comment, on one of these kilns, SNCR is now being used in place of SCR.

In addition, the experience with SCR at these European plants does not show that use of SCR will enable a lower NOx limit to be set for the proposed plant than the final limit that has now been set in the issued permit, 1.2 lbs/ton of clinker, based on use of SNCR.

9. The draft permit would allow SO₂ emissions of 231 tons/year from the Kiln/In-Line Raw Mill and Clinker Cooler at the proposed plant. The newly operational Drake cement plant near Paulden in northwest Arizona seems to have a much tighter SO₂ limit. Condition I.B.3 of the Air Quality Control Permit for Drake plant¹¹ limits the SO₂ emissions from these units to 21.9 tons per year, on a daily rolling 365 day basis. Given that the allowed fuel is similar to that which can be used at the proposed plant, why would there be such a great difference in the permitted SO₂ emissions of the two plants? Are there any SO₂ control technologies or techniques being used at the Drake plant that could likewise be instituted and required at the proposed plant to achieve a similar level of SO₂ emissions control?

The Drake plant does not provide a meaningful point of reference for the permitted SO₂ emissions of the proposed plant because there would be a significant difference between the Drake plant and the proposed plant considering the sulfur content of the limestone and other raw materials that are available locally to the Drake plant.¹² The permitted SO₂

¹⁰ Available at www.tceq.state.tx.us/implementation/air/sip/BSA_settle.html.

¹¹ Available at http://www.azdeq.gov/envirom/air/permits/title_v/CP/DCLLC/1001770/deqfinal.pdf.

¹² The SO₂ emissions of the kiln systems at portland cement plants are largely determined by the sulfur content of the feed to the kiln system, not by the sulfur content of the fuel fired in the kiln. This is because the sulfur in the feed is converted into SO₂ in the “back end” of the kiln system. The sulfur in fuel is converted to SO₂ during combustion at the front end and the middle of the system. The fuel-derived SO₂ must pass through the remainder of the kiln system, so it is very effectively absorbed by the lime dust that is present in

emissions of the Drake plant are a consequence of the very low sulfur content of the raw materials that are available to it, given the geographic region in which it was sited, which facilitate very low SO₂ emissions.^{13, 14} The Drake plant is not equipped with add-on control for SO₂ emissions, as would be used at the proposed plant. In this regard, the proposed plant would have “more control” for SO₂ emissions as it would have an add-on scrubbing system for SO₂ emissions.¹⁵

10. Do facilities that are authorized to use both "marl" and limestone achieve a lower SO₂ emissions rate than proposed for Universal Cement when they use limestone alone. This is relevant because Illinois EPA discounts facilities which use marl because it asserts marl is a geographically limited raw material. However, Illinois EPA does not address whether any of these facilities which are also authorized to use limestone in practice achieve a lower SO₂ emissions rate when using limestone alone. This is directly relevant to the LAER and BACT determinations for SO₂.

In the Project Summary, “marl” was used an example of the low-sulfur “carbonate raw materials” that are present in Florida and certain other regions in the country. In the cement industry, marl is generally considered to be a soft, unconsolidated form of limestone. As present in Florida, it has a low sulfur content, as do other forms of limestone or carbonate raw material that are present in Florida. Accordingly, the SO₂ emission rates of kilns in Florida are not believed to be meaningfully different depending on whether they are being fed with “marl,” limestone” or a mix of marl and limestone.

However, as the sulfur content of the feed material to a cement kiln affects its SO₂ emissions, portland cement kilns in regions with low-sulfur raw materials generally have significantly lower SO₂ emissions than kilns in regions with high-sulfur raw materials. Florida is in a region with particularly low-sulfur raw materials. Similar low-sulfur feed material is not available in the Midwest, where the proposed plant would be located.

The control technology determination for SO₂ for the proposed kiln reflects the sulfur content in local raw materials in the region in which the plant would be located. Due to its location, i.e., not in Florida or another region with low-sulfur feed materials, the SO₂ emissions rates achieved by plants in those other regions are not achievable by the proposed kiln. Moreover, unlike kilns in those other regions, the proposed kiln must be equipped with an add-on control system for SO₂ emissions. In this regard, when developing its new NSPS standard for SO₂ emissions from cement kilns, USEPA, distinguished between three categories or classes of kilns based on the sulfur content of their feed, inherently low-sulfur feed material kilns, moderate-sulfur feed material kilns, and high-sulfur feed material kilns.^{16, 17} The EAB has confirmed that all BACT determinations are site-specific and what

the kiln system. As a consequence, the geographic region in which a cement kiln is located, and the specific qualities of the local mineral resources, is a critical factor in the SO₂ emissions of a kiln.

¹³ Based on the nominal capacity of the Drake plant, 660,000 tons of clinker/year, the annual SO₂ emission limit for the plant is equivalent to an average SO₂ emission rate of about 0.066 lbs/ton of clinker.

¹⁴ For the proposed plant, the composition of the proposed raw materials was provided in Table A-22 in Appendix A of the November 2009 application. Raw materials available to the proposed plant include those that can be readily procured using the Lake Michigan and Chicago waterway system.

¹⁵ The BACT determination for the SO₂ emissions for the proposed kiln is based on achievement of an overall control efficiency of at least 98 percent for SO₂, based on the total loading of sulfur to the kiln, without separately distinguishing between the extent of control provided by inherent dust and add-on scrubbing and whether is from raw materials or fuel (See Table A-22 of the application). This approach was taken because the overall control of sulfur will be the combined effect of these mechanisms.

¹⁶ “Inherently Low-Sulfur Feed Material Kilns – Florida Kilns”

may be deemed as BACT at one site may not necessarily be BACT at another site. See, In re New York Power Authority, Applicant (Arthur Kill Station), 1 E.A.D. 825 (Adm'r 1983).

11. The Illinois EPA concluded the appropriate SO₂ emission limit for the kiln system for both LAER and BACT is 0.40 lb SO₂/ton of clinker (30-day rolling average).¹⁸ The Lone Star Industries Cement Plant in Maryneal, Nolan County, Texas is subject to an emissions limit of 0.33 lb SO₂/ton of clinker (30 day rolling average). See Condition 5.B. of TCEQ Permit PSDTX1101. It does not appear that this limit was included in Illinois EPA's process to determine LAER and BACT for the SO₂ emissions of the proposed plant. Lone Star's Maryneal facility, which also has a preheater/precalciner kiln, is permitted to use limestone as a raw material. Why was a limit of 0.33 lb SO₂/ton of clinker (30 day rolling average) not applied to the proposed plant as BACT and/or LAER.

The new cement kiln that is proposed by Lone Star at its cement plant in Maryneal, Texas, does not provide information that is relevant to permitting of the kiln at the proposed plant for SO₂ emissions. First, the SO₂ emission limit that was set for the Maryneal kiln is a reflection of the local feed material, which has a low sulfur content.¹⁹ The permitting of this

The Florida Department of Environmental Protection (DEP) provided emission test data for multiple pollutants from cement kilns in Florida. These data are summarized in Table 1. Data are presented for permit limits (both permit limits supplied by the Florida DEP in January 2008, and permit limits as contained in the emissions testing spreadsheet that was also transmitted). Table 1 also shows emission data for five kilns. Emissions of SO₂ were low for four of the plants, averaging 0.017, 0.015, 0.016 and 0.022 lb/ton of clinker. The fifth kiln, CEMEX Brooksville-South (formerly Rinker/Florida Crushed Stone) had average SO₂ emissions of 0.0275 lb/ton, which is still lower than the emissions of plants requiring scrubbers for SO₂ control, as will be discussed below. These five Florida kilns are typical of kilns with low-sulfur feed material. Because of the low levels of sulfur in the raw materials used by kilns in Florida and because of the natural SO₂ scrubbing action provided by the alkaline feed materials, emissions of SO₂ are typically low.

Moderate-Sulfur Feed Material Kilns – 18 Data Points from NSPS Facilities

A summary of 18 data points from NSPS facilities with moderate levels of sulfur in incoming feed indicated emissions of 0.8 lb SO₂/ton of feed, with 75 percent removal. This removal was within vendor guaranteed reductions of 60 – 87 percent (Heath, 1996)."

Memorandum, Mark Bahner, Michael Laney and Keith Barnett to Docket Number EPA-HQ-OAR-2007-0877, May 29, 2008, *Summary of Cement Kiln Wet Scrubber and Lime Injection Design and Performance Data*.

Note: An emissions rate of 0.8 lb/ton of feed is equivalent to a rate of 0.5 lb/ton clinker, based on a conversion rate of 1.6 tons of feed per 1.0 ton of clinker,

¹⁷ USEPA ultimately adopted a single limit, 0.40 lbs SO₂/ton of clinker, to address all three of these categories of cement kilns, based on the sulfur content of their feed material. USEPA effectively concluded that it was not necessary to set a separate SO₂ limit for cement kilns using low-sulfur feed materials since SO₂ emissions would naturally be low.

¹⁸ The Greater Chicago Metropolitan Area is designated as nonattainment for PM_{2.5}. The proposed plant's potential SO₂ emissions exceed 100 tons per year. Because SO₂ is a precursor to PM_{2.5}, the proposed plant must be subject to emission limits for SO₂ that represent the Lowest Achievable Emissions Rate (LAER) under Illinois' rules for Major Stationary Sources Construction and Modification (MSSCAM), 35 IAC Part 203. LAER is generally characterized as "...the more stringent rate of emissions based on either the most stringent emission standard, which is contained in the implementation plan of any state for the class of unit (unless it is demonstrated that such limitation is not achievable), or the most stringent emission limitation which is achieved in practice for the class of unit." Because Chicago is in attainment with the SO₂ NAAQS, the plant's SO₂ emissions must also be subject to BACT under the federal PSD rules.

¹⁹ As described by the Texas Commission on Environmental Quality (TCEQ) on page 2 of its Preliminary Determination Summary for the new Maryneal kiln, "The limestone and other cement raw materials used at Maryneal are lower in organic carbon and pyritic sulfur than the mineral deposits used for cement production in the Midlothian area."

Several cement manufacturing plants are located in the Midlothian area, which is in Ellis County, Texas.

kiln did not address processing of higher sulfur feed materials, as would be present at the proposed plant. In this regard, unlike the kiln at the proposed plant, the design of the Maryneal kiln does not include add-on control for SO₂ emissions and instead relies solely on “inherent dry scrubbing” to comply with permits limits for SO₂ emissions. Accordingly, the proposed plant would actually have “more control” for SO₂ emissions as it would have an add-on scrubbing system for SO₂ emissions.

Second, the proposed new Maryneal was not a major project for SO₂ emissions under the PSD program. The proposed new kiln at Maryneal would replace three existing kilns. Lone Star’s application for and the permitting of this new kiln by the Texas Commission on Environmental Quality (TCEQ) were based on netting for SO₂ emissions. The limit for future annual SO₂ emissions of the Maryneal plant with the new kiln, 104 tons/year, was “voluntarily” accepted by Lone Star. The permitted increase in SO₂ emissions was not significant, being only 39 tons/year when compared to the baseline emissions of the existing kilns, 65 tons/year. In effect, the permitting of the new Maryneal kiln relies on an improvement in the inherent control of SO₂ emissions that will accompany conversion from basic dry kilns to a modern kiln with preheater and precalciner and associated in-line raw mill.²⁰ More significantly, the SO₂ emission rate underlying the permitting of the new Maryneal kiln is actually on the order of 0.19 lbs SO₂/ton clinker, not 0.33 lbs SO₂/ton clinker as indicated by this comment. A rate of 0.33 lbs/ton is more representative of the baseline SO₂ emission rate of the existing kilns.²¹ In either case, for the existing kilns or for the new kiln proposed at Maryneal, the SO₂ emission rate is a direct reflection of the local raw materials and is not transferable to the proposed plant. This is because the emission rates and emission limits for SO₂ at Maryneal are the result of the low-sulfur content of the local feed materials, like the cement kilns in Florida.

Finally, the construction of the new Maryneal kiln has not been completed and may not have even commenced. In this regard, the construction permit for the Maryneal project, which was originally issued in April, 2009, was extended earlier this year in January. As such, the Maryneal kiln has not demonstrated that any particular SO₂ emission rate, either 0.33 lb/ton, as cited by this comment, or 0.19 lb/ton, as derived by the Illinois EPA, is achieved in practice by the new kiln.

12. Petroleum coke has a very high metals content, including lead.

This claim is not correct. The metals content of petroleum coke is generally lower than or comparable to that of coal.²² Equally important, the metals content of a fuel does not

²⁰ The additional features of the new kiln system will increase the exposure of SO₂ emissions to dust, thereby facilitating greater absorption of SO₂ on dust.

²¹ Based on available data, the baseline or historic SO₂ emission rate of the three existing kilns at Maryneal is likely no less than 0.26 to 0.32 lbs SO₂/ton of clinker, annual average, depending on the specific assumption made for the actual baseline production of the existing kilns, as compared to the reported design production capacity of the kilns, 600,000 tons of clinker/year.

(65 tons SO₂/yr ÷ 500,000 tons/yr = 0.26 lbs SO₂/ton, 65 tons SO₂/yr ÷ 400,000 tons/yr = 0.32 lbs SO₂/ton.)

The maximum SO₂ emission rate underlying the permit for the new Maryneal kiln is 0.19 lbs/ton, based on its reported design capacity, 1,100,000 tons of clinker/year

(104 tons SO₂/yr ÷ 1,100,000 tons/yr = 0.19 lbs SO₂/ton.)

²² For example, compare information for the composition of petroleum coke reported by the American Petroleum Institute Petroleum HPV Testing Group in *Petroleum Coke Category Analysis and Hazard Characterization*, USEPA, 2007. Appendix B of the report provides data for the trace metal content in the petroleum coke studied. Specifically regarding lead, the data shows concentrations never exceeded 29.6 ppm

necessarily correlate to the emissions of metal. This is the case for cement kilns, where most of the metals entering the kiln with fuel and raw material is either incorporated into the clinker product or captured with the dust by the particulate matter control equipment.²³

13. The permit for the proposed plant could address the metals issue by limiting use of petroleum coke. Without such a limit, the minor source status of the plant must be based on calculations assuming that a 100 percent petroleum coke will be burned.

Given the composition of petroleum coke and the nature of metals emissions from portland cement kilns, a specific restriction on the use of petroleum coke is not appropriate. In addition, the permit includes appropriate provisions to generally address metals emissions from the kiln, including requirements for initial performance testing (Condition 2.1.7-1), periodic performance testing (Condition 2.1.7-2), continuous emissions monitoring for particulate matter and mercury (Condition 2.1.8-1(a) and (c)), and sampling and analysis of fuels (Condition 2.1.8-3).

14. Despite the assurances of the USEPA and the Illinois EPA that tire burning is an acceptable fuel source, many experts disagree and consider the practice extremely hazardous to public health due to the dioxin, mercury and zinc that is released by the process.

It is commonly accepted by credible experts that use of tires as a supplemental fuel in properly equipped and operated cement kilns does not pose any particular risk to public health due to additional emissions. Tires do not pose special concerns for emissions of mercury. Dioxin emissions of a cement kiln generally are not a consequence of the chlorine input to the kiln but the nature and operation of the emission control system on the kiln. Proper operation of the control system on cement kilns relative to dioxin emissions, with maintenance of an appropriate temperature at the inlet to the particulate matter control device, is addressed by USEPA's NESHAP for Portland Cement Kilns, 40 CFR 63 Subpart LLL.²⁴ Emissions of zinc, which is not a hazardous air pollutant, are controlled by the particulate matter control equipment. At the proposed plant, proper operation of the control system relative to emissions of metals, include both mercury and zinc, would also be addressed by USEPA's NESHAP for Portland Cement Plants.

15. The analysis for the draft permit underestimates the impact of whole tire burning on NOx emissions. The analysis concludes that whole tire burning will reduce NOx emissions. Project Summary at 5. But the report cited for this conclusion actually demonstrates that burning tires

(the detection limit in the study). A USEPA study that included an analysis of the composition of coal (by state) listed a lead composition of 24.51 ppm for Illinois coal, which is very similar to that of petroleum coke. *Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units -- Final Report to Congress, Volume 2. Appendices*, USEPA, Office of Air Quality Planning and Standards, 1998, USEPA.

²³ For example, "It has been demonstrated that most heavy metals that are in the fuels or raw materials used in cement kilns are effectively incorporated into the clinker, or contained by standard emissions control devices...As long as cement kilns are designed to meet high technical standards, there has been shown to be little difference between the heavy metal emissions from plants burning only coal and those co-firing with alternative fuels." Murray, Ashley, and Lynn Price. *Use of Alternative Fuels in Cement Manufacture: Analysis of Fuel Characteristics and Feasibility for Use in the Chinese Cement Sector*. USEPA, 2008.

²⁴ Some testing also shows a reduction in the dioxin emissions of a cement kiln when tires are used. For example, a report by Richards et al. suggests that the dioxin/furan emissions of tire-fired kilns are about one-third lower than units firing conventional fuels (e.g., coal). J. Richards et al, *Air Emissions Data Summary for Portland Cement Pyroprocessing Operations Firing Tire-Derived Fuels*, Portland Cement Association R&D Serial No. 3050, 2008.

increases NOx in some kilns (*Air Emissions Data Summary for Portland Cement Pyroprocessing Operations Firing Tire-Derived Fuels*²⁵) Refer to Table 4-1, which indicates that one plant experienced NOx emission when burning tire-derived fuel (TDF) that were 16.8% higher when not burning TDF); Also Table 4-3, which indicated that another plant experienced NOx emissions when burning TDF that were 26.2% higher than when not burning TDF.

The draft permit does not “underestimate the impact of whole tire burning on NOx emissions.” As a general matter, use of tire fuel in a cement kiln is expected to reduce NOx emissions. This is because this practice would enhance staged combustion of fuel in the kiln system, which generally acts to reduce NOx emissions.²⁶ As stated in the Project Summary, “If whole tires are burned in the kiln, their effect may be to reduce NOx emissions of the kiln.” This comment does not demonstrate that this is not the case. It selectively refers to the cited paper, presenting information out of context. In this paper, in the introductory discussion prior to the presentation of emission test data, the paper explains “With these limited data, it is not possible to determine if these modest changes have any dependence on TDF firing or are simply due to routine variability of the emissions over a several day period.” Following the presentation of emission data, the paper concludes “Due to the short term variations in nitrogen oxide emissions, none of these four site specific data sets conclusively demonstrate that nitrogen oxides are affected by TDF firing. The large decreases in emissions included in Reports 256 and 276 suggest that additional site specific data will probably indicate that TDF reduces NOx emissions.” Accordingly, this paper, in fact, supports a position that use of tires may, but will not necessarily, lower NOx emissions from the kiln.²⁷

Finally, in any case, the NOx emissions of the kiln system would be controlled with add-on SNCR technology. The permit sets a stringent limit for NOx emissions of the kiln system that is applicable regardless of whether or not tires are available and being used as fuel. Emissions of NOx will be continuously monitored so that compliance with this limit may be readily verified independent of whether tires are or are not being fired in the kiln.

16. The kiln system would be designed to combust coal, petroleum coke, and scrap whole tires. The draft permit does not specify the maximum rate at which the kiln may combust tires. As discussed in the Project Summary, USEPA has a research paper on the use of tire derived fuel (*Air Emissions from Scrap Tire Combustion*, EPA, 1997). This paper states, “[Tire derived fuel (TDF)] can be used successfully as a 10-20% supplementary fuel in properly designed fuel combustors with good combustion control and add-on particulate controls.” Therefore, it is strongly recommended that the kiln system be limited to combusting 10 to 20 percent scrap whole tires as supplementary fuel.

The issued permit includes a limit on the percentage of scrap tires in the fuel supply to the kiln system, as generally requested by this comment. This limit has been set at 30 percent,

²⁵ Richards, J., Goshaw, D., Speer, D., Holder, T., *Air Emissions Data Summary for Portland Cement Pyroprocessing Operations Firing Tire-Derived Fuels*, Portland Cement Association R&D Serial No. 3050, 2008, pg. 9-10.

²⁶ Refer to the discussion of secondary combustion of fuel, pages 5-10 through 5-17, in *Alternative Control Techniques Document – NO_x Emissions from Cement Manufacturing*, USEPA, 1994, EPA-453/R-94-004.

²⁷ It is also noteworthy that as related to Plant 266, the text of the cited paper and Table 4-3, as specifically addressed by this comment, do not agree. The text indicates that the test data for Plant 266 showed lower emissions of NOx with use of tire fuel. Accordingly, it is uncertain whether testing at Plant 266 actually showed higher or lower NOx emissions with tires. (Perhaps the headings in Table 4-3 were switched.)

by weight,²⁸ the maximum rate that Universal Cement indicates that it expects it would ever use tires. (The initial percentage of scrap tires in the fuel supply would be expected to be in the range of 10 to 20 percent). The limit for maximum tire use has been set at 30 percent because continuous emissions monitoring would be present on the kiln for emissions of PM, NOx, SO₂, CO, total hydrocarbons and mercury. This monitoring will generally verify proper operation of the kiln and its control system for control of emissions. In addition, to specifically address pollutants that are not continuously monitored, the issued permit includes additional requirements for emission testing while using scrap tires.²⁹ If and when scrap tires begin to be used in the kiln system, such testing would be required as part of a period of trial operation with tires.³⁰ This testing would first occur while tire usage is in the range of 10 to 20 percent tires, as this would be the range that tires would initially be used. In the event that the plant subsequently seeks to increase the usage of tires above 20 percent, additional emission testing would be required at the higher usage rate, which could in no case exceed the limit of 30 percent.

In addition, this comment does not demonstrate that it is appropriate to limit usage of tire fuel to less than 30 percent. In this regard, this comment does not accurately characterize the actual findings of the USEPA in the cited report. The cited report does not indicate that scrap tires could not be successfully used in the proposed kiln system at a rate of 30 percent.³¹ Indeed, this report generally indicates that if equipment in which tires are being

²⁸ The limit has been set as a percentage by weight to facilitate ready implementation and enforceability. The implementation of the limit would be unnecessarily complicated if it was set in terms of heat input to the kiln system. This is because information would be needed for both usage of fuels and their heat contents. The limit would apply on a daily basis. Because cement kilns are normally operated at a steady production rate and consistent, stable operation is sought from an operational perspective, a daily limit will adequately serve to address and represent the rate at which tires are actually being used.

²⁹ The issued permit requires testing for PM_{2.5}, selected metals (i.e., lead, zinc and various other metals) and volatile organic material. Emission testing for dioxin/furan need not be addressed as the NESHAP addresses circumstances in which testing for dioxin/furan must be conducted. Emissions testing for HCl, H₂S and sulfuric acid mist are not addressed. It is expected that actual emissions of these pollutants from the kiln system will be a fraction of the applicable limits, so emissions would not be significantly affected by use of tires, with their lower sulfur and chlorine content. If emissions of these pollutants are not a fraction of the applicable limits, as shown by the emission testing on the kiln that is conducted for these pollutants, the Illinois EPA may use its general authority to also require testing for these pollutant(s) as part of the emission testing for use of tires.

³⁰ "Trial operation" with tires is needed to gradually bring the use of tires up to the desired rate, so as to assure that tires can reliably be used in a consistent manner while maintaining stable operation of the kiln system. Required emission testing is to be conducted within the period of trial operation. The durations of the periods of trial operation are defined in terms of the amount of tires that may be used during the period, i.e., 12,000 tons of tires in the initial period of trial operation, and 18,000 tons in the second period or trial operation, for use of more than 20 percent tires. These amounts are derived from use of tires for about six months (180 days). (For example, for the initial trial period of operation, 20 tons fuels/hr x 0.15 ton tires/ton fuel x 24 hrs/day x 180 days/yr = 12,960 tons, ≈ 12,000 tons of tires.)

³¹ As an initial matter, it should be observed that the report cited by this comment, *Air Emissions from Scrap Tire Combustion*, 1997, EPA-600/R-97-115 (Report), presents data from and makes conclusions based on data from 22 existing units using TDF, of which 19 are boilers at industrial facilities and only two are cement kilns. As such, the Report relates experience with the supplementary use of tire fuel at existing sources, focusing on boilers. It is not appropriate to apply the observation in this Report about existing sources to a new source, especially a proposed modern cement kiln.

The reasoning in this comment is also flawed. The fact that available data shows a particular premise to be true, in this case, that existing combustors can successfully use between 10 and 20 percent tires as supplemental fuel, does not provide a sound basis to conclude that either existing combustors or new

fired is appropriately designed, tires could make up 100 percent of the fuel supply. In addition, USEPA has expressed support for the responsible use of scrap tires in portland cement kilns.³² Accordingly, as applied to the proposed kiln system, the key observation of the cited report is that operation with tire fuel must be subject to appropriate monitoring to ensure that the kiln and associated control equipment are appropriately designed and in practice are operated to comply with applicable emission standards and limits when scrap tires are being used. As discussed, this will generally be assured as continuous emissions monitoring would be present for emissions of key pollutants addressing proper operation of the kiln and its control system and additional emission testing is required specifically for use of tires. Moreover, in the event that these measures show that the use of tires must be constrained to ensure compliance, these measures will provide a basis to establish such a operational constraint.

17. The permit should require a stack test to be conducted while firing the maximum tire feed rate of the kiln system, and a stack test in the 10 to 20 percent rate, so the Illinois EPA can determine if

combustors cannot successfully use more than 20 percent tires, as implied by this comment. In fact, the Report provides no conclusions about combustors using more than 20 percent tires as supplemental fuel. Presumably, this is because the underlying data needed to make any conclusions about supplemental use of tires at more than 20 percent was not available. As explained in the Report,

“TDF has been used successfully in properly designed combustors with good combustion control and appropriate add-on controls, particularly particulate controls, such as electrostatic precipitators (ESPs) or fabric filters. Air emissions characteristic of TDF combustion are typical of most solid fuels, such as coal and wood. The resultant air emissions can usually satisfy environmental compliance limits even with TDF representing up to 10 to 20% of the fuel requirements. *Twenty percent supplemental TDF is perceived as an upper limit in most existing boilers because of boiler limitations on fuel or performance.*” (emphasis added) Report, page 1.

In this regard, the quote provided in this comment, which is from a secondary source, omits a key phrase and structure that makes the true nature of the findings of the Report more apparent. The conclusion in the Executive Summary of the Report follows in its entirety.

“*Conclusion*

Air emissions have been documented from open burning of scrap tires and from TDF in well-designed combustors. Laboratory and field studies have confirmed that open burning produces toxic gases that can represent significant acute and chronic health hazards. *However, field studies have also confirmed that TDF can be used successfully as a 10 - 20% supplementary fuel in properly designed solid-fuel combustors with good combustion control and add-on particulate controls, such as electrostatic precipitators or fabric filters. Furthermore, a dedicated tire-to-energy facility specifically designed to burn TDF as its only fuel has been demonstrated to achieve emission rates much lower than most solid fuel combustors.*

No field data were available for well-designed combustors with no add-on particulate controls. Laboratory testing of an RKIS indicated that efficient combustion of supplementary TDF can destroy many volatile and semi-volatile air contaminants. However, it is not likely that a solid fuel combustor without add-on particulate controls could satisfy air emission regulatory requirements in the U.S.

No data were available for poorly designed or primitive combustion devices with no add-on controls. Air emissions from these types of devices would depend on design, fuel type, method of feeding, and other parameters. There is serious concern that emissions would be more like those of an open tire fire than a well-designed combustor. Stack emissions test data would need to be collected and analyzed to confirm this.” (emphasis added) Report, page x.

³² “The Agency supports the responsible use of tires in portland cements kilns and other industrial facilities, so long as the candidate facilities: (1) have a tire storage handling plan; (2) have secured a permit for applicable state and environmental programs; and (3) are in compliance with all requirements of that permit.” USEPA, *Wastes – Resource Conservation – Common Wastes & Materials: Tire-Derived Fuel*, See <http://www.epa.gov/waste/conserves/materials/tires/tdf.htm>.

Note: There would be no open tire storage at the proposed plant. Tires would be unloaded directly from transport trailers directly into the tire fuel feed system.

any further actions or permit conditions are warranted.

As discussed, the issued permit specifically requires emission testing while scrap tires are being used. The initial testing would occur while tire usage is in the range of 10 to 20 percent tires. In the event that the plant subsequently seeks to increase the usage of tires above 20 percent, additional emission testing would be required at the higher usage rate. If the results of either of these two tests indicate that emission testing is needed at other, intermediate levels of tire usage, the Illinois EPA can use its general authority to require testing for those other levels of tire use.

18. The permit needs to require recordkeeping for the firing rate of tire fuel, as a percentage of the fuel combusted.

The issued permit also requires recordkeeping for the usages of tires and other fuels to enable compliance with the applicable limits on tire usage to be verified. In this regard, these records will address not only the percentage of tires in fuel but also provide data to assure that required emission testing is conducted as part of the trial operation with tires that is authorized by the permit.

19. The draft permit would allow Universal Cement to use tire-derived fuel (TDF) at its sole discretion, without engaging in any pilot testing to determine the impact of TDF on the emissions of regulated air pollutants, including GHG and HAPs. Illinois EPA's approach to the use of TDF appears to be based on an inappropriately general "hunch" about the impacts of TDF on emission characteristics. This "hunch" is on display in this internally contradictory statement on p. 24 of the Project Summary about the benefits of TDF at a facility that, like the proposed plant, would use a staged combustion preheater/precalciner design:

If used, tires *may* reduce emissions of NO_x, because tires help create secondary combustion zones, thereby effectively further facilitating staged combustion within the kiln. Tires, while useful in controlling NO_x in older cement kiln design, *have not yet been demonstrated as a NO_x control technology with the latest staged combustion preheater/precalciner kiln design.* (emphasis added).

This comment improperly implies that use of tires would alter Universal Cement's compliance obligations under applicable regulations and the permit. This is not the case. As already discussed, the permit includes appropriate provisions to generally address emissions of HAPs from the kiln, including requirements for initial performance testing (Condition 2.1.7-1), periodic performance testing (Condition 2.1.7-2), continuous emissions monitoring for particulate matter, total hydrocarbons and mercury (as well as other pollutants) and sampling and analysis of fuels (Condition 2.18-3). Universal Cement must also fully account for and determine its emissions of GHG under the USEPA's Mandatory Reporting Rules, 40 CR Part 97. As related to use of tires, additional provisions for emissions testing related to use of tires have been included in the issued permit.

The statement in the Project Summary cited by this comment is not relevant to concerns about emissions of GHG and HAPs, as raised in this comment. The statement explained, in part, why the draft permit would not require tires to be used as a supplemental fuel by the plant as related to control of NO_x emissions. The other reason was that tire fuel is not a commercial fuel and cannot actually be relied upon to be available for use at the plant.

20. TDF should not be used at the proposed plant until a permit-mandated pilot testing protocol is used to analyze the use of this fuel on the full range of regulated air pollutants over a range of conditions. If the introduction of TDF creates an increase in any regulated air pollutant, this fuel should not be employed beyond pilot testing until a permit modification is undertaken to appropriately control the use of this fuel and limit air emission impacts.

In response to this comment, and another similar comment, the issued permit imposes additional requirements on the use of tire fuels, including a limit on the amount of tires that may be used and additional emission testing. However, as the use of tires is part of the original design of the plant, as addressed in the application submitted by Universal Cement, and is fully addressed by the permit that has been issued for the plant, the use of tires by the plant cannot be considered a “future modification” to the plant, as requested by this comment.

21. Did the modeling include the possibility of tires being a significant portion of the fuel mix? It may be that right now Universal Cement intends to mostly use coal and petroleum coke but what happens if, in an attempt to save costs, they switch to more tires? In particular, will it change the projected 24-hour PM-10 of 47.61 or the projected 1-hour NO₂ of 18.4? See, page 13 of the Environmental Justice Assessment.

The modeling is based on the permitted emission rates, as set by the permit. As such, the modeling addressed all permitted operations of the proposed plant. In addition, the issued permit sets limits on the amount of tires that may be in the fuel supply to the kiln.

22. Condition 2.1.2(b)(i) of the draft permit would set a BACT limit for the kiln system for GHG emissions, as carbon dioxide equivalents (CO₂e) on an annual basis, of 1,860 pounds of CO₂e per ton of clinker. This annual limit should be based on either a 12-month rolling average or a 365-day rolling average.

This limit for GHG emissions will apply as a 12-month rolling average, as was and is generally provided by Condition 1.8(c) of both the draft and issued permit.³³ In response, to this comment, this has also been clarified in Condition 2.1.2(b)(i) in the issued permit. This averaging time is appropriate because the GHG limits effectively addresses the process efficiency of a cement kiln. The process efficiency of a cement kiln varies when examined on a short-term basis due to variations in operating level, composition of raw materials and fuel, and equipment operation, and due to timing relative to regularly scheduled periodic and major maintenance. This variability in short-term process efficiency is most effectively addressed by a long-term average limit for GHG emissions, i.e., an annual limit that is rolled monthly. In addition, the environmental concern for GHG emissions is overall emissions or loading to the atmosphere, not short-term emissions.³⁴ Finally, with this averaging time, this limit should be readily enforceable as a practical matter.

23. The Project Summary, page 33, discussed carbon capture and sequestration (CCS) as a possible BACT technology for reducing GHG emissions from the plant. The Illinois EPA concludes that

³³ Condition 1.8(c) provides that compliance with annual limits set by the permit shall generally be determined from a running total of 12 months of data.

³⁴ The USEPA has found that “... since the environmental concern with GHGs is with their cumulative impact in the environment, metrics should focus on longer-term averages (e.g., 30- or 365-day rolling average) rather than short-term averages (e.g., 3- or 24-hr rolling average). USEPA, Office of Air and Radiation, *PSD and Title V Permitting Guidance for Greenhouse Gases*, March 2011, pg 46.

CCS should be rejected in Step 1 of the BACT analysis based on CCS being “in its developmental infancy at this time” and because there are no pipelines near Chicago to transport the CO₂ to viable storage locations. However, USEPA generally considers CCS to be both commercially available and technically feasible for cement manufacturing facilities. (See page 32 of USEPA’s *PSD and Title V Permitting Guidance for Greenhouse Gases*, March 2011 (USEPA Permitting Guidance for GHG).) This does not necessarily mean CCS should be selected as BACT for the proposed plant, but without a better substantiation, CCS should not be deleted at either Step 1 or Step 2 of the BACT analysis. The comment notes that cost issues related to CCS implementation may be a valid reason to eliminate CCS for a particular facility, but such a cost analysis should be conducted under Step 4 of the top-down BACT analysis to support that decision. It is in the economic impacts portion of Step 4 that capture, pipeline construction, and sequestration costs should be considered, along with other impacts of the technology.

In response to this comment, the appropriateness of CCS as BACT technology for the proposed plant has been further evaluated in the manner suggested by this comment. However, as an initial point, it should be noted that the draft permit was based on CCS being eliminated at Step 2 of the BACT analysis, “Feasibility/Infeasibility.” It was not based on rejection of CCS at Step 1, “Availability,” as indicated by this comment.³⁵ Based on its further evaluation, the Illinois EPA concludes that CCS is appropriately rejected at Step 4 of the BACT analysis due to costs impacts. There are also very serious concerns about the feasibility of CCS, which suggest it would also be appropriate to reject CCS at Step 2 of the BACT analysis.

There are three basic components to CCS, CO₂ capture, CO₂ transport and actual sequestration of CO₂. As discussed in the application and by USEPA in its October 2010 *Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Portland Cement Industry* (USEPA GHG White Paper), and considered by the Illinois EPA, there are five “available” techniques for carbon capture that can be considered for the CO₂ emission from cement kilns. Only one of these techniques, post-combustion solvent capture and stripping, is a mature technology, currently used in the chemical and petroleum industry, although not for CCS. The other capture techniques (the Calera process, oxy-

³⁵ It is also noteworthy that the provisions of the USEPA Permitting Guidance for GHG cited by this comment, address Step 1 of the BACT analysis, Availability, not Step 2, Feasibility. With respect to feasibility of CCS, this guidance explains “Assuming CCS has been included in Step 1 of the top-down BACT process for such sources, it now must be evaluated for technical feasibility in Step 2. CCS is composed of three main components: CO₂ capture and/or compression, transport, and storage. CCS may be eliminated from a BACT analysis in Step 2 if it can be shown that there are significant differences pertinent to the successful operation for each of these three main components from what has already been applied to a differing source type. For example, the temperature, pressure, pollutant concentration, or volume of the gas stream to be controlled, may differ so significantly from previous applications that it is uncertain the control device will work in the situation currently undergoing review. Furthermore, CCS may be eliminated from a BACT analysis in Step 2 if the three components working together are deemed technically infeasible for the proposed source, taking into account the integration of the CCS components with the base facility and site-specific considerations (e.g., space for CO₂ capture equipment at an existing facility, right-of-ways to build a pipeline or access to an existing pipeline, access to suitable geologic reservoirs for sequestration, or other storage options).

While CCS is a promising technology, EPA does not believe that at this time CCS will be a technically feasible option in certain cases.

To establish that an option is technically infeasible, the permitting record should show that an available control option has neither been demonstrated in practice nor is available and applicable to the source type under review.” USEPA, Office of Air and Radiation, *PSD and Title V Permitting Guidance for Greenhouse Gases*, March 2011, pg. 35 – 36.

combustion, post-combustion membrane removal, and superheated calcium oxide) are at earlier stages of development, being in the theoretical or research stage, and may never be fully developed. As such, these other capture techniques can be rejected as infeasible.³⁶ In addition, given the “development” that would be needed to perfect these techniques and apply them at the proposed plant, use of any of these techniques would be an “initial application,” the costs of these techniques cannot be assumed to be less than implementation of post-combustion solvent capture and stripping, which is a developed technology.

Post-combustion solvent capture and stripping involves a solvent based scrubber. The technology uses a scrubbing solvent which chemically binds the CO₂ in the flue gas. The solvent is then passed through a stripper where it is heated to release the bound CO₂. The CO₂ can be then compressed for transport to a sequestration site. This technology is commonly used in the natural gas processing industry to remove hydrogen sulfide and CO₂ from raw natural gas. It has also been studied for combustion sources at gas fired power stations. However, little information is available on application of this technology to cement plants. As discussed on page 37 of the USEPA GHG White Paper, there are several issues that still need to be addressed for application of this technology to cement plants. These include the effect of SO₂ in the flue gas on formation of amine salts, solvent degradation due to NO_x in the flue gas, reduction in process efficiency due to particulate in the flue gas, large

³⁶ Calera Process - The Calera process involves capture of CO₂ by chemically converting CO₂ to carbonates. Kiln exhaust gases are scrubbed with passed through water containing calcium, magnesium, sodium, and chloride, at a high pH. CO₂ in the exhaust is absorbed in the water as carbonic acid, which then reacts with the calcium and magnesium to form carbonate minerals. The carbonate minerals can be precipitated from the solution for use in blended cement or other building materials. The scrubbing water can be treated to remove sodium chloride and reused as potable water. Although the Calera process has potential to be configured such that no industrial waste is discharged to the environment, it is still in research stages. It has been tested at a 10MW coal-fired power plant and shown positive results. However, as explained by USEPA on page 35 of the USEPA GHG White Paper, “this process is still being researched for its use in the cement industry.” Since the Calera process has not yet been demonstrated in practice in the cement industry, it is considered to be technically infeasible.

Oxy-combustion - Oxy-combustion is a process in which fuel (coal) is burned in nearly pure oxygen, instead of air. The oxygen is produced by a separate air separation unit that extracts oxygen from the air. Under these conditions, the exhaust gases are rich in CO₂ (up to 80%). CO₂ from the exhaust gases is discharged to a CO₂ separation, purification, and compression facility. As observed by USEPA on page 38 of the GHG White Paper, “this technology is still in the research stage for the cement industry.” Additionally, the research to date has shown numerous technical issues related to using this technique at a cement plant, such as a change in heat transfer characteristics, faster kiln wall deterioration, possible change in clinker formation chemistry, air in-leaks contaminating the CO₂-rich exhaust gas, possible necessary flue-gas cleanup, and a necessary air separation unit. Since oxy-combustion has not yet been demonstrated in practice in the cement industry, it is considered to be technically infeasible.

Post-combustion Membrane - Post-combustion membrane technology uses permeable or semi-permeable membranes to separate CO₂ from flue gas. The separated CO₂ can be then compressed and sent to storage site for sequestration. As observed by USEPA on page 38 of the GHG White Paper, “This technology is still primarily in the research stage, with industrial application at least 10 years away. There are significant problems to overcome designing membrane reactors large enough to handle the kiln exhaust.” Therefore, post-combustion membrane technology is considered to be technically infeasible.

Superheated Calcium Oxide Process - In the superheated calcium oxide process, calcination and combustion reactions are separated in independent chambers so that exhaust gases from the calcination process are rich in CO₂. This is achieved by providing heat to calciner using circulation of superheated particles of calcium oxide (lime) between a fluidized bed combustor and a fluidized bed calciner. The CO₂ rich exhaust from the calciner can be then collected, compressed, and sent for sequestration. As observed by USEPA on page 38 of the GHG White Paper, “the system remains theoretical with no systems yet built.” Therefore, superheated calcium oxide process is considered technically infeasible.

steam requirements to strip CO₂ from the solvent, requirement to maintain oxidizing conditions in the kiln, cooling of the flue gas to optimum scrubber operating temperature, presence of other acidic compounds in the flue gas that may reduce process efficiency, and management of large amount of wastewater that may be generated in the process.³⁷ As reported on page 37 of the USEPA GHG White Paper, solvent absorption technologies are only in the pilot stage for the power sector. Actual demonstrations are many years in the future. As such, the use of the technology for the cement industry is even less developed. Accordingly, there are very serious concerns about applying this technology to the proposed plant, which suggests that it should not be considered feasible.

The feasibility of the second “component” of CCS, transport of CO₂ from the plant to a sequestration site, is also problematic. The closest available geological formation for CO₂ sequestration would be the Illinois Basin, which covers most of Illinois, as well a western Indiana and Kentucky. However, the Illinois basin does not extend up to the northeastern corner of Illinois. The northern edge of the Illinois Basin is about 50 miles from the site of the proposed plant. Therefore, the CO₂ would need to be transported at least 50 miles in order to be sequestered. Per the Midwest Geological Sequestration Consortium’s paper, *Carbon Dioxide Capture and Transportation Options in the Illinois Basin*, there are four options for transport: truck/motor carriers, rail cars, pipeline transportation, and water carriers.³⁸ Truck/motor carriers, rail cars, and water carriers are generally good for transporting smaller volumes over short distances. These would not be practical options for the proposed plant due to the large amount of CO₂ to be sequestered. Pipeline construction requires considerable design and planning work, including detailed route selection, planning for geohazards, physical design of the pipeline, and obtaining business, environmental, highway/railway crossing, and right-of-way permits. The site of the proposed plant is in an urban area, which generally makes pipeline construction a very difficult task. It would be made more complex as the pipeline would be the first pipeline for CO₂ sequestration proposed for the Chicago area.

The issues posed for capture of CO₂ and the development of a CO₂ pipeline to a sequestration site aptly demonstrate that CCS for the proposed plant should be eliminated in Step 2 of the BACT analysis, Feasibility.³⁹ Ordinarily, the BACT analysis would end here. However, without admitting to any shortcomings of its Step 2 analysis and at some effort, the Illinois EPA has performed a cost effectiveness analysis as the comment suggested the possibility of a Step 4 analysis being performed on this issue. Given CO₂ capture technology has not been successfully operated on cement kilns or been demonstrated to be directly applicable, this evaluation of the cost effectiveness analysis of CCS is a backstop to the feasibility analysis. Regardless, as will become apparent in the following discussion, the Illinois EPA thoroughly evaluated the cost effectiveness of CCS.

³⁷ Even if some of the technical challenges are resolved, this technology is highly energy and water intensive. Use of this technology would change the proposed plant from a “no discharge facility” to a major discharger. It would also require steam, in large quantities, so that the plant would also have to include steam boilers.

³⁸ Midwest Geological Sequestration Consortium, *Carbon Dioxide Capture and Transportation Options in the Illinois Basin*. 2004.

³⁹ For the purpose of the proposed plant, it was not considered necessary to further evaluate whether the third component of CCS, the actual sequestration of CO₂, either in conjunction with use of CO₂ for enhanced oil recovery or a stand-alone basis, is feasible at the present time. A cost-estimate was also not assembled for stand-alone sequestration, addressing the development of the actual CO₂ injection well and acquisition of property and sequestration rights” for the area under which CO₂ would be sequestered.

As explained below, one evaluation of the cost-effectiveness of CO₂ capture with post-combustion solvent capture and stripping projects costs ranges from \$17 to \$84 per ton of CO₂ captured.⁴⁰ The calculated cost-effectiveness of the other capture techniques, based on available information would be comparable.⁴¹ However, these estimates cannot be

⁴⁰ Another estimate for the cost-effectiveness of post combustion solvent capture and stripping is \$133/ton of CO₂ avoided, as reported in a paper by D. J. Barker *et al.*, *Capture in the Cement Industry, Energy Procedia 1.1*, pg. 87-94 (2009), as cited by USEPA in its October 2011 GHG Guidance for Portland Cement Plants.
⁴¹

Cost-Effectiveness Analysis for Proposed Kiln using Calera Process

Parameter	Value ³	Unit
2010 Cost Effectiveness ¹	50 - 60	\$/ton CO ₂ removed
2010 CPI/ Average 2011 CPI YTD ²	218/225	
2011 Cost Effectiveness	52 - 62	\$/ton CO ₂ removed

1. Calera, Inc., 2010. *Notes on Sustainability and Potential Market*, October 2010.
2. *Google Finance: Currency, Google*. Web. 19 Dec. 2011. <<https://www.google.com/finance?hl=en>>.
3. The carbonate product from the Calera process could potentially be used in cement or aggregate building materials. In the right market, a profit could be made from the product (creating a negative cost effectiveness). Since the profit can widely vary, it is assumed that no money is generated from use of the carbonate product for the purposes of this cost analysis.

Cost-Effectiveness Analysis for Proposed Kiln using Oxyfuel Combustion

Parameter	Value	Unit
Cost Effectiveness ¹	32.6	€/ton CO ₂ removed
June 2009 Euro to Dollar Conversion ²	1.4	\$/€
2009 CPI/Average 2011 CPI YTD ³	215/225	
Converted Cost Effectiveness	47.8	\$/ton CO ₂ removed

1. European Cement Research Academy (ECRA), Cement Sustainability Initiative, 2009. *ECRA CCS Project - Report about Phase II*, June 22, 2009, Duesseldorf, Germany.
2. *Google Finance: Currency, Google*, Web. 19 Dec. 2011. <<https://www.google.com/finance?hl=en>>.
3. *Consumer Price Index*, Web. 19 Dec. 2011. <<http://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt>>

Cost-Effectiveness Analysis for Proposed Kiln using Post-Combustion Membranes

Parameter	Value	Unit
2015 Cost Effectiveness ¹	45-50	€/ton CO ₂ removed
Converted Cost Effectiveness	63-70 ²	\$/ton CO ₂ removed

1. European Cement Research Academy (ECRA), Cement Sustainability Initiative, 2009. *Development of State of the Art – Techniques in Cement Manufacturing: Trying to Look Ahead*, June 4, 2009, Duesseldorf, Germany.
2. June 2009 Euro to Dollar Conversion, 1.4 \$ per €, *Google Finance: Currency, Google*. Web. 19 Dec. 2011. <<https://www.google.com/finance?hl=en>>.

Cost-Effectiveness Analysis for Proposed Kiln using Superheated Lime

Parameter	Value	Unit
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considered reliable as applied to the proposed plant. They are derived using information that almost certainly reflects the objective for costs that those working on particular capture technologies are hoping to meet. In addition, even those cost-effectiveness values lead to a conclusion that the cost of CCS is excessive.⁴²

**Cost-Effectiveness Analysis for Proposed Kiln using
Post-Combustion Solvent Capture and Stripping**

Parameter	Value	Unit
2030 Cost Effectiveness ¹	10-50	€/ton clinker
Annual Cement Production ²	1,155,000	tpy cement
2030 Annual Cost	12-58	Million €/year
CO ₂ Emission Rate	1,020,275	tpy CO ₂
CO ₂ Emission Reduction	95%	
CO ₂ Removed	969,262	tpy CO ₂
2030 Cost Effectiveness Converted	12-60	€/ton CO ₂ removed
Converted Cost Effectiveness ³	17-84	\$/ton CO ₂ removed

1. European Cement Research Academy (ECRA), Cement Sustainability Initiative, 2009. *Development of State of the Art – Techniques in Cement Manufacturing: Trying to Look Ahead*, June 4, 2009, Duesseldorf, Germany.
2. 3500 TPD value as provided in Universal Cement Construction Permit Application, Updated and Submitted to Illinois EPA November 2009. TPY value calculated based on 7,920 hours of operation per year.
3. June 2009 Euro to Dollar Conversion, 1.4 \$ per €, *Google Finance: Currency*. Google. Web. 19 Dec. 2011. <<https://www.google.com/finance?hl=en>>.

In addition to the above costs for capture of CO₂, there would also be costs for transport of the captured CO₂ to the sequestration site. A conservative (low) cost analysis was performed for the constructing of CO₂ pipeline.⁴³ The cost for land acquisition and

2011 Cost Effectiveness ¹	12 - 51	\$/ton CO ₂ removed
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1. Rodriguez, N., M. Alonso, J.C. Abanades, G. Grasa, and R. Murillo. *Analysis of a Process to Capture the CO₂ Resulting from the Pre-calcination of the Limestone Feed to a Cement Plant*, Energy Procedia 1.1 (2009), pg. 141-48.

⁴² Not all of the capture technologies provide the same level of capture, limiting the comparative value of data (\$/ton CO₂ removed). For example, the document cited for the cost effectiveness of the superheated calcium oxide process notes “On the negative side, only a modest amount of CO₂ is avoided (38%) with this method when compared to other more elaborate capture technologies.”

⁴³

CO ₂ Pipeline Construction Cost Analysis			
The following cost analysis is based on Midwest Geological Sequestration Consortium's report, <i>Carbon Dioxide Capture and Transportation Options in the Illinois Basin</i> . ¹			
Parameter	Value	Unit	Reference/Comment
Maximum CO ₂ mass rate	257,645	lb/hr	GHG Calcs

construction of the CO₂ pipeline was based on the pipeline being located on farmland, not developed land. The distance of the pipeline was optimistically assumed to be just 50 miles, with a suitable sequestration site located outside the Chicago metropolitan area at the edge of the Illinois Basin. With the various conservative assumptions in this analysis, the monetary cost of the CO₂ pipeline, \$1.70/ton, is not particularly significant compared to the cost of capture. Even if the monetary cost of the pipeline would in fact be several times higher, it is clear that the critical issue for a CO₂ pipeline relates to feasibility, i.e., the ability in practice to assemble the right-of-way that would be needed for the pipeline.

When considering the cost-effectiveness of controlling CO₂ with CCS, some reference point is needed to determine whether CCS should or should not be considered cost-effective.^{44, 45}

CO ₂ liquid density	48.49	lb/ft ³	Page 136 (@ 1,900 psig and 80 °F)
CO ₂ vapor density	0.1152	lb/ft ³	Page 137
Max. CO ₂ gas flow rate	2,236,504	SCF/hour	Calculated from mass flowrate and vapor density
	54,000,000	SCF/day	
Pressure drop	1,000	psig	Page 136
Pipe length	50	miles	Distance from Universal Cement to Illinois Basin
Pressure drop per mile	20	psi/mi	Calculated from pressure drop and pipe length
Pipe outer diameter (OD)	8	inch	Figure 3.2 (Page 138), 54 MMSCFD and 20 psi/mile is about halfway between 6.625 and 8.625, round to 8.
Pipe easement	8	acre/mile	Table 5.1 (page 150), acres per mile for 8 inch OD
Total acreage needed	400	acres	Transitional land price for Northeast Illinois farmland with development potential for commercial/residential use ³
	15,000	\$/acre	
Pipeline right-of-way cost	150,000	\$/mi	Price per acre * acre per mile * 1.25 experience factor for condemnation proceedings
Pipeline material cost	79,370	\$/mi	Table 8.3 (Page 163)
Pipeline construction cost	141,753	\$/mi	Table 8.4 (Page 163)
Support services cost	47,812	\$/mi	Table 8.5 (Page 164)
Total construction cost/mile	418,935	\$/mi	Table 8.6 (Page 164)
Total capital cost	20,946,750	\$	For 50 miles of pipeline
Annualized capital cost	1,137,409	\$/yr	Based on 4.5 % interest and a 40 year life (CRF 0.0543)
Annual operating cost/mile	5,333	\$/mi/yr	Table 8.8 (Page 166)
Annual operating cost	266,650	\$/yr	For 50 miles of pipeline
Total annual cost in 2004 \$	1,404,059	\$/yr	
2004 CPI/2011 CPI	189/225		
Total annual cost in 2011 \$	1,670,499	\$/yr	Converted to 2011 prices
1. Midwest Geological Sequestration Consortium. <i>Carbon Dioxide Capture and Transportation Options in the Illinois Basin</i> . 2004.			
2. <i>Consumer Price Index</i> . Web. 19 Dec. 2011. < http://ftp.bls.gov/pub/special.requests/cpi/cpi.txt >			
3. Illinois Society of Professional Farm Managers and Rural Appraisers. <i>2011 Illinois Farmland Values and Lease Trends</i> . 2011.			

⁴⁴ The reference value(s) for cost-effectiveness used for control of other pollutants under the PSD cannot be applied to CO₂. This is because of the difference in environmental effects. Most notably, emissions of CO₂ and the levels of CO₂ in the ambient air do not pose a direct threat to public health. The environmental effects of CO₂, global warming and climate change, are the result of global emissions of CO₂, which are measured in billions of tons per year.

⁴⁵ It is noteworthy that the comment that requested a cost-effectiveness analysis for CCS did not suggest a value at which CCS should be considered cost-effective.

As a working point of reference for the proposed plant, the Illinois EPA has used a value of \$20/ton. This is derived from \$20,000/ton, a cost-effectiveness value for PM, NO_x and SO₂ that the Illinois EPA (and likely many other regulatory agencies) consider clearly excessive.^{46, 47} This is necessary since there are not yet any real projects where the BACT determinations for GHG emissions has required CCS, to provide a reference value based on the actual cost that has been reasonable. By way of further background on the costs that have been expended for control of CO₂ one must refer to CO₂ and GHG trading programs.⁴⁸ In the US, there is a voluntary trading market, the Regional Greenhouse Gas Initiative. The April 2011 report for this trading system, *Annual Report on the Market for RGGI CO₂ Allowances: 2010*, indicates that the average price for CO₂ allowances in 2010 was less than \$2/ton.

24. The best available technology for this plant or any other plants does not require any permitting process because it does emit CO₂ or other pollutants.

There is currently not any technology for the manufacture of portland cement that does not entail combustion of fuel and the generation of CO₂ emissions.

25. The draft permit reflects a flawed and inadequate alternatives analysis. Natural gas is rejected as an alternative fuel on the following basis: “A cement kiln fired only with natural gas would also not be viable economically. With natural gas costing about three times more than coal and petroleum coke, the cement produced by the plant would cost approximately \$16 per ton more solely due to the additional cost of natural gas.” Project Summary at 20. The draft permit does not specify the sources for this analysis, it merely presents conclusions. More to the point, the minimal stated basis for the conclusions is wrong. The most current data show that natural gas is roughly two times the cost of coal, not three. *See* Electric Power Monthly, October 2011, at 2.2

As an initial point, the Illinois EPA acknowledges that the relative cost of fuel was described improperly in the Project Summary. The cost of natural gas is about three times that of coal and petroleum coke. The cost of natural gas is not about three times more than that of coal and petroleum coke. However, the analysis of relative costs of fuels was properly conducted and the data in the application is supportable, as explained below. In addition, the assembled cost data further demonstrates that the cost of natural gas has varied over time, reflective a far more volatile price than coal. Both absolute price and price volatility are concern for sources for which fuel costs are a significant component of operating costs and that are competing economically in markets for commodity-type products like portland cement.

⁴⁶ \$20/ton = \$20,000/ton x ratio of major source thresholds (100 tons/year/100,000 tons/yr).

⁴⁷ The Illinois EPA does not have a “bright line” value for cost-effectiveness. This is because control technology determinations during permitting are made on a case-by-case basis. Accordingly, in other permitting decisions, the cost of alternative control technologies have been determined to be excessive at values that are significantly less than \$20,000/ton of pollutant controlled.

⁴⁸ While voluntary trading programs in the United States do not provide data that directly corresponds to the costs that would be imposed by a mandatory requirement to use CCS, they are nevertheless an indication of what sources in the United States currently consider reasonable to spend for control of CO₂ emissions. Mandatory trading programs, such as the program in the European Union, do not provide relevant information since they are a component of an overall program for control of GHG emissions, in which allowances are issued and compliance requirements apply to both existing and new sources.

In addition, this comment does not address other reasons why use of natural gas should not be mandated as the fuel for the plant. The use of natural gas, given the formation of thermal NO_x in the combustion zone, would result in a significant increase in NO_x emissions. The use of natural gas would also lower the process efficiency of the kiln, necessitating use of additional fuel or either a reduction in the capacity of the plant or a redesign of the plant.

The GHG BACT analysis submitted to the Illinois EPA (February, 2011) used the industrial price of natural gas in Illinois for 2009, which was \$7.31 per MSCF (\$7.17/ mmBtu). The analysis compared this price to the cost of coal and determined that using natural gas at the proposed plant would result in fuel costs three times as much as when using coal. The Energy Information Administration (EIA) defines *industrial price* as "the price of natural gas used for heat, power, or chemical feedstock by manufacturing establishments or those engaged in mining or other mineral extraction as well as consumers in agriculture, forestry, fisheries and construction." By this definition, it is appropriate to use the industrial natural gas prices for estimating the cost of natural gas for the proposed plant.

The comment cites natural gas prices provided in October 2011 Electric Power Monthly to claim that natural gas only costs twice as much as coal. Presumably, the comment refers to data from Table 4.5, *Receipts, Average Cost, and Quality of Fossil Fuels: Industrial Sector, 1997 through August 2011, of Electric Power Monthly*, which shows 2011 year-to-date costs would be \$3.04/mmBtu for coal and \$4.47/mmBtu for natural gas. However, this data does not provide a fair estimate of the fuel prices for the proposed plant. This is because the data is a national average and not specific to Illinois. Fuel prices vary greatly across the country depending on the available fuel resources in each region and the transportation costs associated with different fuels.

To address concerns about simply using the 2009 data for the cost of natural gas, per the information submitted by Universal Cement,⁴⁹ the following table has been assembled to show recent fuel prices for the industrial sector in Illinois and to calculate a five-year average of the prices, normalized to a price per mmBtu heat content provided by the fuel.⁵⁰

⁴⁹ New Source Review (NSR) Permit Application Supplement, Greenhouse Gas (GHG) Applicability, Submitted by Universal Cement LLC to Illinois EPA, February, 2011, Table 3-4, pg 3-16. This information was also included in the July 1, 2011 Universal Cement LLC submittal to the Illinois EPA, to the attention of Bob Smet, under the heading 'Fuel cost information'.

⁵⁰

Costs of Natural Gas and Coal for Illinois				
Year	Illinois Industrial Natural Gas Prices ^a		Illinois Average Coal Price (Including Transportation) ^{b, c}	
	\$/MSCF	\$/mmBtu	\$/ton	\$/mmBtu
2006	9.44	9.25	45	1.9
2007	9.00	8.82	48	2.0
2008	10.58	10.37	54	2.3
2009	7.31	7.17	62	2.6
2010	7.12	6.98	63	2.6
2006-2010 (5-Year Ave.)	8.69	8.52	55	2.3

a. *Illinois Natural Gas Prices*. US Energy Information Administration (EIA). Web. 19 Dec. 2011. <http://www.eia.gov/dnav/ng/ng_pri_sum_dc_u_SIL_a.htm>.

⁵¹ It demonstrates, on a five-year average, the cost of natural gas is approximately three times that of coal.

Comparison of Cost of Natural Gas and Coal for Illinois				
Year	Natural Gas Price (\$/mmBtu)	Coal Price (\$/mmBtu)	Cost Ratio Natural Gas to Coal	Added Cost per Ton of Cement Production (\$) ⁵²
2006	9.3	1.9	4.9	24.97
2007	8.8	2.0	4.4	23.19
2008	10.4	2.3	4.6	27.26
2009	7.2	2.6	2.8	16.05
2010	7.0	2.6	2.7	15.32
2006-2010 (5-year average)	8.5	2.3	3.7	21.41

26. As Illinois EPA acknowledges, the fuel used at the proposed plant is directly relevant to its BACT determinations. More specifically, the determination of BACT requires consideration of use of "clean fuels" as a technique to control emissions from a proposed emission unit. Project Summary, p. 19. Regarding this fuel analysis, did the Illinois EPA analyze whether an incremental substitution of natural gas for coal and petroleum coke was a technically feasible and environmentally beneficial alternative. That is, it appears Illinois EPA's analysis assumes only a total substitution of natural gas, and then discounts a total substitution of this cleaner burning fuel as infeasible (see, for example, page 20 of the Project Summary "A cement kiln fired only with natural gas would also not be viable economically." (Emphasis added). It is not clear Illinois EPA determined what portion of total fuel could consist of natural gas in such a way that overall emissions including GHGs would be reduced, NOx increases would be minimized, and the fuel mix would still be feasible for use in this facility.

The implications of potential fuel substitution for cement kilns are most easily explained on a pollutant-by-pollutant basis. For SO₂, emissions from boilers may require scrubbing unless "clean fuels" are used. However, in cement kilns, the primary source of SO₂ emissions is raw materials. This is because sulfur in the fuel generally reacts with raw materials in the "hot zones" of the kiln and becomes part of the finished product. For this reason, "clean fuel" alternatives have little or no impact on SO₂ emissions. For PM, emissions are also a consequence of both raw materials and fuels. Ash in fuel may also be incorporated into the finished product. In any case, PM emissions of a new kiln must be

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- b. Illinois coal price (not including transportation) *Annual Coal Report*, EIA. Web. 19 Dec. 2011. <<http://www.eia.gov/coal/annual/>>.
 - c. March 2011 price to transport coal via railcar 300 miles from Illinois Basin is \$14.24/ton. Assumes negligible change in transportation costs from 2006 through 2010. *Coal Transportation*. Argus. Web. 12 Dec. 2011. <http://www.argusmedia.com/Coal/~media/Files/PDFs/Samples/Argus-Coal-Transportation.ashx>.

⁵¹ The fuel cost comparison is adjusted to a cost per million Btu (mmBtu) because the heat content of fuel are reported in different terms, e.g., mmBtu/ton for coal and mmBtu/1000 standard cubic feet (MSCF) for gas.

⁵² As shown in Table 3-4 of Universal Cement's February, 2011 NSR Permit Application Supplement, Greenhouse Gas Applicability, the additional \$16/ton cement production cost is calculated using 2009 cost information (\$18,533,238 additional cost using natural gas, divided by the anticipated 3500 tons per day clinker production over 330 days, or 1,155,000 tons per year). In this analysis, the transportation cost of the coal is included, thereby lessening the relative increase in additional cement production costs.

very effectively controlled by a baghouse, irrespective of any contribution of fuel ash to emissions. For NO_x, thermal NO_x dominates at cement kilns, dwarfing the contribution of fuel NO_x due to nitrogen in fuel. For this reason, the usually considered “clean fuel,” natural gas, is, in fact, just the opposite when it comes to cement kilns. Natural gas in a cement kiln burns at a higher temperature than coal and can significantly increase NO_x emissions. Use of natural gas by a cement kiln would reduce its CO₂/GHG emissions. However, cement kilns emit GHG both from CO₂ driven off from the limestone feed material during calcination and from combustion of fuel, with over half the CO₂ emissions being due to calcination. Use of natural gas as a “clean fuel” instead of coal and coke would only affect the fuel related CO₂ emissions of the kiln.⁵³ In addition, because natural gas is a less efficient fuel for a cement kiln, either the amount of fuel used by the kiln would have to increase by about 10 percent or the capacity of the kiln would be reduced by about 10 percent.⁵⁴

Accordingly, the Illinois EPA considered use of natural gas in the BACT determination for the kiln focusing on it as a possible alternative to reduce CO₂ emissions. In this context, the use of natural gas, even in an incremental basis, will continue to show cost-effectiveness values that are excessive. This is because the cost-effectiveness of the use of natural gas as a means to lower CO₂ emissions is independent of the amount of natural gas that is used. Based on the analysis in Universal Cement’s supplement to the application to address GHG, substitution of natural gas for coal, while maintaining the heat input of the kiln, would have an additional cost of about \$96 per ton of CO₂ removed.

The incremental usage of natural gas, in place of solid fuel, on the cost per ton of clinker, would have a gradual or incremental effect on the cost of clinker, making the cement produced by the proposed plant more costly in proportion to the amount of supplemental natural gas that was used. However, this increase in cost will not reduce the demand for cement, which is a commodity product. Rather the result would only be to shift to other suppliers that can provide less expensive cement. Given cement is a global commodity – it would then make economic sense to get cement from somewhere else. This would likely be from an existing plant that is less efficient and whose emissions are less effectively controlled but whose capital costs or “mortgage” has been paid off.

27. The Project Summary reflects a cursory analysis of biomass as though it were one identical fuel source and technology, which it is not. Biomass types differ radically in their availability, combustion properties, and environmental impacts. Thus, it makes no sense to lump together these very different types of fuel – e.g., wood pellets and biodiesel – as simply “biomass” for analytical purposes.

As observed by this comment, there are difference among biomass fuels. However, there are common aspects to may biomass fuels that enable them to be addressed collectively. In

⁵³ The kiln at the proposed plant would use some natural gas during startup. As is common in the cement industry, the start-up of the kiln would be conducted on natural gas to gradually heat the kiln to minimize thermal stress and bring it up to the operating temperature at which coal and coke can be fired. Universal Cement submittal to the Illinois EPA, *Additional Information for New Cement Plant Construction Permit Application*, March 3, 2010, Attachment B, updated section 5.1.2.4.5, pg 5-23.

⁵⁴ Use of natural gas in a kiln would theoretically require 10 percent more fuel heat input to the kiln. This is because natural gas is a less efficient fuel in a cement kiln as it does not have the same luminosity (flame intensity) or radiant energy as a coal flame, as is needed to efficiently make quality clinker. Natural gas also has a lower heating value than coal due to its hydrogen content. Similar phenomenon are present comparing boilers using coal and natural gas, although the effect is not as significant for boilers.

this regard, one category of biomass fuels that could theoretically be used in the proposed cement kiln is “byproduct biomass,” which includes materials such as wood chips, sawdust and clean wood derived from construction and manufacturing and waste materials such as paper waste, municipal waste, etc.⁵⁵ At an initial level, use of such fuels, individually, depends primarily on availability. That is, these fuels cannot be relied in the permitting of the proposed plant if there is not a reliable, permanent supply of these materials. However, the nature of these materials, as byproduct materials is such that their availability cannot be assured. In other words, wood chips or sewage sludge are not manufactured for use as fuel. Rather they are a byproduct of the operation of the supplying facility, with the amount of byproduct material governed by that facility’s operations, e.g., the demand for its product or service. Moreover, the ability to successfully use such byproduct fuels in the proposed kiln will depend on heating value of the fuel, combustion characteristics, variation in fuel properties, potential environmental impacts, regulatory standards, and costs of these fuels. Further, use of such fuel may require additional plant operations to prepare the fuel. The kiln burners may need to be modified to facilitate firing depending on the nature of the fuel. Further, since fuel ash become a part of clinker in the pyroprocessing, consistent quality of the alternative fuels needs to be ensured.

There are also commercially produced biofuels, i.e., ethanol and biodiesel, that are produced for use in the transportation market. The costs of these fuels, which are manufactured to meet the operational needs of motor vehicle engines, are significantly greater than the cost of natural gas. In other words, they are even less cost-effective than use of natural gas.⁵⁶

Finally, there are programs underway, both nationally and locally, to develop the agricultural biomass fuels, such as switch grass and corn stover that are specifically grown for use as fuel. These programs have not yet achieved their objective. Agricultural biomass fuels are not currently commercially available.

The fact that the potential for supplemental use of biomass fuels may exist at some point in the future does not change this analysis, which must address current circumstances.⁵⁷

The USEPA’s GHG BACT guidance document, *Available And Emerging Technologies In the Portland Cement Industry* acknowledges difficulties associated with biomass fuels. Specifically, this document notes the following issues:⁵⁸

⁵⁵ A variety of “byproduct biomass fuels” are burned in cement kilns around the world, including animal droppings, animal meal, bone meal, dried sewage sludge, non-hazardous organic liquids, such as glycerin, rice husks, and coconut shells.

⁵⁶ <http://www.ethanolmarket.com/fuelethanol.html> shows ethanol fuel costs of \$1.75 per gallon. At a heating value of 12,800 Btu/lb of ethanol, the cost of ethanol would be approximately \$20/mmBtu, several times the cost of natural gas, and many times the cost of coal.

⁵⁷ Per Universal Cement’s GHG submittal (February, 2011), its intention is to initially operate the plant using commercially available fuels, potentially supplemented with scrap tires, which may be available, consistent with the previously submitted application material. However, alternative fuels, collectively referred to as biomass fuels, may be considered for use at the plant in the future. The Chicago area may potentially offer opportunities for evaluation of biomass fuels, including wood, agricultural residues, and other natural byproducts, for possible supplementary use in the kiln. In the future, after the new plant commences normal operation, sources of biomass fuel can be explored, trialed, and, if successful, implemented, with appropriate further permitting as required.

⁵⁸ USEPA, Office of Air and Radiation, *Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Portland Cement Industry*, October 2010.

- **Caloric Value.** Although cement kilns can theoretically use 100 percent biomass fuels, the caloric content must be taken into consideration. Most vegetative biomass materials have a caloric content of 9-16 GJ/ton cement, while the main firing of a cement kiln requires at least 18-20 GJ/ton cement. Thus, biomass would have to blend with other fuels if used in the kiln. The lower process temperatures in the precalciner allow the use of lower caloric value fuels. Up to 60 percent of the precalciner fuel can be biomass.
- **Trace Compounds.** The biomass fuel, particularly waste products, may contain trace elements such as heavy metals or may contain compounds that are detrimental such as chlorine. These substances could result in other air emission issues or produce compounds in the combustion process that may be detrimental to equipment or clinker quality.
- **Technical Experience.** Because cement kilns operate differently when alternate fuels are used, technical expertise to operate the process when using the alternate fuels is required.

These latter two points are of particular consequence at the proposed kiln, given the combination of SNCR and the CFBA scrubber and the emission limits that are applicable. Experience is required with the operation of the kiln and its control systems, before alternative fuels, including biomass, can be explored, trialed, and potentially permitted as acceptable components of the fuel supply for the kiln. 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 clinker should be contemplated.

28. Did the Illinois EPA consider incremental use of biomass fuels, which Illinois EPA discounts as "the primary fuels for the kiln", and as "not being a suitable primary fuel for a process designed for high-heat content fuels." Without explanation, Illinois EPA enlarges its dismissal of biomass as a primary fuel to also preclude any blend of biomass. Project Summary at 19 and 20.

The concerns associated with use of biomass fuels, as addressed in a previous response, are also applicable to use of a blended fuel. In particular, for byproduct fuels, the continued availability of such material is still not assured, in a manner comparable to that for a commercial fuel, at any level. Moreover, practical use of any biomass fuels by the kiln would necessitate that it be available at some minimal level, to justify the increased complexity of handling materials and operating the kiln with another component in its fuel supply.

29. Little Illinois information on costs of biomass can be found to substantiate the claim that price of biomass fuels will be a barrier/restraint on the use of biomass at cement plants.⁵⁹

This comment actually serves to confirm the issues that are associated with use of byproduct biomass fuels and agricultural biomass fuels. The absence of cost data confirms the established markets for such materials.

30. The air quality analysis for PM₁₀ on a 24-hour average is not adequate. This analysis identified receptor locations where the proposed plant's modeled impacts were significant during the time

⁵⁹ European Cement Research Academy (ERCA), *Development of State of the Art-Techniques in Cement Manufacturing: Trying to Look Ahead*, June, 2009, Section 3.10, pg. 44.

period of the modeled exceedances. These receptors were located at an adjacent facility operated by Cargill Salt (Cargill). The Illinois EPA proposes to address these impacts by “fencing of this adjacent source’s property to prevent public access.” Project Summary at 15. Fencing is not an acceptable solution to a significant modeled exceedance. Fencing of the Cargill property would not address impacts on employees of the Cargill facility inside the fenceline to protect them from exposure to unhealthy concentrations of PM₁₀. The permit should require continuous monitoring on that site to assess impacts on employees and include a reopener provision to address continuing impacts on health and safety of workers at Cargill.

As discussed in the Project Summary, there are two receptors for which initial modeling for the plant showed exceedances of the 24-hour PM₁₀ NAAQS and PSD Increment to which the emissions of the proposed plant would contribute significantly.⁶⁰ These receptors are on industrial property, a bulk commodity terminal owned and operated by Cargill Salt, located immediately to the south of the proposed plant. As such, the potential for exceedances at these receptors would be appropriately addressed through fencing of the Cargill property.

One consideration for air quality modeling is appropriately delineating “ambient air.” This is because NAAQS and PSD Increments only apply to ambient air as defined by 40 CFR 50.1(e),⁶¹ generally, locations at which the general public may be present or have access and not to industrial properties from which the public is excluded and air quality is addressed by OSHA. As noted in the Project Summary, USEPA has further addressed the subject of “ambient air” through policy guidance. Relevant guidance provides that where a receptor is located on a background source’s non-ambient air property, the contribution from that background source’s emissions may be subtracted from the total modeled concentration. Under this USEPA guidance, the exclusion of the background source’s contribution is only allowed if the background source is fenced and/or otherwise secured to prevent access by the general public.⁶² The further 24-hour PM₁₀ NAAQS modeling conducted by Universal Cement to determine the contribution of various sources to these receptors on the Cargill property did not show exceedances at these receptors when the contribution of Cargill’s own emissions were excluded.

To assure compliance with relevant USEPA policy and protect the public, the permit requires Universal Cement to take measures to ensure that the Cargill facility is not accessible by land by members of the public. This is because on the land side, the Cargill property is only partially fenced.⁶³ To address the possibility that members of the public could access the property at other unfenced locations, Condition 1.2(b) of the permit requires additional fencing be installed as needed to prevent access by the general public through the unfenced area.⁶⁴

⁶⁰ The initial modeling showed possible exceedances at two receptors. At one receptor, both the NAAQS and PSD Increment were exceeded. At the other receptor, only the PSD Increment was exceeded.

⁶¹ 40 CFR 51(e) “(e) *Ambient air* means that portion of the atmosphere, external to buildings, to which the general public has access.”

⁶² See, *Ambient Air*, Memorandum, from Robert D. Bauman, Chief, SO₂/Particulate Matter Programs Branch, to Gerald Fontenot, Chief, Air Programs branch, Region VI, October 17, 1989.

⁶³ On the water side, accessible to the property by the general public is prevented by natural features, i.e., the river and associated wetlands.

⁶⁴ Draft Permit, Condition 1.2(b):

“i. Prior to commencing construction of the plant, the Permittee shall have completed an agreement with Cargill Salt for the fencing of its property southwest of the plant to prevent public access by foot to this property, consistent with the approach to ambient air quality taken in the application.

Employee exposure at the Cargill facility, like workplace exposure generally, is regulated by OSHA. As such, monitoring to address compliance with OSHA standards is also addressed by OSHA, not through the air quality programs that the Illinois EPA administers.

31. The draft permit would not prevent a scenario where the Cargill property is sold for a more sensitive use (*e.g.*, a day care center). It would also not even ensure that the fencing remains in place to protect the public. Permanent institutional controls are required to ensure that future occupants are protected following transfer of the property. The permit should also require, at minimum, the purchase of a deed restriction on the Cargill site that is permanent and enforceable by third parties.

In response to this comment, to ensure that the required fencing is permanent, the issued permit strengthens Condition 1.2(b). This is done by the addition of a third element to the condition, which provides that the permanent presence and maintenance of this fencing as a barrier to access by the general public as an enforceable condition of the issued permit. As this requirement is a condition of the construction permit, the permanent existence of this fencing is an enforceable requirement on the proposed plant. As such, it is not necessary for this requirement to be made enforceable by other means.⁶⁵

32. I strongly oppose the use of engineered barriers to address off-site locations where the NAAQS may not be attained.

Illinois EPA has followed clear and established precedent in this situation. This is because NAAQS and PSD Increments only apply to ambient air as defined by 40 CFR 50.1(e), generally, locations at which the general public may be present or have access and not to industrial properties from which the public is excluded and air quality is addressed by OSHA. As noted in the Project Summary, USEPA has further addressed the subject of “ambient air” through policy guidance. Relevant guidance provides that where a receptor is located on a background source’s non-ambient air property, the contribution from that background source’s emissions may be subtracted from the total modeled concentration. Under this USEPA guidance, the exclusion of the background source’s contribution is only allowed if the background source is fenced and/or otherwise secured to prevent access by the general public.⁶⁶ The further 24-hour PM₁₀ NAAQS modeling conducted by Universal Cement to determine the contribution of various sources to these receptors on the Cargill property did not show exceedances at these receptors when the contribution of Cargill’s own emissions were excluded.

33. The Cargill Salt facility would be fenced off to prevent the general public from breathing polluted air. However, a fence may keep people out, but it does not keep the polluted air in! How can the

ii. Prior to initial operation of the kiln system, the Permittee shall complete the fencing of its property and either the Permittee or Cargill Salt shall complete the fencing for the Cargill Salt property to prevent public access by foot to those properties, consistent with the approach to ambient air quality taken in the application.”

⁶⁵ The issued permit also generally requires the specified fencing of the Cargill property to prevent public access, without limiting it to public access by foot. This is because the Illinois EPA has learned that there may be an access road in the area to be fenced, which would have to be equipped with a gate to control vehicular access. Even if such an access road is not currently present, such a road could be developed in the future and would also have to be equipped with a gate.

⁶⁶ See, *Ambient Air Memorandum*, from Robert D. Bauman, Chief, SO₂/Particulate Matter Programs Branch, to Gerald Fontenot, Chief, Air Programs Branch, Region VI, October 17, 1989.

Illinois EPA be sure that people will not be breathing in this air?

With further dispersion, as air moves over the Cargill property and further downwind, the concentrations of particulate matter in the air, including the contribution from operations at both the proposed plant and Cargill, will go down so that the concentrations of particulate matter in the ambient air meet the NAAQS.

34. The air quality analysis for PM₁₀ 24-hour NAAQS is inadequate. As related to this modeling, the Illinois EPA concluded, “Step 3 culpability analysis of these NAAQS exceedance receptor locations determined that at all but six of these modeled receptor locations, the proposed plant’s impact were less than significant during the time period of the modeled exceedances. At the six remaining receptors, using a direction specific background concentration, no PM₁₀ 24-hour NAAQS exceedances were predicted at any receptor where the proposed plant was predicted to have a significant impact.” Project Summary at 14.

Use of a direction-specific background concentration is not an appropriate limitation. There is no legal basis to isolate direction-specific results in order to disregard significant impacts, and no analytical basis to assume that high background concentrations are necessarily the result of wind direction. Further technical analysis would be necessary to confirm this assumption.

Air quality is impacted by meteorological conditions. In particular, wind direction will impact ambient concentrations, as measured by an ambient air monitor, since sources contributing to air quality are not identical and are not uniformly distributed around a monitor. For example, a monitor with a large source of particulate matter to its south, but residential areas in all other directions, would be expected to experience higher values during periods when the wind blows from the south, as compared to other directions. This phenomenon may be addressed in analyses for short-term air quality impacts by using direction-specific values for background concentrations.

In this regard, USEPA’s *Guideline on Air Quality Models* (Modeling Guideline) specifically provides for the consideration of meteorological conditions in the development of background ambient air concentrations for air quality analyses addressing short-term averaging periods, as follows. As such, direction-specific background values, which consider the wind direction associated with monitored ambient concentrations, are fully appropriate for the analysis of air quality impacts on a 24-hour average basis.⁶⁷

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 at each monitor. For shorter averaging periods, the meteorological conditions accompanying the concentrations of concern should be identified. Concentrations for meteorological condition of concern, at monitors not impacted by the source in question, should be averaged for each separate averaging

⁶⁷ It should also be noted that the 24-hour PM₁₀ modeling analysis was conservative with respect to the modeling guidelines in that the PM₁₀ ambient monitor that was utilized for 24-hour background concentration (the Carver monitor) would be impacted by other sources included in the regional inventory explicitly modeled (as described in Section 8.5.1 of the February, 2011 Class II Air Quality Analysis Report). Only at the six receptors with concentrations of concern (as identified on Table L-9 of the February, 2011 Analysis) was the impact of meteorology included, as provided for by the Modeling Guidelines.

time to determine the average background value.⁶⁸

While the more common method of considering background concentration in PSD modeling analyses historically may have been to add the concentration predicted by the model for a particular event in the form of the NAAQS to the design concentration based on monitor data in the form of the standard, this does not imply that more refined approaches to background concentrations are not appropriate. In recent USEPA guidance considering background concentrations for use with the new short-term NO₂ NAAQS,⁶⁹ USEPA recognizes the use of different background concentrations that take into consideration the relationship between monitored background concentrations and time. For example, USEPA indicates that different backgrounds with respect to season, month, hour of day, day of week, and multiple permutations of these options can be used with adequate documentation to justify that monitored concentrations are in fact dependent on these variables.

Universal Cement demonstrated in its February 2011 dispersion modeling analysis that the 24-hour PM₁₀ concentrations measured at a representative background monitor vary as a function of the wind direction occurring during the time period when those concentrations are measured. Therefore, the use of wind direction-specific background concentrations, while not a standard practice in dispersion modeling analyses, is still an acceptable option. It is also important to note that the use of seasonal, monthly, hour of day, day of week, etc. varying backgrounds is not specified in the Modeling Guidelines. These methods for defining background concentrations for PSD analyses have been, in the past, suggested as part of the application of expert judgment as allowed for in the Modeling Guideline.⁷⁰

35. With regard to the NO_x NAAQS modeling, the permit analysis states, “Further Step 3 culpability analysis of these NAAQS exceedance receptor locations determined that the probability of Universal Cement exceeding the 1-hour NO₂ SIL is insignificant.” No explanation is provided, however, as to what an “insignificant” probability of exceedance is. To the extent potential exceedances were identified through modeling, those exceedances must be addressed.

Whether a permit can be issued when an applicant’s analyses show NAAQS violations depends upon the nature of the violation and the proposed source’s contribution. Thus, it is not “legally inadequate” to issue a permit in such circumstances. The principle of *de minimis* air quality impact or “significant impacts levels” is an essential element of the PSD program and the performance of air quality analyses. The principle is addressed in the NSR Manual, which states the following with regard to a modeled violation of a NAAQS:

⁶⁸ *Guideline on Air Quality Models*, 40 CFR Part 51, Appendix W (Revised, November 9, 2005), Section 8.2.2.

⁶⁹ *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO₂ National Ambient Air Quality Standard*, Memorandum from Tyler Fox, Leader, Air Quality Modeling Group, to Regional Air Division Directors, March 1, 2011, beginning on page 17.

⁷⁰ Meteorological phenomenon associated with threats to air quality standards are rarely amenable to a single mathematical treatment; thus, case-by-case analysis and judgment are frequently required. As modeling efforts become more complex, it is increasingly important that they be directed by highly competent individuals with a broad range of experience and knowledge in air quality meteorology. Further, they should be coordinated closely with specialists in emissions characteristics, air monitoring and data processing. The judgment of experienced meteorologists and analysts is essential. *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 68218, 68230 (November 9, 2010).

The source will not be considered to cause or contribute to the violation if its own impact is not significant at any violating receptor at the time of each predicted violation. In such a case, the permitting agency, upon verification of the demonstration, may approve the permit.

The NSR Workshop Manual, page C.52.⁷¹ Included in the February 2011 Class II Air Quality Analysis Report was an assessment of the culpability of Universal Cement during predicted modeled exceedances of the 1-hour NO₂ NAAQS. An assessment of culpability was conducted using a Cartesian gridded receptor grid, a random receptor grid, and a select random receptor grid. Details of how these three grids were selected and plots of each receptor grid were included in the submittal.⁷²

Since the February 2011 submittal of the February, 2011 Class II Air Quality Analysis Report, a new version of AERMOD, Version 11059 was released. Version 11059 (and subsequent version 11103) includes a feature that can be used to more efficiently post process 1-hour NO₂ concentrations to provide daily maximum concentrations. AERMOD has been designed to allow the calculation of the daily maximum concentrations with respect to the 1-hour NO₂ standard. It is used to determine the contribution of each user-defined source group to the high ranked values for a target source group paired in time and space. This is accomplished as an internal post-processing routine which is executed after the main model run is completed. Note that this modeling capability was not available prior to the AERMOD Version 11059 release on March 1, 2011.

Universal Cement provided an update to its February, 2011 Class II Air Quality Analysis in its comments submitted on November 18, 2011, which addressed the additional capabilities of the current versions of AERMOD per the modeling completed as part of the February, 2011 1-hour NO₂ analysis. The results are summarized below.

TABLE 1. CULPABILITY RESULTS FOR CARTESIAN GRIDDED RECEPTORS – 1-HOUR NO₂ NAAQS – ANALYSIS OF MODELED CONCENTRATIONS AND CONTRIBUTIONS USING 5-YEAR AVERAGES⁷³

Years	Receptor		5-year average of Modeled Concentration (µg/m ³)	Universal Cement's Contribution (µg/m ³)
	X (m)	Y (m)		
2002-2006	456100	4608400	235.23	2.12
2002-2006	456100	4608400	198.02	1.61
2002-2006	456100	4608400	202.96	1.58

⁷¹ *Accord., In re Prairie State Generating Company LLC.*, 13 E.A.D. 1, 104 (2006) (“the requirement of an owner or operator to demonstrate that emissions from a proposed facility will not ‘cause, or contribute to’ air pollution in excess of a NAAQS standard must mean that some non-zero emission of a NAAQS parameter is permissible, otherwise such a demonstration could not be made”).

⁷² Section 8.5.3.1.1 of the February 2011 *Class II Air Quality Analysis Report*.

⁷³ Universal Cement’s comment noted that the three NAAQS exceedance events (1 hour each) were predicted at the same receptor, and that this comment applied the multiyear averaging to both the modeled concentrations and Universal Cement’s contribution.

TABLE 2. CULPABILITY RESULTS FOR RANDOM RECEPTORS - 1-HOUR NO₂ NAAQS – ANALYSIS OF MODELED CONCENTRATIONS AND CONTRIBUTIONS USING 5-YEAR AVERAGES⁷⁴

Years	Receptor		5-year average of Modeled Concentration (µg/m ³)	Universal Cement's Contribution (µg/m ³)
	X(m)	Y(m)		
2002-2006	454400	4612500	247.83	2.85
2002-2006	456000	4608000	232.28	2.33
2002-2006	455100	4611600	221.84	1.89
2002-2006	456000	4608000	202.76	1.95
2002-2006	456000	4608000	205.06	1.98

As shown in the above table, using the additional capabilities in current versions of AERMOD, the enhanced post-processing feature predicts that *all* previous events for which the proposed plant was initially deemed culpable in the February 2011 submittal are below the interim 1-hour NO₂ significant impact level (SIL) for NO₂ (7.5 µg/m³), resulting in an actual culpability percentage, over the Cartesian gridded receptor grid, a random receptor grid, and a select random receptor grid, of 0%. Universal Cement commented that these results confirm the initial conclusion, per the February, 2011 report, that the proposed plant has a statistically insignificant probability of causing or contributing to a 1-hour NO₂ NAAQS exceedance.

Pursuant to a comment from USEPA Region V, the Illinois EPA conducted an additional confirmatory analysis using AERMOD Version 11103, and its enhanced post-processing feature. This additional confirmatory analysis showed Universal Cement's contribution did not exceed the interim NO₂ SIL of 7.5 µg/m³ at *any* receptors where there was a predicted modeled exceedance of the 1-hour NO₂ NAAQS. This confirms that the initial conclusion of an insignificant probability of exceedance was overly conservative, as the new, more accurate model capabilities demonstrate that the proposed Universal Cement facility actually has no probability of an exceedance for any receptors over any of a possible 365 maximum daily events.

36. Based on a review of the summary information accompanying the draft permit, as well as portions of the Illinois EPA's air quality analysis document, the USEPA has concluded that the culpability analysis conducted to determine whether the plant's NO_x emissions would contribute significantly to modeled violations of the 1-hour NO₂ NAAQS is not consistent with Federal modeling guidance. The statement in the Project Summary, page 15, indicating that "the probability of Universal Cement exceeding the 1-hour NO₂ significant impact level is insignificant" is based on a very small subset of the receptors that showed modeled violations of the NAAQS and fails to provide any conclusive evidence that significant contributions to modeled violations would not occur.

Admittedly, the modeling analysis for Universal Cement was submitted prior to USEPA's release on March 1, 2011, of additional modeling guidance regarding the 1-hour NO₂ NAAQS and the subsequent release in early April 2011 of an update to the regulatory version of AERMOD that

⁷⁴ Universal Cement's comment noted that two of the NAAQS exceedance events (1 hour each) occurred at one of the modeled receptors, and that this comment applied the multiyear averaging to both the modeled concentrations and the contribution of the proposed plant.

incorporated enhancements to facilitate such culpability analyses. However, sufficient time has elapsed to allow for appropriate culpability analyses to have been completed prior to the Illinois EPA's notification of its intent to issue a construction permit for Universal Cement. Therefore, prior to making a final decision, USEPA requests that Illinois EPA provide USEPA with an appropriate and adequate demonstration consistent with USEPA permitting requirements that the NO_x emissions from Universal Cement will not cause or contribute to modeled violations of the 1-hour NO₂ NAAQS. The new version of AERMOD automates the culpability analysis, and USEPA would not expect the additional work to take a substantial amount of effort. Further, the new analysis will give the Illinois EPA the necessary information on air quality impacts needed to make a final decision on the permit.

In response to this comment, the Illinois EPA performed an additional air quality modeling analysis using the approach specified in the comment. This additional modeling confirmed that for all modeled NO₂ NAAQS exceedances, Universal Cement's NO₂ emissions did not cause a significant impact in association with these exceedances. Thus the probability of the proposed facility "causing or contributing" to a violation of the NO₂ NAAQS can now more accurately be stated to be zero.

It is also noteworthy that the modeling analysis for Universal Cement was submitted prior to the release of both additional modeling guidance by USEPA for the 1-hour NO₂ NAAQS on March 1, 2011, and an update to the regulatory version of AERMOD, as acknowledged by this comment. If this material had been released before the time that Universal Cement was performing its modeling analysis, it would have been able to use them in its analysis.⁷⁵ However, given the timing, it was entirely appropriate for Universal Cement to have proceeded based upon the version of the model and guidance available to it at that time.

37. Following submittal of the Universal Cement permit application modeling, USEPA published additional guidance for completing cumulative impact assessments to determine if a source has a significant impact during a specific event.⁷⁶ The guidance states that "the significant contribution analysis should examine every multiyear average of daily maximum 1-hour values, beginning with the 8th-highest (98th percentile), continuing down the ranked distribution until the cumulative impact is below the NAAQS." The results included in Universal Cement's February 2011 1-hour NO₂ NAAQS culpability analysis did not consider the multiyear average of Universal Cement's contributions to a NAAQS exceedance event. Rather, those results considered if Universal Cement's daily maximum 8th highest 1-hour value during any year exceeded the interim 1-hour NO_x significant impact level (SIL) concentration of 7.5 µg/m³. The February 2011 culpability analysis was thus much more conservative than what current USEPA guidance requires. Universal Cement went back and applied the latest USEPA guidance to the modeling results generated in the February 2011 analysis for the same Cartesian and random receptor grids. The results indicate that Universal Cement's multiyear contribution is below the interim SIL of 7.5 µg/m³ for all predicted NAAQS exceedance events. This analysis further verifies that the proposed plant will not cause or contribute to a predicted exceedance of the 1-hour NO₂ NAAQS.

⁷⁵ It is commonly understood to be very difficult to base a review on guidance that has not yet been published. *See, In re Old Dominion Electric Cooperative Clover, Virginia*, 3 E.A.D. 779, ___ (Adm'r 1992) (The EAB declined to find reviewable error where the State failed to require "modeling of NO_x emissions for impact on ozone formation" because there was "no acceptable EPA-approved method for assessing ozone impacts attributable to individual point sources of NO_x emissions").

⁷⁶ *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_x National Ambient Air Quality Standard*, Memo from Tyler Fox, Leader, Air Quality Modeling Group, USEPA, to Regional Air Division Directors, March 1, 2011.

In response to this and other comments, the Illinois EPA performed an additional confirmatory analysis of the multiyear average of the proposed plant's contributions to any 1-hour NO₂ NAAQS exceedance event. This additional analysis confirmed that the plant's contributions did not exceed the interim NO₂ SIL of 7.5 µg/m³ at any of the receptors for any modeled exceedance of the 1-hour NO₂ NAAQS.

38. The draft permit is legally inadequate because it authorizes the construction of a source that air quality modeling demonstrates will cause and contribute to violations of the National Ambient Air Quality Standards (NAAQS).

This comment is incorrect. The air quality modeling indicates that the proposed plant will not "cause or contribute" to the violation of any applicable NAAQS. USEPA has adopted "significant impact levels" ("SIL") for distinguishing *de minimis* emissions that do not "cause or contribute" to a violation of a NAAQS. 40 CFR 51.165(b).⁷⁷ It has long been recognized that USEPA has the discretion to exempt from review "some emission increase on grounds of *de minimis* or administrative necessity."⁷⁸ *Alabama Power Co. v. Costle*, 636 F2d 323, 400 (D.C. Cir. 1980).

In this case, with the exception of PM₁₀, Universal Cement's modeling analysis demonstrates that the proposed source emissions will not exceed the applicable SIL for a NAAQS pollutant at the time of any predicted NAAQS exceedance – and thus are considered *de minimis* in relation to that exceedance. As stated in EPA's New Source Review Manual:

The source will not be considered to cause or contribute to the violation if its own impact is not significant at any violating receptor at the time of each predicted

⁷⁷ *Accord., Guideline on Air Quality Models*, November 9, 2005. This 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." As addressed by this guidance, the circumstances of the modeled PM₁₀ and NO₂ exceedances for the proposed plant are the second of three possible outcomes of modeling by a permit applicant.

⁷⁸ For an in-depth discussion of the legal underpinnings to USEPA's historical position that for purposes of PSD permitting, a source will not cause or contribute to a predicted NAAQS or increment violation if the source's estimated air quality impact is insignificant (i.e., at or below defined *de minimis* levels) see *Memorandum from Sally Carter, Legal Counsel, to File, Universal Cement, dated December 15, 2011. See also, Memorandum from Gerald A. Emison, Director, Office of Air Quality Planning and Standards (MD-10) to Thomas J. Maslany, Director, Air Management Division (3AM00), Air Quality Analysis for Prevention of Significant Deterioration, July 5, 1988; see also, Memorandum from Marcia L. Spink, Chief, Air Programs Branch, Region III, USEPA, to John M. Daniel, Jr., P.E., Assistant Executive Director, Department of Air Pollution Control, Virginia, April 25, 1990 (outlining procedures for the issuance of PSD permits to sources with and without significant impacts in areas with modeled violations).*

violation. In such cases, the permitting agency, upon verification of the demonstration, may approve the permit.

The NSR Workshop Manual at p. C.52. *Accord, In re Prairie State Energy*, 13 E.A.D. 1, 107, fn 122 (2006).

In the case of PM₁₀, the modeling demonstrates that there are no exceedances of the NAAQS at any time and receptor location at which the Universal Cement plant exceeds the PM₁₀ SIL. This demonstration is discussed elsewhere in this response to comments. The modeled exceedances referred to in this comment are associated with existing sources in the modeling inventory. They are not a basis for permit denial because this is not a significant contribution by the proposed plant, i.e., the modeled contributions of the proposed plant are below the significant impact levels established by USEPA for various pollutants and averaging times.

39. In the Project Summary, the Illinois EPA honestly acknowledged that the air quality analysis performed for Universal Cement and reviewed by the Illinois EPA, revealed exceedances of the NAAQS for both PM₁₀ and NO₂:

For PM₁₀ and NO₂, the modeling indicated exceedances of the National Ambient Air Quality Standard. Further analysis indicates that for PM₁₀, background levels are the significant contributor to ambient exceedances.

Illinois EPA concurs that a conservative approach using a single, uniform background concentration (regardless of the meteorological conditions) and using the existing emission inventory data for existing sources in conjunction with Universal Cement appears to be responsible for the predicted PM₁₀ exceedances. As discussed elsewhere, however, the air quality modeling demonstrates that Universal Cement's emissions will not "cause or contribute" to those exceedances.

In its opinion in *Prairie State*, the EAB explained that where a permit modeling demonstration predicts an exceedance of a NAAQS, but also demonstrates that the proposed source does not "cause or contribute" to the violation, "the identification of a potential violation of the NAAQS requires the permitting authority to address the causes of the violation (i.e., other sources that significantly contribute to the violation) as a matter independent of the permitting action in which the modeling was conducted..." *In re Prairie State Generating Company, LLC*, 13 E.A.D. 1, 107 (2006).

The exceedances of the PM₁₀ and NO₂ NAAQS that were predicted by initial modeling were appropriately addressed with further culpability analyses performed in accordance with USEPA guidance and EAB caselaw as discussed above. While the preliminary analysis yielded maximum concentrations for 1-hour NO₂ and 24-hour PM₁₀ attributable to the proposed plant that were in excess of the applicable significant or de minimis impact levels, thereby triggering a full impact analysis for the proposed plant and existing sources in the area, the Illinois EPA determined that the air quality modeling analyses show that the proposed source will not cause or contribute to an exceedance of the PM₁₀ and NO₂ NAAQS as Universal Cement's impact is not *significant* at any violating receptor at the time of each predicted violation.⁷⁹ Furthermore, as already discussed, the Guideline on Air Quality Models provides for the opportunity to incorporate the use of meteorological conditions in

⁷⁹ See also, *The NSR Workshop Manual*, pages C.24-C.26

the development of a background concentration. And the *Guideline* specifically does allow, for short term averaging periods such as a 24-hour PM₁₀ averaging period, the impact of meteorological conditions to be taken into account for concentrations of concern.

40. The results for the Significance Impact Analysis are contained in Table 1 of the Project Summary, which summarizes the results of this analysis for NO₂, PM₁₀, SO₂ and CO. For PM₁₀, 24-hour average, the reported results of this significance analysis are a maximum predicted impact of 47.61 µg/m³, compared to a SIL of 5 µg/m³. For NO₂, 1-hour average, the reported results of this analysis are a maximum predicted impact of 18.4 µg/m³, compared to a SIL of 7.52 µg/m³.

Because Step 1 of the PM₁₀ air quality analysis, the significant impact analysis, suggested impacts more than the significance level, the analysis proceeded to Step 2, a full impact analysis. In the Project Summary, the Illinois EPA characterized the results of the Step 2 analysis as follows:

Under Step 2, for the 24-hour PM₁₀ NAAQS analysis, modeled PM₁₀ concentrations, considering project emissions, emissions from regional inventory sources, and an additional background monitored concentration, showed modeled exceedances of the NAAQS occurred *at several modeled receptor locations*. Further Step 3 culpability analysis of these NAAQS exceedance receptor locations determined that at all but six of these modeled receptor locations, the proposed plant's impact were less than significant during the time period of the modeled exceedances. (emphasis added).

The modeling suggested related problems with the PSD increment analysis. The Illinois EPA summarized the results of this analysis as follows:

Also under Step 2, for the 24-hour PM₁₀ PSD increment analysis, modeled PM₁₀ concentrations, project emissions, and "increment-affecting" emissions from regional inventory sources, a modeled exceedance of the 24-hour PM₁₀ PSD increment occurred at several modeled receptor locations.

As to the 1-hour NO₂ standard, the Illinois EPA similarly concluded:

Under Step 2, for the 1-hour NO₂ NAAQS analysis, considering project emissions, emissions from regional inventory sources, and an additional background monitored concentration, showed modeled exceedances of the NAAQS occurred at several modeled receptor locations.

In order to ensure the record of this proceeding is clear, I formally request that the Responsiveness Summary identify the PM₁₀ and NO₂ receptor locations where exceedances were identified under the Step 2 modeled analysis, along with the actual modeled levels at these locations.

The air quality analysis generally showed possible PM₁₀ exceedances in the industrial corridor along the Calumet River to the south/southwest of the plant site. The specific receptor locations where the NAAQS exceedances were identified are shown in Figure M-11 of the February, 2011 modeling report submitted by Universal Cement. These results are summarized in Tables L-5 and L-6 of the modeling report submittal. Figure M-17 of this submittal shows the receptor locations for the predicted increment exceedances, per Step 2 of the analysis (Tables L-10 and L-11 summarize these results). The modeling results do not necessarily reflect actual air quality. Consistent with USEPA guidance for PM₁₀ modeling, the procedures for modeling are conservative and generally act to overstate actual impacts and air quality. Modeling is conducted for existing emission units operating

at permitted or potential emission rates, with maximum operating rates and hours of operation. Default assumptions about stacks may also be used that cause actual impacts of emissions to be overstated.⁸⁰

The air quality analysis generally showed exceedances of the 1-hour NO₂ NAAQS throughout the area. Figure M-13 of the February 2011 modeling report submittal shows the receptor locations of predicted NAAQS exceedances for NO₂, and these results are summarized in Table L-15. These modeling results clearly do not reflect actual air quality but are a consequence of the conservative procedures for modeling.⁸¹

41. The failure to permit the proposed plant in a manner consistent with PM₁₀ and NO₂ NAAQS would be a clear basis for a permit appeal. It would also be the basis for other actions to ensure Illinois is fulfilling its responsibilities under the SIP to maintain NAAQS attainment in this region, especially for PM₁₀.

What is clear about the legal decisions of the EAB, this administrative tribunal has not only affirmed the use of significant impact levels but has relied upon guidance addressing preliminary and full air quality impact analyses in the *NSR Workshop Manual*. Just as this guidance provided instruction in *Knauf*, *AES Puerto Rico*, *Hudson Power*, and *Prairie State*, it likewise lends direction to today's applicants and permitting authorities.⁸² See, *In re Knauf Fiber Glass, GmbH*, 8 E.A.D. 121, 134-135, fn. 25. Under such circumstances, it was more than appropriate for Universal Cement and the Illinois EPA to consider "whether the net emissions increase from the proposed source will result in a significant *ambient* impact at the point (receptor) of each predicted violation, and at the time the violation is predicted to occur." See, *NSR Workshop Manual*, page C.51-53 (*emphasis added*).

As this discussion makes evident, Universal Cement performed the modeling in accordance with the USEPA's historical interpretation that a source will "not cause or contribute to a predicted NAAQS or increment violation if the source's estimated air quality impact is insignificant (i.e., at or below de minimis levels)."

42. In relationship to the draft permit for the proposed plant, the Illinois EPA's response to these modeling results is inconsistent with its legal responsibilities under the Clean Air Act and the PSD program.

The Illinois EPA's response to the modeling for the proposed plant is fully consistent with the Clean Air Act and the PSD rules, as it prevents significant deterioration of air quality, as both defined and prohibited by the PSD rules, due to the proposed plant. Moreover, the

⁸⁰ Certain modeled exceedances may not have any relevance to ambient air quality. This is because they were located on industrial property, which are be fenced and not accessible to the general public, so that the exceedance were predicted at locations that do not constitute ambient air.

⁸¹ The applicant's February, 2011 modeling analysis demonstrates this point. Table 8-9 of the Class II Air Quality Analysis shows the lack of correlation between results from the conservative procedures for modeling, and actual monitored values for NO₂.

⁸² The EAB has both acknowledged "significant ambient impact levels," and the relevancy of the *NSR Workshop Manual* for purposes of a staged approach to air quality analysis. See, *In re Knauf Fiber Glass, GMBH*, 8 E.A.D. 121, 149, fn. 40 (EAB 1999); see also, *In re AES Puerto Rico L.P.*, 8 E.A.D. 324, 330-332 (EAB 1999); see also, *In re Hudson Power 14-Buena Vista*, 4 E.A.D. 258, 271 (EAB 1992); see also, *In re Ecoelectrica, L.P.*, 7 E.A.D. 56, 66 (EAB 1997); see also, *In re BP Cherry Point*, PSD Appeal No. 05-01, slip op. at 25-29 (EAB, June 21, 2005); see also, *In re Prairie State Generating Company, LLC*, 13 E.A.D. 1, 92 (EAB 2006).

Illinois EPA determined that air quality modeling analyses show that the proposed plant will not have noticeable effects on the air quality in the Lake Calumet area. This determination is entirely consistent with USEPA's hierarchical approach to air quality analysis (i.e., for purposes of PSD permitting, a source will not cause or contribute to a predicted violation if the source's estimated air quality impact is not significant).⁸³ This determination is supported by dispersion modeling, which shows that the concentrations of these pollutants in the air would continue to be below the NAAQS and PSD increment established by the USEPA to protect human health and the environment.

In particular, the preliminary analysis yielded maximum concentrations for 1-hour NO₂ and 24-hour PM₁₀ attributable to the proposed plant that were in excess of the applicable significant or de minimis impact levels thereby triggering a full impact analysis for the proposed plant and existing sources in the area.⁸⁴ To be a significant contributor to the predicted 24-hour PM₁₀ NAAQS and PSD increment violation, any contribution by the proposed plant to the predicted violation must be in excess of 5 µg/m³ for the receptors and times for which the modeled NAAQS or PSD Increment violations are predicted.

At six of the modeled receptor locations, possible NAAQS exceedances of the 24-hour PM₁₀ NAAQS were identified. As noted elsewhere in this response to comments, the *Guideline on Air Quality Models* provides for the opportunity to incorporate the use of meteorological conditions in the development of a background concentration. Incorporating this provision eliminated the initial conservative predicted 24-hour PM₁₀ NAAQS exceedances at these 6 receptors using a single, uniform background concentration, regardless of meteorological conditions.

There are two receptors for which initial modeling for the plant showed possible exceedances of the 24-hour PM₁₀ NAAQS and PSD Increment to which the emissions of the proposed plant would contribute significantly.⁸⁵ These receptors are on industrial property, a bulk commodity terminal owned and operated by Cargill Salt, located immediately to the south of the proposed plant. Relevant guidance provides that where a receptor is located on a background source's non-ambient air property, the contribution from that background source's emissions may be subtracted from the total modeled concentration. Under this USEPA guidance, the exclusion of the background source's contribution is only allowed if the background source is fenced and/or otherwise secured to prevent access by the general public.⁸⁶ As such, the potential for exceedances at these receptors would be appropriately addressed through fencing of the Cargill property. In conclusion, the modeling analysis showed that the proposed plant did not contribute significantly to the modeled exceedances of the 24-hour PM₁₀ NAAQS or PSD increment. Given there were no time-receptor combinations for which Universal

⁸³ See, *In re Prairie State Generating Company, LLC*, 13 E.A.D. 1 (EAB 2006); see also, *In re Knauf Fiber Glass, GMBH*, 8 E.A.D. 121, 149, fn. 40 (EAB 1999); see also, *In re AES Puerto Rico L.P.*, 8 E.A.D. 324, 330-332 (EAB 1999); see also, *In re Hadson Power 14-Buena Vista*, 4 E.A.D. 258, 271 (EAB 1992); see also, *In re Ecoelectrica, L.P.*, 7 E.A.D. 56, 66 (EAB 1997); see also, *In re BP Cherry Point*, PSD Appeal No. 05-01, slip op. at 25-29 (EAB, June 21, 2005).

⁸⁴ See, February 2011 *Class II Air Quality Analysis Report*; see also, *The NSR Workshop Manual*, pages C.24-C.26.

⁸⁵ The initial modeling showed exceedances at two receptors. At one receptor, both the NAAQS and PSD Increment were exceeded. At the other receptor, only the PSD Increment was exceeded.

⁸⁶ See, *Ambient Air*, Memorandum, from Robert D. Bauman, Chief, SO₂/Particulate Matter Programs Branch, to Gerald Fontenot, Chief, Air Programs branch, Region VI, October 17, 1989.

Cement's impacts exceeded the significance level at a NAAQS or PSD increment modeled exceedance for 24-hour PM₁₀, the Illinois EPA, upon verification of the demonstration, may approve the permit.

Meanwhile, Step 3 of the full impact analysis demonstrated that the emissions of the proposed plant complied with the NAAQS for 1-hour NO₂. To be a significant contributor to the predicted 1-hour NO₂ NAAQS violation, any contribution by the proposed plant to the predicted violation must be in excess of 7.5 µg/m³ for the receptors and times for which the modeled NAAQS violation are predicted. Based upon the February 2011 modeling submittal, using the AERMOD model and USEPA guidance available at that time, the 1-hour NO₂ NAAQS modeling results indicated that the proposed plant had an insignificant probability of contributing to the modeled exceedances of the 1-hour NO₂ NAAQS. Given USEPA published additional guidance for completing cumulative impact assessments to determine if a source has a significant impact during a specific event subsequent to the February 2011 submittal, Universal Cement, in its comment submitted during the public comment period, applied the latest USEPA guidance to the modeling results generated in the February 2011 analysis. These results confirmed that the proposed plant's multiyear contribution is below the significant impact level for all predicted NAAQS exceedance events.

In addition, the Illinois EPA performed modeling runs to verify Universal Cement's results for the full impact analysis. This additional modeling confirmed that for all modeled NO₂ NAAQS exceedances, Universal Cement's NO₂ emissions did not cause a significant impact in association with these exceedances. Based on these modeling results and the prior analysis provided by Universal Cement, the Illinois EPA has concluded that the proposed facility would not significantly impact the 1-hour NO₂ NAAQS. *See, Hawaiian Electric Company, Inc. v. United States Environmental Protection Agency*, 723 F.2d 1440, 1446 (9th Cir. 1984) (need for agency discretion in applying the modeling results).

This discussion makes further evident that Universal Cement and the Illinois EPA performed the modeling in accordance with USEPA guidance and EAB precedence that a source will "not cause or contribute to a predicted NAAQS or increment violation if the source's estimated air quality impact is insignificant."

43. For example, rather than imposing additional emission limits on Universal Cement, the Illinois EPA instead concludes: "Further analysis indicates that for PM₁₀ background levels are the significant contributor to ambient exceedances."

By using this justification, the Illinois EPA is ignoring its fundamental responsibility to ensure that the emissions of the proposed plant in combination with other contributing sources will not cause violations of the NAAQS. It is discounting at least six receptor locations where it concedes Universal Cement's PM₁₀ emissions are a significant contributor. When confronted with an off-site receptor location where PM₁₀ impacts will be especially severe and where Universal Cement's contribution is unmistakable among all other sources, Illinois EPA still does not impose additional emission limits on Universal Cement. Rather, Illinois EPA proposes permanently fencing off this area.

The Illinois EPA is not discounting the six receptor locations where the proposed plant is a significant contributor. Rather, using expert judgment and precedent, as recognized by the *Guideline on Air Quality Models*, and recent USEPA guidance, the impact of meteorological

conditions has been taken into account to demonstrate that no exceedences of the NAAQS are predicted to occur.

Likewise, Illinois EPA has not discounted predicted NAAQS exceedences that are caused by an existing Cargill Salt facility that is adjacent to the proposed plant. Rather, the potential for exceedences at these receptors would be appropriately addressed through fencing of the Cargill property. Consistent with recent USEPA guidance, the Illinois EPA has appropriately exercised its expert judgment.⁸⁷

44. There are other significant legal problems with Illinois EPA's response in the draft permit to modeling information for the proposed plant. Based on its justifications for issuing this draft permit, the residents of the Southeast Side have every reason to question whether the Illinois EPA is adhering to its SIP responsibilities in relationship to the Lake Calumet area. That is, in addition to its ordinary responsibilities under the PSD program, Illinois EPA has an additional set of SIP-mandated PM₁₀ maintenance, contingency and control responsibilities for this formerly non-attainment region. Illinois EPA is not only failing to fulfill these affirmative responsibilities, it is proactively approving a source that will cause PM₁₀ NAAQS exceedences in several locations.

The Illinois EPA has fulfilled its SIP-mandated PM₁₀ maintenance and contingency requirements for the former Lake Calumet nonattainment area. Pursuant to Section 107 of the Clean Air Act, certain requirements must be met before an area can be redesignated attainment that include but are not limited to a fully approved maintenance plan under Section 175(A) of the Clean Air Act. *See*, Section 107(d)(3)(E) of the Clean Air Act. Consistent with these requirements, the Illinois EPA prepared a maintenance plan, *Maintenance Plan for Particulate Matter Less Than 10 Microns (PM10) for the Lake Calumet Moderate Nonattainment Area in Cook County Illinois*, September 1, 2005, (“Maintenance Plan”) in accordance with USEPA guidance. This Maintenance Plan required certain corrective actions to be taken in the event of a monitored exceedence at certain specified levels or any future violations of the ambient standards. *See*, *Maintenance Plan for Particulate Matter Less Than 10 Microns (PM10) for the Lake Calumet Moderate Nonattainment Area in Cook County Illinois*, September 1, 2005. Illinois’ contingency provisions for PM₁₀ attainment, contained in 35 IAC Part 212 Subpart U (Additional Control Measures), provides for the identification and potential implementation of contingency measures. Sources subject to Subpart U must submit a contingency measure plan reflecting PM₁₀ emission reductions. In the event of a monitored exceedence or violation of the PM₁₀ NAAQS, the Illinois EPA must notify sources found to be culpable, which must then implement the appropriate measures contained in their contingency measure plans.

The suggestion provided by this comment is that the trigger for the requirement to implement a corrective action plan is a *modeled* exceedence of the PM₁₀ NAAQS. However, the language in Subpart U could not be clearer. Implementation of a corrective action plan is only triggered by an exceedence detected by *monitoring*. *See*, 35 IAC 212.702 and

⁸⁷ Given the highly technical nature of air modeling, permit issuers have been afforded broad latitude and flexibility in their application of air quality modeling. *In re Prairie State Generating Company, LLC.*, 13 E.A.D. 1, 99 (EAB 2006) (providing that this broad discretion is due to the numerous references in Appendix W to “‘recommendations,’ ‘guidelines,’ and reviewing authority discretion”).

212.704.⁸⁸ No such exceedance has been monitored in the Lake Calumet area. For example, refer to the *Illinois Annual Air Quality Report*, for 2009 and 2010. Absent monitored exceedances of the PM₁₀ NAAQS, no source is yet obligated to comply with the terms of its contingency measure plan. This is entirely consistent with the Illinois' *Maintenance Plan for Particulate Matter Less Than 10 Microns (PM₁₀) for the Lake Calumet Moderate Nonattainment Area in Cook County Illinois* and 35 IAC Part 212.⁸⁹

45. The proposed plant would be located within the former Lake Calumet PM₁₀ nonattainment area.⁹⁰ In making its 2005 decision to reclassify the area as attainment, USEPA specifically cited to the Illinois Maintenance Demonstration and Verification of Continued Attainment, which predicted emission trends for the years 2002-2014 for both nonroad and mobile sources. USEPA underscored Illinois' obligation to implement contingency measures and additional control measures needed to assure future attainment of the PM₁₀ NAAQS in this region.

Illinois EPA concurs with this comment. The adequate safeguards required per 35 Illinois Administrative Code (IAC) Part 212, Subpart U have been incorporated into Universal Cement permit, as noted at Condition 1.4-2.b.

35 IAC 212.702(a) provides “[i]f the review of monitoring data reveals an exceedance of the 24-hour ambient air quality standard for PM-10 found at 35 IAC 243.120, the Agency shall attempt to determine the source or sources causing or contributing to the exceedance.”

The implementation of contingency measures and additional control measures (Universal Cement will be subject to preparing and submitting a Contingency Measure Plan, per Permit Condition 1.4-2(b)(i) is triggered by monitoring data. Monitoring has not shown exceedances of the PM₁₀ NAAQS.⁹¹

46. The emissions from the proposed plant should be reduced to a level consistent with attainment of the PM₁₀ and NO₂ NAAQS in this area.

The commenter is misconstruing the requirements of permitting pollutants that meet NAAQS. There is no requirement that new construction be prohibited unless it is required to entirely offset existing emissions. Indeed, such a requirement is impossible to meet and would in effect be a moratorium on new construction which would prevent the construction of even very clean facilities. As discussed in the *Prairie State* decision, the EAB reviewed this alternative and rejected it in favor of the SILs approach to new construction. *In re Prairie State Generating Company, LLC*, 13 E.A.D. 1, 106-107 (2006).

The proposed plant will be subject to stringent emission standards, but the Clean Air Act does not require that Universal Cement must single-handedly reverse the contribution of all other sources to air quality. As stated by the EAB, where modeling in the context of a

⁸⁸ It is appropriate that contingency measures be triggered by actual monitoring. This is because modeling is a conservative evaluation of possible air quality impacts and may greatly overstate actual ambient concentrations for a variety of reasons.

⁸⁹ As noted elsewhere in this response to comments, the requirements for a Contingency Measure Plan have been included in the permit for the proposed plant. See, Condition 1.4-2.b.

⁹⁰ The Lake Calumet area was designated as nonattainment for PM₁₀ until 2005. For the purpose of the nonattainment designation, the Lake Calumet area was: The area bounded on the north by 79th Street, on the west by Interstate 57 between Sibley Boulevard and Interstate 94 and by Interstate 94 between Interstate 57 and 79th Street, on the south by Sibley Boulevard, and on the east by the Illinois/Indiana State line.

⁹¹ Illinois EPA, *Illinois Annual Air Quality Report 2010*, December 2011.

proposed new source reveals a violation of a NAAQS, but the new source does not cause or contribute to that violation, the permitting authority should address the causes of that violation independently from the permitting action in which the modeling was conducted. *In re Prairie State Generating Company, LLC*, 13 E.A.D. 1, 107, fn. 122 (2006).

Of particular relevance is USEPA's further explanation of whether the proposed source, in combination with existing sources, will cause or contribute to a NAAQS violation:⁹²

When a violation of any NAAQS or increment is predicted at one or more receptors in the impact area, the applicant can determine whether the net emissions increase from the proposed source will result in a significant ambient impact at the point (receptor) of each predicted violation, and at the time the violation is predicted to occur. The source will not be considered to cause or contribute to the violation if its own impact is not *significant* at any violating receptor at the time of each predicted violation. In such a case, the permitting agency, upon verification of the demonstration, may approve the permit. However, the agency must also take remedial action through applicable provisions of the state implementation plan to address the predicted violation(s).

For NO₂, the proposed plant does not have a significant impact at the time and location of any predicted modeled NO₂ 1-hour exceedences.

For PM₁₀, at six of the modeled receptor locations, possible exceedences of the 24-hour PM₁₀ NAAQS were identified. As already discussed, the Guideline on Air Quality Models provides for the opportunity to incorporate the use of meteorological conditions in the development of a background concentration. Incorporating this provision eliminated the 24-hour PM₁₀ NAAQS exceedences at these six receptors.

In addition, there are two receptors for which initial modeling for the plant showed possible exceedences of the 24-hour PM₁₀ NAAQS and PSD Increment to which the emissions of the proposed plant would contribute significantly.⁹³ These receptors are on industrial property, a bulk commodity terminal owned and operated by Cargill Salt, located immediately to the south of the proposed plant. Where a receptor is located on a background source's non-ambient air property, the contribution from that background source's emissions may be subtracted from the total modeled concentration. Under this USEPA guidance, the exclusion of the background source's contribution is only allowed if the background source is fenced and/or otherwise secured to prevent access by the general public. As such, the potential for exceedences at these receptors would be appropriately addressed through fencing of the Cargill property.

47. The model used to predict the local ambient concentrations is based on the permitted levels of emissions not being exceeded. What will happen if these limits are exceeded, particularly during startup and shutdown or if there are upset emissions.

If emissions exceed permit limits, ambient concentrations would likely be higher. However, they would not necessarily be measurably higher or cause or contribute a violation of a NAAQS. In this regard, emission rates for startup and shutdown were addressed in the modeling and the permit. The additional air quality impact of any exceedance of a permit

⁹² *The NSR Workshop Manual at page C.52*

⁹³ The initial modeling showed exceedences at two receptors. At one receptor, both the NAAQS and PSD Increment were exceeded. At the other receptor, only the PSD Increment was exceeded.

limit would depend on the unit that is responsible and the nature and duration of the incident. It would also depend on the emissions of other units during the incident, both at the plant and at other facilities. It would also depend on the meteorology during the incident. Because of these considerations and the conservative nature of air quality modeling, exceedances of permit limits should not be assumed to be synonymous with air quality exceedances.

More importantly, separate from any impact on ambient air quality, an exceedance of a permit limit would trigger an appropriate response by the Illinois EPA to ensure that appropriate corrective actions have been or will be taken by Universal Cement to restore compliance and prevent similar incidents in the future, as well as other actions as needed to protect public health and the environment, and, lastly, to recover appropriate penalties considering the nature of the noncompliance and any economic benefits to a source that resulted from noncompliance. In the unlikely event that the continued operation of the plant would pose a threat to public health, an injunction would be sought to bar further operation of the plant until the problem was corrected. In such case, or if penalties are appropriate or litigation is otherwise required, enforcement action would be taken against the plant by the Illinois EPA and the Illinois Attorney General's Office, which acts as the Illinois EPA's attorney in litigation.

48. A number of corrections and clarifications should be noted to the Illinois EPA's "Hazardous Air Pollutant Evaluation for Universal Cement, LLC, Chicago, Illinois," October 19, 2011. Most significantly, the plant's lead emissions will be lower than were evaluated. This is because the lead emission factor from AP-42 for a cement kiln equipped with an ESP was used (0.00071 lbs/ton of clinker) rather than the factor for a kiln with a baghouse (0.000075 lbs/ton). Correcting this makes the evaluation even more conservative. On the other hand, the evaluation should be based on the NESHAP standard for mercury (0.000024 lbs/ton of clinker) rather than a factor of 0.000012 lbs/ton.

The various corrections and clarifications to this evaluation noted by this comment have been noted by the Illinois EPA. They do not change the conclusions of the evaluation. That is, the modeled HAP concentrations show no modeled concentrations exceeding the acceptable values. To provide clarity, an updated evaluation report has been prepared.

49. The draft permit incorrectly concludes that the proposed plant would be a minor source of hazardous air pollutants (HAPs). The permit would limit hourly HCl emissions to 2.4 lbs/hr. Annual HCl emissions would be limited to 9.5 tpy, just under the major source threshold for this pollutant. However, 2.4 lbs/hr multiplied by 8760 hours/yr (continuous operation in a non-leap year) is 10.51 tpy. This is over 10.0 tpy, the major source threshold for an individual HAP. Since the permit would not limit operating hours of the kiln system, the plant must be treated as major based on its HCl emissions.

The issued permit includes an explicit limit on the annual operation of the kiln system, 7,920 hours per year (See Condition 2.1.5(e)), as indirectly suggested by this comment. This limit will constrain HCl emissions to 9.5 tpy, less than 10 tpy (2.4 lb/hr x 7,920 hr/yr = 9.504 tpy). The annual limits on HCl emissions in Attachments 1 and 2 of the draft permit reflect the 7,920 hours per year operating limit. Associated recordkeeping to address this operational limit is also required by the issued permit (See Condition 2.1.9(d)(iv)).

This operational limit should not be considered an "artificial" constraint on the operation of the kiln system at the proposed plant. It simply codifies the fact that the kiln system cannot

operate continuously because of the need for periodic maintenance. As a consequence, it would be unlikely that the kiln system could ever operate more than 330 days per year (330 days/yr x 24 hrs/day = 7,920 hrs/yr). In this regard, in Table A-2.1, Footnote 2, of its September 14, 2010 submittal, Universal Cement indicated that the kiln system would only operate 330 days per year or 7,920 hours per year.

50. The draft permit incorrectly concludes that the proposed plant is a minor source for VOM emissions. The draft permit would limit VOM emissions of the kiln system to 23.8 lbs/hr. Annual emissions would be limited to 94.1 tpy, just under the NA NSR major source threshold for VOM. However, 23.8 lbs/hr multiplied by 8760 hours is 104.24 tpy, over the major source threshold. Since the permit would not limit the operating hours of the kiln system, the plant must be treated as major for VOM and thus a major project for VOM emissions (ozone) for purposes of Nonattainment New Source Review (MSSCAM).

As already discussed, the issued permit includes an explicit limit on the annual operation of the kiln system, 7,920 hours per year. This will constrain the annual VOM emissions of the plant to the limit in the draft permit, so that the plant would not be a major source for emissions of VOM. (23.8 lb/hr x 7,920 hr/yr = 94.25 tpy). The VOM emission limits included in Attachment 1 and Attachment 2 of the construction permit reflect the 7,920 hours per year operating limit.

51. The draft permit incorrectly concludes that the proposed plant is a minor project for emissions of H₂S. The draft permit would limit H₂S emissions to 2.5 lbs/hr. Annual emissions would be limited to 9.9 tpy, just under the PSD major source threshold for this pollutant. However, 2.5 lbs/hr multiplied by 8760 hours is 10.95 tpy, over the major source threshold. Since there is not a limit on the operating hours of the kiln system, the plant must be treated as major project for H₂S emissions.

As already discussed, the issued permit includes an explicit limit on the annual operation of the kiln system, 7,920 hours per year. This will constrain the annual H₂S emissions of the plant to the limit in the draft permit, so that the plant would not be a major source for emissions of H₂S. (2.5 lb/hr x 7,920 hr/yr = 9.9 tpy.)

52. The permit should have enforceable limits to ensure emissions below relevant significant and major source emission thresholds. To the extent the draft permit is grounded in synthetic minor limits, notwithstanding the arithmetic errors cited above in the calculations – it is essential that those limits be enforceable. This is particularly true given that the purported emission limits put the proposed plant extremely close to the thresholds for several pollutants: HCl - 9.5 tpy, H₂S – 9.9 tpy, VOM - 94.1 tpy, PM_{2.5} - 99.6 tpy, lead - 0.41 tpy and sulfuric acid mist - 6.9 tpy.

The fact that the permit constrains the annual emissions of certain pollutants to only slightly less than the relevant major or significant emission threshold does not mean that these limits are not enforceable. The annual emission limits cited by this comment are supported by various short-term limits on emissions to facilitate practical enforceability. In addition, in day-to-day operation, emissions must be less than these limits. This is because the permit limits address the maximum emissions of emission units at the plant. For maximum emissions to comply with the applicable limits, the normal or typical emissions of emission units must be lower than the applicable limits.

53. It is very important that emissions of HCl, H₂S, VOM, PM_{2.5}, lead and sulfuric acid mist from the proposed plant be monitored aggressively. However, the draft permit would allow annual

emissions of these pollutants be verified through use of emission factors – a woefully blunt and inaccurate measure that is wholly inadequate to detect the minor emission fluctuations that could easily send emissions over major source thresholds. In this regard, the permit would be inconsistent with USEPA’s guidance on use of emission factors from its *Compilation of Air Pollutant Emission Factors*, AP-42.⁹⁴ See Permit Condition 2.1.9(g)(ii). Emissions of all these pollutants, as well emissions of metals other than lead, be measured with continuous emissions monitoring systems or quarterly emissions testing, coupled with coal sampling and parameteric monitoring of the relevant control devices or processes to ensure continuing compliance with synthetic minor limits.

The issued permit reflects a sound approach to tracking or “monitoring” of the plant’s emissions of various pollutants, including tracking of emissions of HCl, H₂S, VOM, PM_{2.5}, lead and sulfuric acid mist, as addressed by this comment. The approach does not simply rely on emission factors as suggested by this comment. The approach relies on various measures, including emissions monitoring, operational monitoring and appropriate recordkeeping, to verify that the kiln system and associated control system is routinely operated in a manner that is consistent with operation during periodic emissions testing so that the results of such testing are representative of the plant’s actual emissions. This approach to emissions tracking for the subject pollutants is generally consistent with the approach in the draft permit, with one further enhancement, which although not suggested by this comment, was stimulated by it. This further enhancement is a requirement for additional emission testing for the subject pollutants if the regular, periodic emission testing for the pollutants does not demonstrate compliance by a specified margin.⁹⁵

By way of further discussion, this comment does not identify any particular flaw in the approach taken in the draft permit to tracking of the emissions of the subject pollutants. As a general matter, the approach does not rely on emission factors from AP-42 for emission units for which unit- or plant-specific emission testing can be conducted. Rather, the permit specifies that emissions of the subject pollutants must be determined from “appropriate” emission factors. This generally requires use of unit- or plant-specific factors developed from emission testing at the plant. It further requires use of “event-specific” emission factors during periods when the emission factors from emission testing would not adequately account for the actual emissions. Accordingly, the USEPA’s dictums on the appropriate use of “generic” emission factors from AP-42 are not relevant to the permit. More generally, the approach that has been taken in the permit is consistent with the

⁹⁴ USEPA guidance documents have repeatedly called into question the usefulness of AP-42 emission factors in calculations of emissions from individual sources, and expressed a preference for site-specific data. See, e.g., letter dated April 29, 1996 from Jole C. Luehrs, USEPA to Larry Devillier, Louisiana Department of Environmental Quality (“1996 USEPA Guidance”); memorandum dated January 28, 2005 from Stephen D. Page, USEPA re: Technical Guidance for Title V Permitting of Printing Facilities (“USEPA 1995 EF Guidance”); letter dated November 22, 1994 to Robert H. Collum, Jr., Georgia Department of Natural Resources, from Kathie A. Stein, USEPA. One such document states, “AP-42 emissions factors are developed as averages of reported test data sets and, while useful in supporting a national emissions inventory, are generally not acceptable for site-specific applicability determinations; site-specific developed emissions factors are best.” USEPA 1995 EF Guidance at .pdf p. 21. Another similarly observes, “The objective of AP-42 is to provide a technical library of different pollution control and measuring technologies and methods used by different industry groups. As AP-42 has always stated, it does not yield accurate emissions estimates for individual sources.” USEPA 1994 EF Guidance at .pdf p. 2.

⁹⁵ **In the event that refinements to the approach to emissions tracking are found to be needed based on actual operation of the plant, after it is constructed, these enhancement can be put in place in the Clean Air Act Permit Program (CAAPP) permit for the plant, as part of the “periodic monitoring” for the plant required by the CAAPP program.**

approach that is commonly taken in circumstances where continuous emissions monitoring is not feasible or appropriate, as is the case for emissions of the subject pollutants from the kiln system.⁹⁶ In such circumstances, emissions must be indirectly tracked by verifying proper operation of equipment. This serves to assure that the emission rates or emission factors measured during periodic testing are representative of the plant's emissions as it actually operates. It also identifies improper operation of equipment, when the established emission factors would not accurately account for actual emissions and event-specific adjustments must be made to established emission factors to accurately account for actual emissions.

Consideration of the normal variation in emissions, as addressed by this comment, is a reasonable concern for some of the subject pollutants, given the closeness to the relevant regulatory thresholds. However, quarterly emission testing, as recommended by this comment, would be a crude way to address the "minor fluctuations in emissions" that accompany normal variation in operation of the kiln system. This is because such testing would not directly address variation in operation. While emissions testing would be more frequent, such testing still would not necessarily coincide with operating conditions that are associated with higher emissions. As normal variation in operation and emissions will be present, it will be more directly and effectively addressed by linking the frequency of emissions testing for the subject pollutants to the results of previous testing. This will support actual operation of the plant at emissions levels that are normally well below the permit limits for the subject pollutants. By contrast, more frequent emission testing would merely confirm compliance with the permit limits for the subject pollutants.

Accordingly, in response to this comment, to more directly address variability in operation, the issued permit established a tiered approach for the testing of the subject pollutants that are of particular concern. If testing shows compliance by less than a 5 percent margin, further testing would be required in 120 days.⁹⁷ If the margin of compliance is between 15 and 5 percent, additional testing would be required to be conducted within one year.

54. Adjacent natural areas and wildlife can only be negatively impacted and situating a cement kiln less than a mile away will be in direct contradiction to all restoration work done thus far. The flora and fauna already stressed.

Universal Cement prepared an Ecological Screening Assessment as part of its evaluation of the proposed plant. The evaluation noted, in particular, that the plant would be located near the naturalized portion of Lake Calumet, and, in particular, the Indian Ridge Marsh (located immediately to the west of the proposed Universal Cement site, and analyzed impacts in these areas).⁹⁸ The assessment was reviewed by Illinois EPA, and Illinois EPA concurred with the summary that the emissions from the proposed facility, including hazardous air pollutants (HAPs), were not expected to lead to levels sufficient to negatively

⁹⁶ The technology for continuous emission monitoring of the subject pollutants, as would be present in the exhaust from the kiln system, does not yet exist.

⁹⁷ The timing for testing is set at 120 days to accommodate unforeseen delays that occur in conjunction with emission testing, which would result in the additional testing being more than three months after the test that triggers the requirement for additional testing. Effectively, the 120 day deadline would require testing to be scheduled to take place within three months.

⁹⁸ Class II Air Quality Analysis Report, February, 2011, Appendix P titled *Universal Cement Facility, Enhanced Soils and Vegetation Analysis and Ecological Screening Assessment*, as prepared by Cambridge Environmental Inc. See, Summary on page 1. Supplemental material was submitted by Stephen Zemba (Cambridge Environmental) to Rachel Rineheart (USEPA), August 2, 2011.

affect flora and fauna.

The U.S. Department of Interior also independently reviewed Universal Cement's Ecological Screening Assessment. Per its August 22, 2011 letter, the U.S. Department of Interior concluded that

...based on these analyses, we also conclude that local flora and fauna, including federally listed species, will be exposed to contaminants from the future emissions from this facility. However, based on the best available information we do not believe this exposure will elicit a detectable negative response from the listed species. In addition, the increment of change anticipated from the "worst case" (facility operating at 100% capacity) level of pollutants, when added to the existing baseline or background condition, is not likely to negatively affect the survival or reproduction of any federally listed species within the action area.⁹⁹

As the Department of Interior summary notes that no federally listed species within the action area will be negatively affected, no negative impacts to other existing flora or fauna are anticipated.

55. In relationship to the soil and vegetative analysis, I requests Illinois EPA clarify if this analysis included the contribution of criteria pollutants already emitted by existing local sources that, in combination with the emissions of the proposed plant, could significantly and negatively affect soil and vegetation;

The PSD rules, 40 CFR 52.21(o)(1), require the owner or operator of a new source or modification to conduct "an analysis of the impairment to visibility, soils and vegetation that would occur as a result of the source . . . and general commercial, residential, industrial and other growth associated with the source . . . The owner or operator need not provide an analysis of the impact on vegetation having no significant commercial or recreational value." See, 40 CFR 52.21(o)(1). The PSD regulations do not identify the preferred means or methods for performing the soils and vegetation analysis nor do they provide criteria against which any potential impacts are to be evaluated. Cf., *Knauf Fiber Glass, GmbH*, 8 E.A.D. 121, 156-157 (EAB 1999) (PSD regulations do not delineate how the visibility analysis must be conducted or define what constitutes visibility impairment); see also, *In re Indeck-Elwood, LLC*, 13 E.A.D. 126, 157 (EAB 2006). USEPA's *NSR Workshop Manual* offers only limited insight into the desired nature of the evaluation or its corresponding level of detail. See, *The NSR Workshop Manual, pages D.1 through D.12*. Per the New Source Review Workshop Manual, the consideration of additional impacts in terms of its affect on soils and vegetation in the vicinity of the Universal Cement facility should include the following:

This analysis assesses the impacts of air, ground and water pollution on soils, vegetation, and visibility caused by any increase in emissions of any regulated pollutant from the source or modification under review, and from associated growth.¹⁰⁰

⁹⁹ Louise Clemency, Field Supervisor, US Department of the Interior, US Fish and Wildlife Service Region III, Chicago Ecological Services Field Office, to Pamela Blakley, Chief Air Permits Section, USEPA Region V.

¹⁰⁰ *The NSR Workshop Manual*, Additional Impact Analysis, page D.1.

Thus, the impact of the new source is determined in this soils and vegetation analysis on the basis of the new or modified source, and does not include any contribution from pollutants already emitted by existing local sources.

Perhaps the most illustrative comment from the guidance provides that “[f]or most types of soils and vegetation, ambient concentrations of criteria pollutants below the secondary national ambient air quality standards will not result in harmful effects.” *Id.* The EAB has previously affirmed an applicant’s consideration of secondary NAAQS in its additional impact analysis. See, *In re Kawaihae Cogeneration Project*, 7 E.A.D. 107, 130 (EAB 1997) (denial of review where Petitioners failed to show existence of sensitive plant species that would be harmed by exposure to pollutants existing at levels below the secondary NAAQS)¹⁰¹; see also, *In re Prairie State Generating Co.*, 13 E.A.D. 1, 109-110 (EAB 2006).

The analysis included in the Enhanced Soils and Vegetation Analysis and Ecological Screening Assessment attached to the February, 2011 Class II Air Quality Analysis Report (at Section 8.10.2), and a supplement provided on August 29, 2011¹⁰² are very comprehensive in determining the impacts of the new source. The Enhanced Soils and Vegetation Analysis and Ecological Screening Assessment contains both the impacts from the proposed plant and background concentrations.¹⁰³

A conclusion of no harmful effects to the soils and vegetation in the area from the proposed plant was affirmed by the U.S. Department of the Interior, U.S. Fish and Wildlife Service (Region III), per their August 22, 2011 letter to USEPA Region V (Pamela Blakley):

...based on these analyses, we also conclude that local flora and fauna, including federally listed species, will be exposed to contaminants from the future emissions from this facility. However, based on the best available information we do not believe this exposure will elicit a detectable negative response from the listed species. In addition, the increment of change anticipated from the “worst case” (facility operating at 100% capacity) level of pollutants, when added to the existing baseline or background condition, is not likely to negatively affect the survival or reproduction of any federally listed species within the action.”¹⁰⁴

¹⁰¹ EAB precedent and *The NSR Workshop Manual* affirm the application of surrogates. See, *In re Genesee Power*, 4 E.A.D. 832, 859-860 (EAB 1993) (approving the employment of CO emissions compliance as a surrogate indicator of VOC emissions); see also, *In re BP Cherry Point*, 12 E.A.D. 209, 221-225 (EAB, 2005) (affirming the application of PM as a surrogate for PM₁₀ and PM₁₀ for PM_{2.5}); see also, *The NSR Workshop Manual*, pages H.6, I.6 (recognizing use of surrogate parameter monitoring for continuous direct monitoring).

¹⁰² Supplemental information regarding the proposed Universal Cement plant, from Stephen Zemba to Rachel Rineheart, dated August 2, 2011.

¹⁰³ Universal Cement provided its *Enhanced Soils & Vegetation Analysis and Ecological Screening Assessment* dated February 2011 as Appendix P to its February 2011 *Class II Air Quality Analysis Report*. Table 4 in this document “contains the maximum modeled air concentrations of the HAPs considered in this analysis along with modeled and/or measured background concentrations for each compound.” *Id.* at page 34. Based on this information, Universal Cement compared modeled air quality impacts from the proposed plant against measured and modeled background air quality data to assess the magnitude of the proposed plant’s likely impacts relative to current impacts from other sources. *Id.* The analysis goes on to state that “[t]he air quality impacts at receptor locations of significant ecological interest are all expected to be fairly small relative to current levels,” supporting the overall conclusion of the analysis that “no adverse effects on the local environment are expected due to facility emissions.” *Id.*

¹⁰⁴ Louise Clemencey, Field Supervisor, US Department of the Interior, US Fish and Wildlife Service Region III, Chicago Ecological Services Field Office, to Pamela Blakley, Chief Air Permits Section, USEPA Region V.

In addition, a cumulative impact analysis was performed for PM₁₀ as triggered by the requirements of the PSD permit program for the proposed plant. For other pollutants, emissions and/or modeled concentrations were below *de minimis* levels as set by the USEPA such that no further analysis was required as part of the permitting process to specifically evaluate the impacts of the proposed plant. As a general matter, the networks of ambient air monitors that the Illinois EPA and the Indiana Department of Environmental Management operate will be used to confirm that the cumulative air quality levels, considering both the proposed plant and existing sources, continue to comply with the NAAQS. impacts.

56. Did the soil and vegetative analysis include the existing ambient air quality conditions for criteria air pollutants and the likelihood that these background conditions in combination with the emissions from the proposed plant could significantly and negatively affect soil and vegetation?

As just discussed, the analysis of additional impacts to soils and vegetation is to be based on any increase in emissions of any regulated pollutant from the source under review. See, *The NSR Workshop Manual*, at D.1. Beyond this, the guidance document cites to several references for permit applicants and regulators to consider but it does not endorse any particular methodology. *Id.* at D.5. Perhaps the most illustrative comment from the guidance provides that “[f]or most types of soils and vegetation, ambient concentrations of criteria pollutants below the secondary national ambient air quality standards will not result in harmful effects.” *Id.* Secondary national ambient air quality standards (PM₁₀, SO₂, NO₂, ozone, and lead) are public welfare-based standards and are considered to be protective of plants, animals and soils.

The EAB has previously affirmed an applicant’s consideration of secondary NAAQS in its additional impact analysis. See, *In re Kawaihae Cogeneration Project*, 7 E.A.D. 107, 130 (EAB 1997) (denial of review where Petitioners failed to show existence of sensitive plant species that would be harmed by exposure to pollutants existing at levels below the secondary NAAQS); see also, *In re Prairie State Generating Co.*, 13 E.A.D. 1, 109-110 (EAB 2006).

Modeling results for the proposed plant have either been determined to be insignificant or do not exceed the secondary NAAQS (for PM₁₀). For other pollutants, in the Enhanced Soils and Vegetation Analysis and Ecological Screening Assessment attached to the February, 2011 Class II Air Quality Analysis Report, Universal Cement provides a comparison of modeled metals, organics, acid gases, SO₂, NO_x, sulfuric acid mist, and ammonia impacts against sensitive vegetation impact background concentrations and screening levels. This analysis indicates that no adverse effects on the local environment are expected from the proposed facility emissions.

57. Did the soil and vegetative analysis, include the growth of mobile source traffic that will be necessary to construct and operate the proposed plant, and the impacts of air emissions from this predictable growth in mobile sources on regional soil and vegetation, alone and in combination with plant emissions?

The growth analysis elements include a projection of the associated industrial, commercial, and residential source growth that will occur in the area due to the plant; and an estimate of the air emissions generated by the above associated industrial, commercial, and residential growth.

The growth impacts of the proposed plant are expected to be minimal and distributed throughout the region, with anticipated additional emissions from growth expected to be low. This is because the plant would be developed to meet an existing demand for portland cement in the Greater Chicago Area. The general area where the proposed plant would be sited is already a heavily traveled industrial corridor.¹⁰⁵

Growth in mobile source traffic related to additional full time commuting employees, or additional construction labor (during the construction) will only be a small fraction of the existing mobile source volume.¹⁰⁶

Truck traffic increases will also be minimal, given Universal Cement's intent to utilize the adjacent Calumet River for delivery of the majority of the raw materials and fuel used at the plant.¹⁰⁷

The Class II Air Quality Analysis completed by Universal Cement, and reviewed by the Illinois EPA, demonstrated that the plant would not cause or contribute to exceedences of the PM₁₀ NAAQS (see responses to earlier comments). It is noted that the fugitive emissions predicted from mobile source traffic while on the plant site, and included in the PM₁₀ modeling analysis, are higher than what would be expected given calculation methodology currently available from USEPA.¹⁰⁸

For the soils and vegetation component of the additional impacts analysis, the Illinois EPA's analysis included the February 2011 Class II Air Quality Analysis Report (at Section 8.10.2 of Universal Cement's application) and a supplement provided in August 2, 2011. These documents were comprehensive in determining the minimal adverse impacts of the new source on soils and vegetation from the stationary point source emissions. Comparatively speaking, any additional emissions from consideration of the associated growth in mobile source emissions will be small and only be a small fraction of the emissions impact from the plant.¹⁰⁹

¹⁰⁵ Average annual daily traffic counts on I-94 in vicinity of E 130th interchange are 171,000 vehicles per day, and 10,100 trucks per day. On feeder streets in this vicinity, traffic counts are 20,100 vehicles per day on both E 103rd and E 130th Streets, 7300 vehicles per day on Torrence Avenue, per <http://www.gettingaroundillinois.com/MapViewer.aspx>.

¹⁰⁶ Per information submitted by Universal Cement (November 2009 application, Section 9.6), peak labor during the construction period is expected to be approximately 400 people. Upon completion of the construction of the plant, 90 people will be permanently employed at the plant.

¹⁰⁷ Per Condition 2.5.1 of the permit, dump hoppers associated with receipt of raw materials and solid fuel will be located at the plant. However, the use of these dump hoppers for receipt of raw materials and fuel by truck will be limited. "The Permittee indicates that these dump hoppers will be needed to address interruptions in the normal means of transport and receiving of materials, most notably interruptions in direct delivery of limestone by barge during winter months."

¹⁰⁸ Specifically, the allowable PM₁₀ emissions of 1.7 tons per year (per Condition 2.6.5 of the permit) from fugitive dust from mobile source traffic at the plant site were included in the PM₁₀ NAAQS analysis. It is noteworthy that USEPA's emission factors for emissions from paved roads have been subsequently revised since the time of Universal Cement's application submittal. The current version of the predictive emission factor equation, per USEPA's January 2011 update, would substantially reduce PM₁₀ emissions from the 1.7 tons per year originally predicted by Universal Cement, to 0.17 tons per year.

¹⁰⁹ For example, of the predicted allowable emissions of 134.8 tons per year of PM₁₀ from the proposed plant, only 1.7 tons per year will be generated from mobile source emissions (see Attachment 1 of the Permit, Summary of Permitted Annual Emissions of the Plant).

58. The plant would create a significant, adverse and disproportionate harm for local residents by causing and contributing to local violations of the NAAQS. The Illinois EPA-approved Environmental Justice Analysis is inadequate to discount significant, adverse and disproportionate harms to local residents caused by the air quality impacts of constructing and operating this facility.

The Illinois EPA has met with its obligations related to environmental justice (“EJ”)¹¹⁰. EJ has two broad goals.¹¹¹ The first seeks to ensure meaningful public participation. The second is that communities are not to be disproportionately impacted by environmental degradation or receive less than an equitable share of environmental protection and benefits.¹¹² The Illinois EPA achieved both goals, as demonstrated by the Administrative Record.

Meaningful public participation was provided during the permitting process, as evidenced by numerous outreach efforts and meetings between Universal Cement and members of the community, the provision of the full record to the public at no charge, the Spanish translation of key permit notices and documents, and the availability of the environmental justice analyses to the public during the public comment period. The fact that more stringent emissions limits were incorporated in the final permit in response to public comment is further evidence of meaningful public participation.

Illinois EPA reviewed the potential for adverse impact in areas of maximum predicted impact for all criteria pollutants and a thorough list of potential hazardous air emissions, and concluded that minority and/or low-income communities will not experience an adverse human or environmental impacts from the proposed plant’s emissions. See, *Environmental Justice Assessment & Outreach Activities*, October 2011 (“Assessment”), David Gossman, October 2011; see also, *Memorandum from Matthew Will, Modeling Unit, to Bob Smet, Construction Unit, Environmental Justice Assessment Report Submitted by Universal Cement*; see also, *Memorandum from Les Morrow, Environmental Toxicologist, to Bob Smet, Hazardous Air Pollutant Evaluation for Universal Cement, LLC, Chicago, Illinois, dated October 19, 2011.*

To determine the significance of the impacts predicted for the Universal plant, Illinois EPA looked to the NAAQS modeling of Universal’s predicted impacts.¹¹³ In some instances, e.g. 1-hr NO₂, this modeling involved review of literally millions of modeled “events.” The risk or measure of impact was evaluated and compared to benchmarks, including EPA

¹¹⁰Environmental Justice or “EJ”, as that term is defined by Illinois EPA, is the protection of the health of the people of Illinois and its environment, equity in the administration of the State’s environmental programs, and the provision of adequate opportunities for meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. See, *Illinois EPA’s Environmental Justice Policy* at www.epa.state.il.us/environmental-justice/policy.html.

¹¹¹ *Toolkit for Assessing Potential Allegations of Environmental Injustice*, USEPA Enforcement and Compliance and Assurance Division, with Preface by Office of Environmental Justice (Nov. 3, 2004); *Plan EJ 2014*, USEPA Office of Environmental Justice (Sept. 2011)

¹¹² *Id.*

¹¹³ Air quality that adheres to the NAAQS is presumptively protective of public health in the general population, and thus is not significantly adverse pursuant to USEPA Environmental Appeals Board precedence. See, 42 U.S.C. §7409 (b) (NAAQS are set at levels designed to protect public health and welfare); see also, 40 CFR §50.2 (NAAQS are set at levels designed to protect public health); *In re Shell Gulf of Mexico, Inc. & In re Shell Offshore, Inc.*, OCS Appeal Nos. 10-1 to 10-4, slip op. at 73-74 (EAB December 30, 2010).

established NAAQS “significant impact levels”¹¹⁴ for each criteria pollutant, EPA guidance and Environmental Appeals Board decisions. This review demonstrated that emissions from the proposed plant will not cause or contribute to an exceedance of any NAAQS.

59. The Executive Order entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" states in relevant part that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations." Exec. Order 12,898, 59 Fed. Reg. 7629, 7629 (Feb. 11,1994) ("Executive Order"). Federal agencies are required to implement this order "consistent with, and to the extent permitted by, existing law." *Id.* at 7632. The Environmental Appeals Board has held that environmental justice issues must be considered in connection with the issuance of PSD permits. *In re Prairie State Generating Co.*, 13 E.A.D. 1, 123 (EAB 2006) *aff'd sub nom. Sierra Club v. Us. EPA*, 499 F.3d 653 (7th Cir. 2007); *In re AES Puerto Rico, L.P.*, 8 E.A.D. 324, 351 (EAB 1999), *aff'd sub nom. Sur Contra La Confaminacion v. EPA*, 202 F.3d 443 (1 st Cir., 2000); *In re Knauf Fiber Glass GmbH*, 8 E.A.D. 121, 174-175 (EAB 1999) ("*Knauf*"); *In re EcoElectrica, L.P.*, 7 E.A.D. 56, 67-69 (EAB 1997); *In Re Shell Gulf of Mexico, Inc. & In Re Shell Offshore, Inc.*, OCS Appeal Nos. 10-1 to 10-4, Slip Op. at 63-4 (EAB December 30, 2010) ("*Shell II*").

In addition, Illinois EPA as a federally funded entity has a legal obligation to consider environmental justice issues in compliance with Title VI. ["No person in the United States shall, on the ground of race, color, or national origin, ... be subjected to discrimination under any program or activity receiving Federal financial assistance." Title VI of the Civil Rights Act of 1964, 42 U.S.C. 2000d]. As articulated in Title VI, recipients of federal funds have an affirmative obligation to ensure non-discrimination. As such, because Illinois EPA is a state agency that receives funding from a federal entity, the U.S. Environmental Protection Agency, it has a legal duty to ensure nondiscrimination in this case.

The Illinois EPA is committed to protecting the health of the citizens of Illinois and its environment, and to promoting environmental equity in the administration of its programs to the extent it may do so legally and practicably. The Illinois EPA supports the objectives of achieving environmental equity for all of the citizens of Illinois.

As such, the Illinois EPA is fully aware of its obligation to consider environmental justice in its PSD permitting decisions and has undertaken a thorough analysis of the potential for adverse impacts on the environmental justice communities identified in the course of that review.

60. Both Universal Cement and Illinois EPA acknowledge that the composition of the community surrounding the proposed plant site triggers an environmental justice analysis. To this end, Universal Cement prepared - and Illinois EPA accepted and endorsed – an Environmental Justice Assessment for PSD Permit Application No. 08120011. This Assessment was produced in October 2011 by Universal Cement's consultant, and was first made available to the public at the public hearing on October 19th. Illinois EPA's endorsement is contained in a memo dated October 18, 2011, stating, "The report's use of modeling results and air quality data for the purpose of the Environmental Justice assessment are appropriate in demonstrating that no significant adverse impacts will occur."

¹¹⁴ **Significant impact levels or SILs ensure that any individual facility will not exceed *de minimis* levels and thus, will not cause or contribute to an exceedance of a NAAQS.**

Illinois EPA agrees that the composition of the community surrounding the proposed plant site triggers an environmental justice analysis. To this end, Universal Cement prepared an Environmental Justice Assessment for this application. *See, Environmental Justice Assessment & Outreach Activities, October 2011* (“Assessment”), *David Gossman, October 2011*. This Environmental Justice Assessment was produced in October 2011 by Universal Cement and was posted on Illinois EPA’s website and made available to the public at the outset of the public hearing on October 19th. Illinois EPA approved Universal Cement’s EJ Assessment in a memorandum dated October 18, 2011, also available at the outset of the public hearing and posted on Illinois EPA’s website, stating, “The report's use of modeling results and air quality data for the purpose of the Environmental Justice assessment are appropriate in demonstrating that no significant adverse impacts will occur.” *See, Memorandum from Matthew Will, Modeling Unit, to Bob Smet, Construction Unit, Environmental Justice Assessment Report Submitted by Universal Cement. The Illinois EPA also performed a separate analysis of the potential impact of a wide range of potential “hazardous air emissions” compared to key health standards. That analysis found Universal Cement’s predicted emissions would not contribute to an exceedance of any established health standard. See, Memorandum from Les Morrow, Environmental Toxicologist, to Bob Smet, Hazardous Air Pollutant Evaluation for Universal Cement, LLC, Chicago, Illinois, dated October 19, 2011.*

61. Perhaps because of its late introduction into the permitting process, the Environmental Justice Assessment was designed and conducted without community input.

USEPA is in the process of developing policies and procedures for addressing environmental justice concerns in permitting actions. *See, Plan EJ 2014* (September 2011). Although there are neither regulatory standards nor best practices guidance on how to encourage public involvement in permit proceedings in environmental justice communities, in the Addendum to Plan EJ 2014 titled *Considering Environmental Justice in Permitting*, USEPA lists a number of potential means of conducting effective public outreach – many of which were implemented in the case of the Universal Cement permit proceeding -- including: 1) translation of documents in appropriate languages; 2) direct and targeted outreach to community organizations and institutions; 3) making documents physically accessible and free to communities; and 4) scheduling meetings during non-working hours. *See, Plan EJ 2014, p. 51.*

Attachment 2, submitted with *Environmental Justice Assessment & Outreach Activities, October 2011* (“Assessment”) listed 22 Universal Cement public outreach activities, including many meetings with and telephones calls to members of the community, community organizations, local officials, the local community college, regional and national environmental groups, and members of the Illinois EPA Environmental Justice Advisory Committee regarding the proposed plant between April 2011 and October 12, 2011. *See, Assessment*. These activities demonstrate a substantial effort by Universal Cement to inform the public of its proposed facility and gather information on community concerns prior to generating its Environmental Justice Assessment. Notification of the proposed permit and the Project Summary for the draft permit were translated into Spanish, as were newspaper and online notifications of the public hearing. Copies of the complete Illinois EPA permit record were made available to representatives of community organizations at no charge, courtesy of the permit applicant. Spanish translators were also made available at the public hearing. In addition, during the hearing and the 30-day public comment period, members of the public were afforded the opportunity to comment on the proposed facility,

the Environmental Justice analysis and the Illinois EPA's evaluation of the same. Finally, this Responsiveness Summary and revisions to the permit, itself, respond to concerns raised by members of the public in this process despite the fact that no disproportionate impact from this facility is predicted to occur in an environmental justice community by the modeling data.

The Environmental Appeals Board has recognized the addition of more restrictive emission limits in a PSD permit as evidence of effective public participation in the context of EJ. See, *In re AES Puerto Rico, L.P.*, 8 EAD 324, (EAB 1999); *In re Knauf Glass, GmbH*, 9 EAD 1, 17 (March 14, 2000) ("...although petitioners may not be fully satisfied with the type of public participation that occurred here, it was, in fact, effective in securing an environmental benefit through lower emissions."). Universal Cement's PSD permit evidences effective public participation and Illinois EPA's commitment to addressing public concerns, even where there is no indication of a disproportionate impact, by the fact that several public comments directly resulted in a more restrictive permit. (Most notably, a number of provisions were added to the permit to address the use of scrap tires as supplemental fuel in the kiln, which directly responds to general concerns about the practice expressed by the public.)¹¹⁵

62. This is unfortunate, because a fundamental assumption of the analysis is at odds with the perspective of community members regarding the primary "significant, adverse and disproportionate" harm posed by this plant. Perhaps just as importantly, it is also at odds with clear Environmental Appeals Board precedent about what constitutes a significant, disproportionate and adverse harm in the context of PSD permitting.

Environmental Appeals Board precedent is clear, the standard for evaluating whether a significant, adverse and disproportionate harm will occur in an environmental justice community is compliance with the NAAQS. See, *In Re Shell Gulf of Mexico, Inc. & In Re Shell Offshore, Inc.*, OCS Appeal Nos. 10-1 to 10-4, Slip Op. at 73-74 (EAB December 30, 2010) (NAAQS compliance demonstrates that minority or low-income populations will not experience disproportionately high and adverse human health or environmental effects). Significant impact levels or SILs ensure that an individual facility will not exceed *de minimis* levels and thus, will not cause or contribute to an exceedance of a NAAQS.

As previously discussed in this Response, the Administrative Record clearly supports the Illinois EPA's finding that the proposed source will not have noticeable effects on the air quality in the Lake Calumet area. See, *The NSR Workshop Manual*, pages C.24-C.26. Given this finding, the Illinois EPA has ensured that neighboring environmental justice communities will not experience significant adverse impacts from the proposed project and thus, the question of disproportionate harm from such impacts within environmental justice communities does not arise in this case.

63. The Environmental Justice analysis focuses only on three residential neighborhoods within two miles of the proposed plant. From the point of view of community members - many of whom testified at the public hearing about poor existing air quality and the prevalence of respiratory illness throughout this area of Chicago- this geographic boundary is entirely arbitrary.

¹¹⁵ Other changes were also made between the draft and issued permit that increase its stringency, including the setting the permit limit for NOx emissions of the kiln at 1.2 lbs/ton of clinker, to take effect after an extended shake-down period.

The geographic scope of the Environmental Justice Analysis was not arbitrary. Rather, the radius of concern was selected based on air quality modeling results, which defined the geographic extent of predicted maximum air quality impacts. Using maximum modeled impacts to define the area of concern in an environmental justice analysis is a valid approach in a permitting context and has been used in a number of EJ analyses reviewed and approved by the EAB. See, EJ analysis performed in Shell II, *Supplemental Environmental Justice Analysis for Proposed Outer Continental Shelf PSD Permit No. R10OCS/PSD –AK-2010-01 and Permit No. R10OCS/PSD-AK-09-01*; See, *In re Prairie State Generating Co., LLC*, 13 E.A.D. 1, 123-124 (2006).

Although USEPA guidance suggests a default one-mile radius around a facility may be used, Universal's modeling allowed it initially to consider a much broader area and ultimately to extend its scope of review to the two-mile study radius in order to incorporate all areas of maximum air quality impact for each of the four criteria pollutants of concern. The Assessment boundaries, as defined by the modeled maximum contaminant levels for NO₂, PM₁₀, SO₂, and CO, are shown in Table 4 and Figures 5 and 6 of the *Environmental Justice Assessment & Outreach Activities*, October 2011.

Extending the study to areas of lesser impact that are farther from the proposed plant was not necessary in this case because environmental justice communities were already identified within the two mile radius of greatest potential impact. Importantly, such an extension would not have changed the two key conclusions: 1) environmental justice communities exist within the range of potential impact of the plant, and 2) the maximum impacts are predicted to occur within the two mile radius. Based on these key conclusions, the Environmental Justice Analysis went forward and reviewed the proposed plant's maximum modeled ambient air quality impacts against the applicable "significance impact levels" for each of the NAAQS's of concern for the plant, which are the benchmarks recognized by USEPA guidance and Environmental Appeals Board decisions for determining whether a significant adverse impact exists in an environmental justice community. The results of this analysis should be considered conservative for communities at greater distances, as they would experience lesser impacts.

64. This development did not conduct a true environmental justice analysis of my community and my community would be negatively impacted by the development. The exclusion of the Altgeld Gardens and surrounding neighborhoods show a lack of knowledge of the boundary this plant will have on my community. Majority of all air emissions that come from existing facilities, blow in my community's direction. Therefore, this development would be an added burden to citizens in this area who are already experiencing health problems. I hope that you will make the right decision and have Universal Cement redo its study and include the impacts that this plant will have on my community.

To omit my community, Altgeld Gardens, one of the most polluted communities in our nation, from its environmental justice analysis demonstrates that Universal Cement is trying to hide the truth about the exposures and the negative health impacts that this plant would have on my community. This permitting process needs to be started over to ensure that my community, an environmental justice community is examined and protected. These issues raised should serve as legitimate reasons to deny Universal Cement a permit and restart the public comment period!

Altgeld Gardens was not omitted from any of the analyses used to predict impacts from the proposed plant. The modeling analysis submitted by Universal Cement and reviewed by the Illinois EPA utilized a receptor grid extending about 6 miles in all directions from the

proposed plant. Altgeld Gardens is located approximately 3 miles to the southwest of the proposed plant, so potential impacts of the proposed plant on Altgeld Gardens were evaluated. As demonstrated by the modeling results summarized in the Environmental Justice Assessment submitted by Universal Cement¹¹⁶, maximum impacts from the proposed plant were located within 2 miles of the proposed plant, closer to the proposed plant than Altgeld Gardens. (All of the proposed plant's maximum impacts were well east of I-94 while Altgeld Gardens is located west of I-94.)

65. The appropriate geographic scope is the southeast Chicago area that was formerly nonattainment for PM₁₀, PM₁₀ and NO₂, where NAAQS exceedances were identified at several modeled locations, are the most significant pollutants.

The comment provides no basis for concluding that the boundaries of a past nonattainment area for a particular pollutant prescribes the radius of concern for that pollutant for purposes of an environmental justice analysis. EPA's process for redesignation of an area to attainment is very thorough. Furthermore, the EAB has recently reiterated long-standing EPA policy that the standards to be applied in an area are those of the currently applicable designation. At this time, the Chicago Metropolitan Non-Attainment Area is in "attainment" for both PM₁₀ and NO₂.

Furthermore, EPA policy and EAB decisions provide that the standard for EJ analyses in PSD permitting is whether the proposed action will significantly cause or contribute to non-attainment of a NAAQS.¹¹⁷ That analysis proceeds using conservatively established EPA "significant impact levels" to distinguish significant from *de minimis* impacts.¹¹⁸ Concern for environmental justice does not require more extensive review of a facility's impacts in an environmental justice community if those impacts are judged to be *de minimis* based on universally applied standards. See, *In re Prairie State Generating Company, LLC*, 13 E.A.D. 1, 124-125 (2006). In this case, the modeling predicts that the impacts from the emissions of PM₁₀ and NO₂ from the proposed plant will not exceed the conservative "significant impact levels" established for these pollutants.

66. The PM₁₀ and 1-hour NO₂ NAAQS are clear standards by which to evaluate whether there is a significant, adverse and disproportionate harm. As acknowledged by Illinois EPA, for the 24-hour PM₁₀ and 1-hour NO₂ NAAQS analysis, modeled concentrations, considering project emissions, emissions from regional inventory sources, and an additional background monitored concentration, showed modeled exceedances of the NAAQS occurred at several modeled receptor locations. Rather than reducing Universal Cement's emission limit based on this finding, Illinois EPA engages in a sleight of hand which broadly attributes the exceedances to existing air quality conditions and mandates fences rather than tighter emission limits. This not only ignores Illinois EPA's legal responsibilities under the PSD program, it also ignores clear EAB precedent about agency responsibilities to prevent significant, adverse and disproportionate harm.

¹¹⁶ Figures 5 and 6 of the *Environmental Justice Assessment*, dated October 2011.

¹¹⁷ *In re Shell Gulf of Mexico, Inc. & In re Shell Offshore, Inc.*, OCS Appeal Nos. 10-1 to 10-4, Slip Op. at 73-74 (EAB December 30, 2010).

¹¹⁸ *In re Prairie State Generating Company, LLC*, 13 E.A.D. 1, 108 (2006) ("significant impact levels under the PSD program...reflect levels that have been established at small fractions of the applicable NAAQS to distinguish between impacts that are trivial and impacts that are worthy of further investigation and analysis").

As discussed elsewhere in this Responsiveness Summary, the two-mile study radius appropriately employed by Universal incorporated all areas of maximum air quality impact for each of the four major contaminants of concern. The exceedances of the PM₁₀ and NO₂ NAAQS that were predicted by initial modeling were addressed with further culpability analyses. The preliminary analysis yielded maximum concentrations for 1-hour NOx and PM₁₀ attributable to the proposed plant that were in excess of the applicable significant or de minimis impact levels. This triggered a full impact analysis for the proposed plant and existing sources in the area.

Based on this more refined analysis for PM₁₀, and as previously discussed, the Illinois EPA determined that the NAAQS will not be exceeded at any ambient air receptor for which Universal Cement exceeds the significant impact level for PM₁₀. In addition, the Illinois EPA reran the 1-hour NOx NAAQS "culpability analysis". In response to a comment, the Illinois EPA employed the most recent version of AERMOD confirming that Universal Cement's emissions will not exceed the significant impact level for NOx at any receptor location. Given the proposed project's estimated air quality impact is insignificant (i.e., at or below de minimis levels) and would not thereby contribute to a predicted NAAQS or increment violation for PM₁₀, NOx, or any other PSD pollutant, all legal responsibilities under the PSD program have been fulfilled and responsibilities to prevent significant, adverse and disproportionate harm have been met by the Illinois EPA.

67. For the Environmental Appeals Board, failure to achieve the NAAQS constitutes clear evidence of a significant, adverse and disproportionate harm. *See, e.g., Knauff II*, 9 EAD. at 15-17; *In re Sutter Power Plant*, 8 E.A.D. 680, 692 (describing the NAAQS as the "bellweather of health protection"). In the recent *In Re Shell Gulf of Mexico, Inc. & In Re Shell Offshore, Inc.* case, the Environmental Appeals Board underscored that NAAQS compliance is a clear basis for evaluating whether a significant, adverse and disproportionate harm will occur, stating:

The Agency sets the NAAQS using technical and scientific expertise, ensuring that the primary NAAQS protects the public health with an adequate margin of safety ... The Board relies on and defers to the Agency's cumulative expertise when upholding a permit issuer's environmental justice analysis based on a proposed facility's compliance with the relevant NAAQS in a PSD appeal. In the context of an environmental justice analysis, compliance with the NAAQS is emblematic of achieving a level of public health protection that, based on the level of protection afforded by a primary NAAQS, demonstrates that minority or low-income populations will not experience disproportionately high and adverse human health or environmental effects due to exposure to relevant criteria pollutants. *In Re Shell Gulf of Mexico, Inc. & In Re Shell Offshore, Inc.*, OCS Appeal Nos. 10-1 to 10-4, Slip Op. at 73-74 (EAB December 30, 2010) ("Shell II").

Notably, in Shell II, the issue was non-compliance with the new 1-hour NO₂ NAAQS, which is also directly at issue in the present permitting.

The Illinois EPA concurs with the comment that the Environmental Appeals Board clearly articulated the standard for evaluating whether a significant, adverse and disproportionate harm will occur in an environmental justice community. Compliance with the NAAQS demonstrates that minority or low-income populations will not experience disproportionately high and adverse human health or environmental effects. *See, In re Shell Gulf of Mexico, Inc. & In re Shell Offshore, Inc.*, OCS Appeal Nos. 10-1 to 10-4, Slip Op. at 73-74 (EAB December 30, 2010). Significant impact levels or SILs ensure that an

individual facility will not exceed *de minimis* levels and thus, will not cause or contribute to an exceedance of a NAAQS.

To provide further clarification, where dispersion modeling predicts a violation of the NAAQS but the proposed source's impact is not significant at the violating receptor, the proposed source may be permitted. Meanwhile, in the event that modeling indicates that the NAAQS will not be violated at any ambient air receptor for which the proposed source exceeds the significant impact level, the proposed source may also be permitted. *Accord., In re Prairie State Generating Company, LLC*, 13 E.A.D. 1, 104-108 (2006); *see also, The NSR Workshop Manual, C.52.*

The comment suggests that the proposed source will exceed the significant impact levels and thus, will cause or contribute to a violation of the NAAQS. However, in this case, the modeling demonstrates that the PM₁₀ NAAQS will be met at any time and ambient air receptor location at which the proposed plant would have PM₁₀ emissions exceeding the SIL *de minimis* threshold -- thus the cumulative impact of the plant's PM₁₀ emissions and those of all other sources results in air quality that meets the protective NAAQS standard. Turning to the 1-hour NO₂ NAAQS, the Illinois EPA recently confirmed its original conclusion. As previously discussed in this response to comments, the modeling demonstrates that the proposed plant's emissions will be below the *de minimis* SIL's and thus will not cause or contribute to the cumulative impacts of all other sources of those pollutants in the area.

68. In light of exceedances of PM₁₀ and 1-hour NO₂ NAAQS at several modeled receptor locations, the geographically artificial, constricted Environmental Justice analysis in the present permit proceeding is illegally arbitrary.

The premise underlying this comment is that Universal Cement's modeling does not demonstrate compliance with the PM₁₀ and NO₂ NAAQS. However, the basis and legal support for the Illinois EPA's finding that Universal Cement's modeling was properly performed and demonstrates that the proposed source will not cause or contribute to non-compliance with any applicable NAAQS has already been discussed at length in this response to comments. Based on that finding, Illinois EPA concurs in the conclusion of the Environmental Justice Assessment that no further analysis of disproportionate impact is required under USEPA guidance concerning environmental justice.

As noted by the EAB in *Prairie State*, "significant impact levels under the PSD program...reflect levels that have been established at small fractions of the applicable NAAQS to distinguish between impacts that are trivial and impacts that are worthy of further investigation and analysis." *In re Prairie State Generating Company, LLC*, 13 E.A.D. 1, 108 (2006). In that case, the EAB upheld the Illinois EPA's conclusion that trivial impacts do not pose a concern for disproportionate impacts under an environmental justice analysis. *In re Prairie State Generating Company, LLC*, 13 E.A.D. 1, 123-125 (2006).

It should be noted that Illinois EPA went further than is required by USEPA guidance and Environmental Appeals Board decisions and independently modeled the potential for hazardous air pollutant impacts in the areas of greatest modeled impact. That modeling analysis, which found no impacts above conservative health-based standards, was also introduced and made available to the public at the public hearing and posted on the Illinois EPA and EPA Region 5 webpages at the outset of the public hearing. *See, Memorandum*

from Less Morrow, Environmental Toxicologist, to Bob Smet, Hazardous Air Pollutant Evaluation for Universal Cement, LLC, Chicago, Illinois, dated October 19, 2011.

69. At a minimum, this underscores the inadequacy of this analysis. However, the larger and more decisive point is that the existence of exceedances of the PM₁₀ and NO₂ NAAQS at several modeled receptor locations indicates that the proposed permitting of the Universal Cement plant will cause and contribute to significant, adverse and disproportionate harm. Illinois EPA has not addressed these exceedances by mandating more strict emission limits that would eliminate these NAAQS exceedances. This is not only a violation of Illinois EPA's responsibilities under the PSD program, it is also prohibited under Title VI of the Civil Rights Act of 1964 and Illinois EPA's obligation to USEPA to ensure its activities do not create a significant, adverse and disproportionate harm.

This comment indicates a misunderstanding of the EAB decisions on Environmental Justice. The existence of an exceedance at any given modeled point and time does not reveal anything about the causation of that exceedance. As discussed elsewhere in this response to comments, the Administrative Record clearly supports the Illinois EPA's finding that the proposed source will not have noticeable effects on the air quality in the Lake Calumet area. See, *The NSR Workshop Manual, pages C.24-C.26*. Again, computer modeling demonstrates that minority or low-income populations will not experience adverse human health or environmental effects, and as such will not be subject to disproportionate adverse impacts. Thus, the Illinois EPA has assured that these pollutants have been addressed in accordance with established EPA policy and EAB decisions interpreting the requirements of the PSD program and Title VI of the Civil Rights Act. Accord, *In re Shell Gulf of Mexico, Inc. & In re Shell Offshore, Inc.*, OCS Appeal Nos. 10-1 to 10-4, Slip Op. at 73-74 (EAB December 30, 2010).

The comment incorrectly assumes that a new source cannot be permitted in a PSD area if a modeled event indicates an exceedance of a NAAQS unless the proposed source's emissions are restricted to entirely offset the cumulative impact of existing sources. This is incorrect. Nothing in the PSD program regulations, EPA's EJ guidance or EAB decisions indicate that a new source that is *demonstrated not to cause or contribute to an exceedance of a NAAQS* cannot be permitted without offsetting existing background emissions. PSD regulations do provide that a PSD source that *is found to be significantly causing or contributing to an exceedance of a NAAQS* may be permitted if it mitigates its own impact by offsetting its own emission contribution. However, in this case, the modeling demonstrates that the proposed plant's emissions will not cause or contribute to any event in which a NAAQS was modeled as being exceeded based upon the inventory of existing permitted emission sources. Therefore, no offset is required. Furthermore, although compliance with the NAAQS is presumptively compliance with EJ standards for no adverse impact, there is no requirement that new construction be prohibited in EJ communities absent the ability of new facilities to offset existing pollution. Indeed, such a requirement could prevent the construction of even very clean facilities in EJ communities. This could contribute to a downward economic cycle in such communities. The proposed plant will be subject to very stringent emission standards, but it cannot be held to a requirement that it must single-handedly reverse the contribution of every existing permitted source in Southeast Chicago.

70. The 10th Ward is a minority community. According to the 2010 census, the population of the 10th Ward is about 52,000 people of which 63% are Latino and 18% are African American. So when there is a cumulative impact and a preponderance of hazardous, toxic, polluting industry in our past, in our present and scheduled for our future – this speaks to egregious and serious acts of

environmental injustice and smacks of environmental racism.

As already discussed, the various air quality analyses submitted with the application and the Illinois EPA's review of these analyses and its own modeling analysis show that the proposed plant should not pose a threat to public health. In particular, the proposed source will not cause or contribute to a predicted NAAQS or increment violation and thus, ensures that this community is not disproportionately impacted by degradation of the environment.

71. The Southeast side has been designated a "nonattainment" area. While this project meets some of Illinois' individual environmental standards, the Illinois EPA must also take into consideration the cumulative effects and impacts upon our community.

As the Southeast side is part of the Greater Chicago Metropolitan Area, which is currently designated as nonattainment for only the NAAQS for ozone and PM_{2.5},¹¹⁹ it triggers additional regulatory requirements for the permitting of the proposed plant. For NO_x, a precursor to formation of both ozone and PM_{2.5} in the atmosphere, and for SO₂, a precursor to PM_{2.5} formation, this includes the requirement to provide emission offsets, i.e., creditable reductions in emission of NO_x and SO₂ at existing sources, that respectively are greater than the proposed plant's permitted emissions of NO_x and SO₂. Under the permit, emissions of VOM, which contribute to ground-level ozone, are addressed by restricting VOM emissions so that the plant would not be a major source of VOM and the requirements of Illinois' Major Stationary Sources Construction And Modification (MSSCAM), 35 IAC Part 203, for proposed major projects are not triggered. Likewise, the plant's direct PM_{2.5} emissions must be below the major source of MSSCAM.

While USEPA in its *Plan EJ 2014* has stated its intent to develop guidance on how cumulative impacts might be addressed in the permitting context, the best guidance on this to date is USEPA's own environmental justice analyses for PSD permits and EAB decisions discussing appropriate environmental justice analyses. The EJ analyses in those cases indicate that cumulative air pollution impacts are addressed by the benchmark of the NAAQS and modeling demonstrations for compliance with the NAAQS. *See, In re Shell Gulf of Mexico, Inc. & In re Shell Offshore, Inc.*, OCS Appeal Nos. 10-1 to 10-4, Slip Op. at 73-74 (EAB December 30, 2010). The NAAQS are conservatively designed to protect sensitive populations from the cumulative emissions sources that impact air quality.¹²⁰

¹¹⁹ The fact that a particular area is part of a larger area that is designated nonattainment does not indicate that air quality levels in the smaller area actually exceed the NAAQS. Rather designation is a legal determination that there have been exceedances in the larger area. In addition, designation as nonattainment does not mean that air quality in the area is currently exceeding the NAAQS. Because air quality designations are a formal determination by USEPA, based on a relevant body of air quality monitoring data, the redesignation to attainment lags behind actual attainment of the NAAQS.

¹²⁰ "Primary" NAAQS are set to protect public health, including the health of "sensitive" populations such as asthmatics, children and the elderly. *See*, <http://www.epa.gov/naaqs/>. Section 109(b)(1) of the Clean Air Act defines national primary ambient air quality standards as "allowing an adequate margin of safety . . . requisite to protect public health." USEPA has interpreted the legislative history to §109 of the Clean Air Act as requiring primary standards be set at the "maximum permissible ambient air level . . . which will protect the health of "any [sensitive] group of the population." *Primary National Ambient Air Quality Standards for Nitrogen Dioxide*, 75 FR 6474, 6475, fn.2 (February 9, 2010) & *National Ambient Air Quality Standards for Particulate Matter*, 71 FR 61144, 61145, fn.1 (November 17, 2006). "[T]he protection offered by these standards may be especially important for children because children, along with other sensitive population subgroups such as the elderly and people with existing heart or lung disease, are potentially susceptible to health effects resulting from PM exposure." 71 FR 61144, 61218 (November 17, 2006); *see also*, 75 FR 6474,

Modeling demonstrations performed in the context of a permit application, such as that of Universal Cement, incorporate both monitored air quality as “background” emissions and conservatively assumed maximum allowable emissions for the state’s inventory of permitted stationary sources and add the proposed source’s emissions.

In this case, the modeling demonstrates that the PM₁₀ NAAQS will be met at any time and ambient air receptor location at which the proposed plant would have PM₁₀ emissions exceeding the SIL *de minimis* threshold -- thus the cumulative impact of the proposed plant’s PM₁₀ emissions and those of all other sources results in air quality that meets the protective NAAQS standard.

For NO₂, SO₂ and CO, the other PSD criteria pollutants which will be emitted by the proposed plant, the modeling demonstrates that the plant’s emissions will be below the SIL’s or *de minimis* and thus will not meaningfully cause or contribute to the cumulative impacts of all other sources of those pollutants in the area.

While the cumulative modeled emissions in the area of the proposed plant do exceed the NAAQS at some locations and some times, the modeling demonstrates that this would occur regardless of this permitting action and cannot be effectively addressed by further reducing emissions from this already highly regulated and very low emitting new facility. In its opinion in *In re Prairie State Generating Co.*, the EAB explained that where a permit modeling demonstration predicts an exceedance of a NAAQS, but also demonstrates that the proposed source does not “cause or contribute” to the violation, “the identification of a potential violation of the NAAQS requires the permitting authority to address the causes of the violation (i.e. other sources that significantly contribute to the violation) as a matter independent of the permitting action in which the modeling was conducted...” *In re Prairie State Generating Company, LLC*, 13 E.A.D. 1, 107 (2006).

To take a different approach in an environmental justice community and prohibit permitting new facilities in environmental justice communities where a pre-existing NAAQS exceedance is modeled would not clean up the existing cumulative impacts and would also deter economic development in those communities.

72. Do not cut my children and grandchildren’s lives short by allowing the proposed plant to pollute the air more. My community is an environmental justice community because it is a minority community. Many people have low incomes. Have pity and do not allow the proposed plant in my community.

The air quality analyses submitted with the application show that the plant should not pose a threat to public health. As discussed elsewhere, the proposed source will not cause or contribute to a predicted NAAQS or PSD increment violations.

73. Air quality in the surrounding area/communities is less than "quality." Additional emissions will have an additive or cumulative effect that is not being taken into consideration

6529 (February 9, 2010) (discussing the protection afforded by NO₂ NAAQS may be especially important for asthmatics including asthmatic children).

“Secondary” NAAQS are set to protect public welfare and the environment. Both primary and secondary NAAQS are addressed by air pollution control programs, including nonattainment designations and the permitting of proposed new major sources and major modifications at existing sources.

The Illinois EPA shares the concerns expressed by this comment about the current levels of air quality in the Greater Chicago Metropolitan Area. However, current air quality is being appropriately addressed by activities to lower emissions and to maintain compliance with the NAAQS. These NAAQS are established by USEPA to protect human health and welfare and the environment based on careful review of scientific research and study. There are also other USEPA programs whose specific focus is to generally improve air quality in urban areas, such as the required reductions in the sulfur content of gasoline and diesel fuels used in motor vehicles.

Based on the existing monitoring network maintained by the Illinois EPA and the Indiana Department of Environmental Management, the southeast area of Chicago, including the area in the vicinity of the proposed plant, meets all NAAQS. Specifically, air quality monitors located near the proposed site, including the Washington high school monitor located at 3535 E 114th Street, and the Carver monitor located at 13100 S. Doty, show annual and 24-hour PM_{2.5} and 24-hour PM₁₀ concentrations meeting the applicable NAAQS.¹²¹ Nearby Chicago area monitors for ozone, CO, NO₂, SO₂, and lead show similar concentrations meeting the respective NAAQS in the most recent year of data availability.

The air quality analysis completed as part of the permitting process for the proposed plant showed that, for those pollutants which trigger a comprehensive air quality modeling analysis, the impacts on air quality from the proposed plant will be less than the significance levels established by USEPA.¹²² The exception to this was for PM₁₀, for which the proposed plant was found to have a significant impact, per the modeling study completed by Universal Cement. However, the analysis completed for PM₁₀ showed that the proposed plant, in combination with other nearby and regional sources of PM₁₀, and with the safeguard of fencing as addressed in Condition 1.2(b) of the issued permit, will not cause or contribute to an exceedance of the PM₁₀ NAAQS or PSD increment standards.¹²³

An additional analysis, completed by Illinois EPA as part of its review of the impacts of hazardous air pollutants emitted from the proposed plant, also showed that the emissions from the plant will not exceed established thresholds.¹²⁴

74. This area in the past had steel mills which are no longer here. (LTV, Acme, Wisconsin Steel). My neighbors are all dead due to cancer. Now the area has big coal piles and an asphalt company just west of my neighborhood. When the wind blows, there is the odor of asphalt and the dirt from the coal piles is black. What is a cement plant going to add to problems here?

Cement plants do not handle asphalt or other similar organic liquids, so odors should not be a concern for the proposed plant. As compared to the existing coal terminal, the plant would handle less material, material would not be handled in the open, and the nearest

¹²¹ Illinois EPA, *Illinois 2010 Annual Air Quality Report*.

¹²² *Class II Air Quality Analysis Report*, February, 2011, Section 8.4. Further analysis conducted by Universal Cement, per comments received on November 18, 2011, validated the initial conclusion that the proposed plant would not have a significant impact for 1-hour NO₂ concentrations (per section 8.5.3 of the February, 2011 report). This validation was confirmed by the Illinois EPA per additional modeling completed after the comment period ended on November 18, 2011, confirming that Universal Cements proposed emissions did not cause or contribute to a modeled exceedance of the 1-hour NAAQS at any receptor where Universal Cement could have a significant impact.

¹²³ *Class II Air Quality Analysis Report*, February, 2011, Sections 8.5 and 8.6.

¹²⁴ Illinois EPA, *Hazardous Air Pollutant Evaluation for Universal Cement, LLC, Chicago, Illinois*, October 19, 2011.

residences would be much further away.

More generally, as previously discussed, the Illinois EPA considered the cumulative effects and impacts of the proposed project to the Lake Calumet area. The review of the proposed plant shows that the quality of the air would continue to be protected. The permit for the plant sets specific limits on the amount of emissions and also includes provisions to assure that the plant is appropriately controlled to maintain emissions within these limits. This includes emissions monitoring, operational monitoring, emission testing and recordkeeping to verify that the emission units at the plant are properly operated and actual emissions are within permitted levels.

75. I need to know the cumulative effects of all the different sources in the area, both in Chicago and Indiana that affect the area and my community.

Information on current air quality in or representative of the Southeast Side is available from the ambient air monitoring stations in the area and nearby in Chicago and northeast Indiana.

76. I request the Illinois EPA require the proposed plant to use a cleaner fuel or to deny the permit.

The fuel selected by Universal Cement for the proposed plant does not provide a legal basis to deny the permit. The review of the plans for the proposed plant included consideration of using “cleaner fuels,” as an alternative to the planned fuels. The review concluded that the plant could comply with applicable regulatory requirements with the fuels that are planned for the plant. In this regard, because of the way that fuels burn in a cement kiln and the add-on control equipment on the proposed kiln, the quality of the fuel appears to be a minor factor in its emissions, except for emissions of GHG (CO₂). However, CO₂ does not pose a direct threat to local human health, use of natural gas would act to increase emissions of NO_x and the cost associated with using natural gas instead of the planned fuels, would be excessive.

77. My community has more than its fair share of polluting industries. The cumulative effect of the emissions from these industries must be taken into account.

The permit process for a proposed major source considers the effect of the proposed source and existing sources already in the area as necessary to confirm that the proposed source will not cause or contribute to violations of air quality standards. Consistent with this process, the Illinois EPA appropriately considered the cumulative effects and impacts of the proposed plant to air quality in the Lake Calumet area. The review of the proposed plant shows that the quality of the air would be protected. In particular, the air quality analysis for PM₁₀ shows that the plant should be considered to have an insignificant effect on ambient air quality.

78. I have never seen an enclosed coal pile proposed so far, but this is the third in a very recent onslaught of new sources that are high in air pollutants for asthma. There is a serious concern in my community that the cumulative impact is not really being looked at, that attention is not really being paid to not only how do all the permits add up in this area, but over the border in Indiana that is a stone's throw away. So, I'm wondering if you could give us kind of an overview of what it is the Illinois EPA does to take into consideration the cumulative impact, and if there's anything that's done, especially if you take into consideration right across the border when we've got all those industries in Indiana as well.

As part of the modeling for the proposed plant, a cumulative impact analysis was performed for PM₁₀ and NO₂, as required for the permitting of the plant under the PSD program. For other criteria pollutants, emissions and/or modeled impacts were below applicable regulatory or policy thresholds adopted by USEPA so further analysis was not required as part of the permitting process. Accordingly, for these pollutants, Illinois EPA and the Indiana Department of Environmental Management will continue to operate and maintain a system of ambient air monitors that will be used to assess cumulative or overall quality of air in the area for different pollutants. These monitors will also provide data for the overall air quality for PM₁₀ and NO₂.

79. The Illinois EPA must consider the new liquid asphalt terminal already down the street.

The new liquid asphalt terminal north of the site of the proposed plant, Asphalt Operating Services at 2701 East 106th Street, does not pose any issues for the permitting of the proposed plant. This terminal facility is not a major source of emissions. The principal pollutant emitted by the facility is hydrocarbons or volatile organic material, from the liquid asphalt and asphalt solutions that are stored and handled at this facility.¹²⁵

80. Because a number of projects are proposed for my community, they must conform to higher standards and to a higher level of expectations, even if it is at a great cost to those companies.

As already discussed, applicable air pollution control rules, as implemented through the issued permit will hold this plant to a high standard for control of emissions. The plant is expected to be the first new portland cement plant in the United States regulated under USEPA's recently adopted NESHAP rules for Portland Cement Plants. Although the plant is a minor source of HAP emissions based on enforceable limits in its permit, it is nonetheless required to comply with almost all of the same stringent standards that are applied to major sources of HAP. While subject to challenge and recently remanded in part, these rules are applied in this permit.

81. The Illinois EPA must also strongly weigh and consider the coal gasification plant proposed by Leucadia and the many other projects and plans that our community is not even aware of.

As a general matter, companies proposing new sources must address the "existing sources," both operating and permitted for construction, in the area in which they seek to locate. It is neither practical nor legally justified for a company that is applying for a construction permit for a proposed project, like Universal Cement, to consider "future sources" that might be proposed at some later date. Likewise, other than actions that are taken during the review of an application for a proposed major source to generally protect air quality, the Illinois EPA cannot specifically address "future sources" that might be proposed for the area at some later. At a minimum, it is not reasonable to expect either a company or the Illinois EPA to speculate on the nature of such future sources and their emissions. Any such future sources will have to address the area in which it seeks to locate, including the level of air quality due to the emissions from the pre-existing sources in the area. In this regard, as the Leucadia plant would almost certainly be a major source of emissions,¹²⁶ before a construction permit would be

¹²⁵ For more information about Asphalt Operating Services refer to its website, <http://aoschicago.net/image>.

¹²⁶ As of the date that the construction permit was issued for the proposed plant, Leucadia had not submitted an application to the Illinois EPA for a construction permit for the substitute natural gas plant that it has announced that it is considering developing at a site on the Southeast Side.

issued for the Leucadia plant, Leucadia would have to conduct air quality analysis to show that it would not cause violations of the NAAQS considering the emissions of the proposed plant, which has preceded it in permitting.

When conducting the air quality analysis, if a project could have significant impact on air quality by itself, the applicant is required to appropriately address existing sources in its further air quality analyses, either by specifically including them in the modeling or addressing them through the background data for ambient air quality.. However, future sources are obviously not included, and any major source of emissions, such as a coal gasification plant, proposing to construct in the future will have to undergo its own air quality analysis to determine its effect on the degradation of the air quality.

82. The prevalence of asthma is on the rise, and it appears that at least some of the increase can be attributed to emissions.

The observation in this comment is not supported by the actual facts. Since 1970 to the present, when reported cases of asthma have reportedly been on the rise, emissions have been substantially reduced and air quality has improved significantly, as is clearly the case in the Southeast Side. Some studies have found that pollution-derived particulate in outdoor air has little relationship to the prevalence of asthma. Various studies have found neighboring communities in the same air shed with essentially identical air quality, with widely disparate asthma hospitalization rates. Studies show that asthma incidence and predisposition to allergic reactions is increasing even though air quality is improving. One hypothesis is that this phenomenon is unrelated to outdoor, ambient air quality but is instead due to changes in lifestyle and “energy conservation”, which are increasing exposure to indoor allergens.¹²⁷

At the same time, efforts also continue to be made to improve public awareness of the importance of air quality and the actual daily air quality levels. This is particularly important for individuals that do have asthma or other chronic respiratory diseases. This information allows them to take appropriate measures to reduce any added risk to their health posed by poor air quality, by reducing time spent outdoors, avoiding physical exertion, and other precautions that are appropriate for their condition, in addition to the measures that they must routinely take. As already discussed, to assist these individuals and others who are particularly sensitive to ambient air quality, the Illinois EPA uses the Air Quality Index to report air pollution levels on a daily basis.

83. Many children today have respiratory problems. Many of my friends have been unable to carry a fetus to full term. Some friends never were able to have children. I never could have children.

The Illinois EPA, as well as USEPA, are concerned about the potential for additional health risks to children and women of child-bearing age, as well as the elderly, and work to address those potential risks in various programs. For example, concerns about mercury

¹²⁷ Geographical variations in asthma hospitalization rates also show sharp differences that cannot be attributed to differences in ambient air quality. In Europe, asthma rates appear lower in more polluted regions than in regions with cleaner air. Research conducted in New York City has found that asthma prevalence correlates strongly with socioeconomic status, with several factors linked to poverty. Specific factors that related to asthma risk in low income areas were the number of occupants per household (bacterial exposure), water leaks (fungal exposure), deteriorating building materials (fungal and mite exposures), and exposure to house dust, including animal dander.

contamination and programs to address such contamination and to control mercury emissions are driven by the need to protect children and unborn children. NAAQS are set at levels as needed to protect sensitive sectors of the population, notably the young as well as the elderly and those already suffering from respiratory disease, as appropriate based on the potential effects of exposure to a pollutant. NAAQS are not set just at the higher, less stringent level to protect healthy adults.¹²⁸ Concerns about children do not necessitate an additional assessment as part of the permitting of the proposed plant. This is because the regulatory programs that are being implemented through this permit already address concerns about disproportionate impacts of emissions and poor air quality on children, wherever they are.

84. My son takes medication twice a day to control his asthma and he takes his inhaler when he has difficulty breathing. I have met many adults and children who also suffer from asthma. Sad to say, I have known many of them that have passed away from an asthma attack. Please do not allow the proposed plant to come into my community to pollute more into the air.

As noted in this comment, asthma is a serious disease that requires appropriate care and management. To assist asthmatic individuals and others who are particularly sensitive to ambient air quality, the Illinois EPA uses the Air Quality Index (AQI) to report air pollution levels on a daily basis. This allows individuals who may be affected by poor air quality, and the parents of the children who may be affected by poor air quality, to plan and adjust activities appropriately. In Illinois, most of the orange days, in which air quality may affect sensitive individuals, are generally associated with ozone levels. With improvements in air quality, the number of orange days continues to go down.

85. My family and I all suffer from asthma. Many of my neighbors are also living with asthma. Please do something to clean the air. Please do not bring more companies to damage health of my family and neighbors. Even if these companies bring jobs, people here cannot use these jobs because they are sick and others have to take care of their sick relatives.

As discussed, the emissions of the proposed plant should not meaningfully affect air quality. At the same time, other actions are occurring involving existing source so that there should be continuing improvements in the air quality and the quality of life for residents of the Southeast side.

86. The community already experiences health and illness disparities and the plant would contribute to these issues.

This should not be the case. The air quality modeling analyses show that the plant should not have noticeable effects on the air quality in the various communities in the Lake Calumet area. This evaluation, which was performed using computerized dispersions modeling, shows that the concentrations of these pollutants in the air would continue to be below the NAAQS, which are established by USEPA to protect human health and welfare. In addition, as discussed actions are occurring that will reduce emissions and improve air quality

¹²⁸ USEPA has recognized that the protection afforded by the PM NAAQS is important for children, the elderly and those with existing heart or lung disease and the protection afforded by the NO₂ NAAQS may be especially important for asthmatics including asthmatic children. See, *National Ambient Air Quality Standards for Particulate Matter*, 71 FR 61144, 61218 (October 17, 2006) & *Primary National Ambient Air Quality Standards for Particulate Matter*, 75 FR 6474, 6529 (February 9, 2010).

87. Big coal piles have appeared behind my house. Every time family cooks out, the meat is covered in coal dust. When the company waters the coal down and I am in my backyard, I can feel the coal with water hit all over me. My family cannot open the windows because the coal dust covers everything. I will not let my children go outside to play because their hair gets full of dust and I can see dust on their clothes. I do not want any more of the same or worse.

The complaints about existing sources in the area that were made during the comment public period for the proposed plant have been referred to Illinois EPA's Field Operations Section for investigation and appropriate follow up action. The circumstances at these existing sources also should not be equated with the conditions at the proposed plant, which would not be located near residence and must be designed and operated to prevent nuisance dust. For example, as compared to the coal terminal that is the subject of one complaint, must less would handle and it would not be managed in open piles but in an enclosed silo.

88. Identifying alternative fuels and power sources that have less emissions of pollutants for my community such as a solar farm, wind power, biofuels and the like, are not the responsibility of the community but the responsibility of companies that want to build new facilities.

Alternative fuels, such as biofuels, were examined as part of the control technology review for this project. The examination of alternative power sources, such as solar and wind, falls outside the scope of this permitting matter and is a responsibility that is, at some level, shared by everyone.

89. My concerns is emissions from the burning of coal, petroleum coke, and tires in the kiln.

As discussed, the emissions from combustion of fuels are addressed by the permit. They will be appropriately addressed by the design of the kiln, good combustion practices, SNCR, a baghouse (filter). Proper operation of these systems will be verified by the continuous emissions monitoring that is conducted for the kiln for various pollutants.

90. Public health and welfare require that the United States and Illinois move forward with sustainable clean energy alternatives.

While the Illinois EPA generally supports the sentiment expressed in this comment, it is not relevant to the permitting of the proposed plant, nor is it relevant to production of portland cement. The issue before the Illinois EPA for permitting is whether it the plans for the plant would satisfy applicable regulatory requirements and criteria for issuance of a permit. The application a submitted by Universal Cement and the various review conducted by the Illinois show that the plants for the plant meet these requirements.

91. I am concerned about devaluation of my property due to pollution.

The permitting programs administered by the Illinois EPA are only one factor in the value of residential property, as they provide for the control and prevention of pollution. Also important are local land use planning and management and other programs that are administered by local government, in this case, the City of Chicago. In this regard, the proposed plant would be located on an existing industrial site that is physically separate from residential neighborhoods, consistent with the Calumet Land Use Plan. This plan maintain industrial development in industrial areas, with further development of buffer zones (i.e., parks and open spaces) to separate industry from residential neighborhoods.

92. The lone operating ambient air monitor on the southeast side is located at Washington High School. This monitor has recently indicated extremely hazardous levels of pollution.

This comment is not correct. In recent years, the ambient monitoring station at Washington High School has confirmed that air quality complies with the NAAQS for PM_{2.5}, PM₁₀ and lead with a substantial margin of compliance.^{129, 130} As already discussed, other ambient monitoring stations are also located in the general area and confirm that air quality in the area currently complies with the NAAQS.

93. I want the Illinois EPA to install additional ambient air monitors in multiple locations in the Southeast Side, with real time access to the data collected from these monitors. If not, we request the Illinois EPA deny this permit.

Additional ambient air monitoring stations are not needed in the Southeast Side. The ambient monitoring stations in the general area of the proposed plant, including stations in both Illinois and Indiana, are sufficient to provide air quality data that is representative of the Southeast Side.¹³¹

As already discussed, the Illinois EPA uses the Air Quality Index (AQI) System to provide “real-time” information on air pollution levels on a daily basis. On an annual basis, the Illinois EPA reports the quantitative, numerical information for the air quality measured at its ambient air monitoring stations in an annual report.¹³²

¹²⁹ Based on data measured in 2010 at the ambient monitoring station at Washington High School: PM_{2.5} 24-hour average design values* (2008 – 2010) 29.4 µg/m³, compared to the NAAQS of 35 µg/m³
PM_{2.5} annual average design values* (2008 – 2010) 12.7 µg/m³, compared to the NAAQS of 15 µg/m³
PM₁₀ maximum 24-hour average concentration 91 µg/m³, compared to the NAAQS of 150 µg/m³
Lead maximum 3-month average 0.05 µg/m³, compared to the NAAQS of 0.15 µg/m³

* Because the NAAQS for PM_{2.5} apply as the average of air quality data over a period of three years, air quality for PM_{2.5} compared to the NAAQS is expressed in terms of “design values.”

In 2010, the highest 24-hour average concentration measured at Washington High School was 41.5 µg/m³, which is over the numerical value of the NAAQS. Because of the statistical form of the PM_{2.5} NAAQS, this measurement does not indicate that the NAAQS was violated. Indeed, this is only value higher than the numerical value of the NAAQS during the three years period of 2008 through 2010. The second highest concentration measured in 2010 was 30.3 µg/m³, which was also the 98th percentile concentration.

¹³⁰ In 2010, on most days, the Air Quality Index data for the City of Chicago showed good or moderate air quality (58.4% and 40.3% of year, respectively). Air quality was rated as unhealthy for sensitive groups on five days (1.4%). On no days was the air quality rated as unhealthy.

¹³¹ There are a number of ambient air quality monitoring stations operating in the general area in which the proposed plant would be located:

Washington High School, 3535 E 114th St, Chicago – PM_{2.5}, PM₁₀ and lead

Carver High School, 13100 S. Doty, Chicago - PM₁₀

Southeast Police Station, 103rd and Luella, Chicago – PM_{2.5} and SO₂

Franklin School, 141st Street, East Chicago – PM_{2.5} and PM₁₀

Post Office, 901 E. Chicago Ave., East Chicago – CO

IITRI Bunker, 201 Mississippi St., Gary – PM_{2.5}, PM₁₀, SO₂, NO_x, ozone and lead

Clark High School, 1921 Davis St., Hammond – PM_{2.5} and PM₁₀

Purdue University Calumet, Powers Building, 2200 169th St., Hammond – PM_{2.5}

1300 E. 141st St., Hammond – SO₂, lead and ozone

Whiting High School, 1751 Oliver St., Whiting – ozone

¹³² The Annual Air Quality Reports prepared by the Illinois EPA are available on the internet. <http://www.epa.state.il.us/air/air-quality-report/index.html>

94. Where are the existing ambient air monitors and are there enough of them in the right places? If the existing monitors are inadequate, the accuracy of the air quality modeling may be called into question, since the results of the modeling combine projected impacts from modeling and monitored background concentrations.

The number of monitors in the vicinity of the proposed plant, in southeast Chicago and northwest Indiana, provides ample monitoring data to determine the air quality in the southeast Chicago geographical area.

95. A public park is within a third of a mile of the proposed plant site, one where multi-use trails will eventually be incorporated as amenities for the public to use to connect in a healthy way with the outdoors. It would be ill advised to do so in air that is a toxic soup of particulate matter and toxins.

The presence of public parks near the site of the proposed plant does not alter the conclusions regarding the air quality impacts of the plant, as discussed above and summarized in the Project Summary, based on the air quality modeling analysis conducted for the plant.¹³³

The air quality analysis submitted by Universal Cement and reviewed by the Illinois EPA shows that the proposed project will not cause or contribute to violations of the ambient air quality standards or applicable PSD increments for SO₂, NO₂, PM₁₀ and CO.

The approach taken in the modeling of the proposed plant was consistent with well established methodology for modeling.¹³⁴ Receptor grids are developed to identify areas of maximum impacts. Receptors are located closer together in areas where high concentrations are likely, in the immediate vicinity of the plant, which included the public park that would be located 1/3 mile from the proposed plant site.¹³⁵

96. It appears to be inconsistent to state that the area is a nonattainment area and that the plant will emit criteria pollutants, yet that NAAQS will not be exceeded. Can you clarify?

In a situation where the NAAQS for a pollutant are already exceeded, any proposed new major source must acquire offsets for the nonattainment area pollutant that are more than the amount of its proposed permitted emissions for that pollutant. It must also utilize technology that ensures that the emissions of that pollutant are at their lowest, i.e., Lowest Achievable Emission Rate.

97. In addition, even though Illinois EPA acknowledges additional truck traffic will be generated by the operations of this plant, it is not clear the air quality impact of this truck traffic was included in any PM₁₀ or NO₂ modeling. If this additional source of emissions was not included, it suggests that local air quality impacts related to the proposed plant have, if anything, been underestimated.

¹³³ See Section VII of the Project Summary and the Class II Air Quality Analysis, submitted February, 2011.

¹³⁴ *Class II Air Quality Analysis*, submitted February, 2011, Section 8.2.4. The procedures followed in this modeling analysis are consistent with modeling guidelines (*Prevention of Significant Deterioration, The Art and Science of the PSD Air Quality Analysis, The Modeling Perspective*, Illinois EPA April 15, 2010 and the USEPA's *Guideline on Air Quality Models*, 40 CFR Part 51, Appendix W (Revised, November 9, 2005).

¹³⁵ It is also noteworthy that public parks and other open space sites are developed in part to function as a buffer between industrial areas and residential areas.

The inclusion of additional truck traffic on the roadway infrastructure around the proposed Universal Cement facility was not modeled against either the PM₁₀ or NO₂ NAAQS. As per *The NSR Workshop Manual*,¹³⁶ the inclusion of background concentrations in the modeling analysis will account for the impacts of existing sources and growth in residential, commercial, and industrial source emissions due to the new source. This guidance was under the auspices of the Full Impact Analysis of which the NAAQS modeling is a part. *The NSR Workshop Manual* goes on to say that:

While existing mobile source emissions are considered in the determination of background air quality for the NAAQS analysis (typically using existing air quality data), it should be noted that the applicant need not model estimates of future mobile source emissions growth that could result from the proposed project because the definition of "secondary emissions" specifically excludes any emissions coming directly from mobile sources.

Air quality data may be used to establish background concentrations in the impact area resulting from existing sources that are not considered as nearby sources (e.g., area and mobile sources, natural sources, and distant point sources).

Thus, including the background concentrations measured by ambient monitors fulfilled the need to consider the impacts of any increased truck traffic.

Furthermore, as the trucks serving the plant would be mobile sources, their tailpipe emissions should not be included in the construction permit for the proposed plant, which can only address emissions from the plant itself (e.g., the kiln, material handling, etc.). Emissions from mobile sources are addressed as part of transportation planning, separately from the permitting of stationary sources. Mobile sources, including cars and trucks, are subject to federal regulations adopted by USEPA that are lowering emissions from this source sector as existing vehicles are replaced with new vehicles.

98. Any model used to assess attainment should include the contribution of mobile sources that are essential for the construction and operation of this plant and that, but for the construction and operation of this plant, would not impact local air quality.

The emissions from additional truck traffic in the area are accounted for in air quality analysis with the data for background air quality that is collected from ambient air quality monitoring stations.¹³⁷

99. Ozinga will use barges on the Calumet River to bring its supplies, which means more bridges going up, stopping traffic. The southeast side is cut off by bridges and trains now. In an emergency, ambulances have to stop for bridges and trains. Will any of these companies help with my family's medical bills?

¹³⁶ *The NSR Workshop Manual*, Chapter C, Section V.A

¹³⁷ *The NSR Workshop Manual* at page C.34, "While existing mobile source emissions are considered in the determination of background air quality for the NAAQS analysis (typically using existing air quality data), it should be noted that the applicant need not model estimates of future mobile source emissions growth that could result from the proposed project because the definition of "secondary emissions" specifically excludes any emissions coming directly from mobile sources."

While this comment is beyond the scope of this permitting matter, the public is urged to contact the appropriate local, state and federal transportation regulators who address these specific issues.

100. Where will the emission offsets for the NO_x and SO₂ emissions of the proposed plant be obtained from and is there a particular candidate for these offsets?

It is expected that the emission offsets will be obtained from Corn Products International, Inc., from its plant in Bedford Park. It is located in the industrial corridor along the Sanitary Ship Canal. The area includes a number of “industrial facilities,” including the Stickney Works of the Metropolitan Water Reclamation District of Greater Chicago. Bedford Park is located in the former McCook Vicinity PM₁₀ Nonattainment Area.

101. I understand that local approvals would also be necessary before the proposed plant could be constructed. In the Responsiveness Summary, I request Illinois EPA to identify these other local approvals and explain why Illinois EPA is engaging in permitting activity for a plant that has not acquired all necessary local approvals.

While the Illinois EPA would also expect that various local approvals would be needed for the construction of the plant, notably building, air quality and business permits from the City of Chicago, the Illinois EPA does not know which approvals would actually be needed. This is because local permitting and approvals are separate from the environmental permitting programs administered by the Illinois EPA under state law. In addition, these local permits and approvals may address aspects of proposed sources that do not involve emitting equipment and operations.

There is not a legal requirement that local permits and approvals for the proposed plant be obtained prior to action by the Illinois EPA on this air pollution control construction permit, which is needed for the plant under state law and regulation. Indeed, for certain proposed projects it is common for state permitting to be completed before the local approval process is completed. For example, local government officials may want a proposed source to have received a state permit before they complete their review of the proposed source.

102. Will site remediation activities be required on this former industrial property before the proposed plant can be constructed? How would any pre-construction remedial activities be taken into account in determining the date by which Universal Cement would be required to begin actual, continuous construction?

Universal Cement indicates that the due diligence review conducted for the site of the proposed plant has not identified the need for site remediation. In the event that the need for remediation is identified in the future, the date by which Universal Cement would have to commence construction under the issued permit would be addressed in accordance with relevant regulatory provisions and USEPA policy and guidance dealing with the timing for commencement of construction and expiration of permits under the federal PSD program.¹³⁸

¹³⁸ The PSD rules, 40 CFR 52.21(r)(2), generally provide that an approval to construct shall become invalid if construction is not commenced within 18 months after such approval becomes effective, if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time. This period of time may be extended upon a satisfactory showing that an extension is justified.

103. What impact do comments and concerns from the public have upon the Illinois EPA in its decision on this application?

The comments that are the most relevant to the permitting of this proposed plant are ones that relate to the applicable regulatory issues that must be addressed in the review of the application for this plant. Comments supporting the proposed plant because of the jobs and economic benefits that it would provide are generally not relevant to the permitting process.

104. Will a more complete Spanish translation be available? Also, will there be a Spanish translation of the Environmental Justice Assessment, given that this is a major concern from this community.

The Illinois EPA has provided Spanish translations of documents that provide general information about the proposed plant. It is not appropriate for the Illinois EPA to provide Spanish translations of documents that are regulatory in nature or highly technical in nature, such as the Environmental Justice Assessment. In addition to the effort that would be entailed in undertaking such translations, the translations would potentially be misleading as they would be inconsistent with the official documents.

105. I am interested in general information about how Portland cement is made, including information in Spanish.

General information about the portland cement manufacturing process is available from various sites on the Internet, including sites that provide information in Spanish.¹³⁹

106. My comment to this would be to find another open area. The communities on the Southeast side have experienced bad air, floors covered with soot, children and elders sometimes not in the best of health, breathing polluted air.

The air quality impact analyses conducted for the proposed plant show that it would meet applicable requirements. The plant would be located in a zone on the Westside of the Calumet River designated for industrial development, consistent with the Calumet Land Use Plan. This Land Use Plan also provides for development of buffer zones (parks/open space) to separate industrial plants from residential areas.

GENERAL COMMENTS

- This plant will be a safe, responsible neighbor, the cleanest of its kind ever built in the U.S. It will be equipped with all the latest state-of-the-art technology. It will be keenly respectful of nearby ecological jewels, like the Calumet River, Indian Ridge Marsh and the Hegewisch Marsh.
- I want to feel confident that my health is not being negatively impacted by where I live. I do have that confidence and will continue to have it after the proposed plant is operational.
- Universal Cement has committed to building a \$250 million manufacturing plant in the 10th Ward. Local residents will benefit from the jobs and economic development it will bring. This is \$250 million that will go toward building a brand new, state-of-the-art plant that will bring more than 90 full-time, well paying jobs to our area. These are in addition to the hundreds of

¹³⁹ General information on various topics is available in the Spanish version of Wikipedia: <http://es.wikipedia.org/wiki/Wikipedia:Portada>

construction jobs that will be created over the next few years. This plant will reinvigorate the economic landscape of local communities.

- Federal statistics indicate that 65% of the families in the Roseland community have an income level less than the poverty level. Our families need jobs. I am very encouraged that Ozinga is ready to invest in the community so that local jobs can be created. More firms need to step up to make a difference in the financial future of families on the south side of Chicago.
- The application reflects a high degree of integrity and responsibility by the applicant in bringing jobs to the Lake Calumet area. The proposed plant location is in a Planned Manufacturing District that is well served by transportation systems including rail, barge and highway and energy transmission networks for gas, oil, electricity and coal. The plant is a major step forward in replacing the 30,000 jobs that have been lost in the area over the past 35 years.
- People need employment to survive. This plant will provide the communities in the southeast side with the opportunity to find jobs, earn a living, and provide for their families. Jobs mean a refuge from the unforgiving streets and pride in contributing to society in positive ways.
- At a time when Chicago's unemployment has soared above 10 percent, the proposed plant would be an opportunity to put our fellow Southeast Side residents back on the job. The proposed plant will enliven an industrial corridor that's struggled to re-find its footing since the decline of American manufacturing began decades ago.
- Many coal-powered plants are located here in Chicago, where air quality is not good. This is the time in human history to move "Beyond Coal."
- I am joining in with the concerns of others about adding additional pollution into the air with the proposed plant. The air is already over-polluted by the city dump that is unfortunately in the area. There is a need for more regulation of emissions on the Southeast side.
- I strongly support the construction of the proposed plant. A new local cement plant would help American builders end their reliance on foreign-owned cement producers.
- The tax revenue and re-investment opportunities that will result from having a quarter of a billion dollars injected into our local economy will not only spur local business development in the present, it will also provide the capital to lay a strong foundation for future financial growth.
- Foreign companies have purchased many of the plants that supply the cement needed to make concrete. Also, many local ready mix concrete suppliers throughout the country have been bought out by large conglomerates. Ozinga is one of the largest independent ready mix suppliers in the country. This plant is needed to give Ozinga access to cement at a competitive price. This allows the businesses in the Chicago area to get their concrete at prices that allow building in Chicago to be able to compete throughout the country. If Ozinga does not have access to its own raw material supply and has to sell out to a large conglomerate, a local company will be gone and our area will see higher concrete prices across the board. Its main competitor, Prairie Materials, is owned by a Brazilian Company.
- As with any project, it is essential that Universal Cement fully comply with all applicable environmental standards, as well as other local requirements, such as Chicago's programs for Minority and Women-owned Businesses, so that it reflects Chicago values.

- Give our community cleaner money-making businesses.
- There is no such thing as “clean coal.”
- No number of jobs is worth endangering the health of any child or any adult. It is a cynical view that says the only way to improve our economic condition is through heavy, dirty industry. Other job producers exist – stores, malls, clean energy as an example. It’s downright unjust to keep putting these kinds of businesses in an area that is already overloaded.
- I want renewable energy jobs here! The community deserves clean, renewable energy jobs as opposed to more dirty coal industry. The jobs that will be provided by this plant are not the jobs that we need.
- It is not fair to continue poisoning my community and my health for the sake of only 90 permanent jobs. My life depends on breathing clean air and my right to want to breathe clean fresh air will be violated by this development.
- Stop the Southeast side from being a dumping ground.
- Somehow other sources of jobs need to be found for my community, that green the community and help local youth to use their knowledge in safer cleaner ways. Let local youth know that technology can come here and not only on the north side of Chicago and the suburbs.

FOR ADDITIONAL INFORMATION

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

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**ATTACHMENT 1: LISTING OF SIGNIFICANT CHANGES
BETWEEN THE DRAFT PERMIT AND THE ISSUED PERMIT**

Condition 1.2(b)(iii) – To directly respond to public comments concerning the permanency of the fencing requirements for the neighboring property (Cargill Salt facility) an additional provision has been included in the issued permit to explicitly state that these requirements are permanent and enforceable, as they are terms of the permit.

Condition 1.6(d) – In response to a public comment concerning the minor source status of the plant for hazardous air pollutants (HAPs), limits explicitly addressing the plant’s emissions of HAPs have been included in the issued permit. While the provisions of the draft permit fully addressed HAP emissions, the draft permit relied upon limits for “surrogate pollutants” to limit emissions of some HAPs. In particular, consistent with the approach taken by USEPA in the NESHAP, permit limits and regulatory limits for particulate matter and total hydrocarbons were relied upon to address emissions of metal HAPs and organic HAPs. The additional condition will directly set limits for the plant’s emissions of HAPs, further memorializing its status a minor source for HAPs.

Condition 1.7(c) – Since only engines will be fired on diesel fuel, only engines will be required to use ultra low-sulfur diesel. As a result, this condition would no longer inappropriately suggest that the finish mill, when operating in raw material dryer mode with firing of fuel, cannot be fired on natural gas, as otherwise provided for by the permit.

Condition 1.10-3 – Recordkeeping requirements related to HAP emissions of the plant have been included in the issued permit, to accompany the limits for HAP emission in Condition 1.6(d). This recordkeeping is necessary to provide the data that will be needed to verify compliance with these limits in Condition 1.6(d) and directly confirm that the plant is not a major source of HAPs.

Conditions 2.1.1 and 2.1.2(a)(i)(E) – In the issued permit, this condition now provides appropriate flexibility to construct a multi-stage preheater/precalciner kiln rather than specifying that the preheater on the kiln must have five stages. This would accommodate either a four, five or six-stage preheater in the final design of the kiln system. This flexibility is reasonable as the final design of the kiln may reflect improvements in preheater technology or further refinements of the design to ensure compliance with the numerical limit that has been set as BACT for GHG.

Condition 2.1.2(b)(i) – As a result of further investigation in response to a public comment, the permit limit for the kiln for NOx in the issued permit is generally set at 1.2 lbs/ton of clinker, rather than 1.5 lbs/ton, as would have been set by the draft permit. Emissions information for a new cement kiln in Arizona, Drake Cement, as has only recently become available, shows that a NOx limit of 1.2 lbs/ton should be considered to be achievable by the proposed kiln after an extended shake-down period. The limit of 1.5 lbs/ton of clinker would be applicable for the initial one-year extended shake-down period. This will provide Universal Cement with a reasonable amount of time to fully shake-down the new kiln and its emission control train, and demonstrate compliance with other emission limits in the permit before it must begin complying with a 1.2 lb/ton limit for NOx.

Condition 2.1.5(a)(ii) - In response to a public comment, the annual operating hours of the kiln have been explicitly limited to 7,920 hours per year in the issued permit. This will facilitate practical enforceability of the limits on annual emissions set by the permit for certain pollutants for which the plant would not be a major source or would not have significant emissions. This is because this operational limit will provide consistency between the short-term emission limits that have been set for the kiln and the annual emissions limits that are also set by the permit, which re the product of the short-term limits and operation

for 7,920 hours per year.

Condition 2.1.5(b) - In response to both specific public comments and general concerns from the public about tires being used as supplemental fuel in the kiln, the issued permit sets various restrictions on the use of tires. In particular, the issued permit restricts the use of tires to periods of trial operation until appropriate emission testing is conducted for operation with tires. This testing would have to be conducted as part of the trial period. An initial trial period of operation would be provided for use of up to 20 percent tires in the fuel supply to the kiln. A second trial period would be provided if the plant seeks to increase usage of tires above 20 percent. An absolute limit on tire use is set at 30 percent, the maximum amount of tires that the source would ever expect to have in the fuel supply to kiln. These provisions will provide additional information on the effect of tires on emissions, so as to assure compliance with applicable limits as well as to provide general information on this subject, as is of interest to the public, as well as the Illinois EPA and other.

“Trial operation” with tires is needed to gradually bring the use of tires up to the desired rate, so as to assure that tires can reliably be used in a consistent manner while maintaining stable operation of the kiln system. The durations of the periods of trial operation are defined in terms of the amount of tires that may be used during the period, i.e., 12,000 tons of tires in the initial period of trial operation, and 18,000 tons in the second period or trial operation, for use of more than 20 percent tires. These amounts are derived from use of tires for no more than about six months (180 days). For example, for the initial trial period of operation, $20 \text{ tons fuels/hr} \times 0.15 \text{ ton tires/ton fuel} \times 24 \text{ hrs/day} \times 180 \text{ days/yr} = 12,960 \text{ tons}$, $\approx 12,000$ tons of tires. The usage of the tires for the second trial period is relatively not as great as the source would only be increasing the usage of tires. With the approach to use of tires taken by the issued permit, it is not necessary for continued use of tires after the trial period to be specifically approved by the Illinois EPA. The rate at which tires may be used is directly constrained by the permit. The continuous emissions monitoring during the period of trial operation and the results of emission testing will speak for themselves.

Condition 2.1.6(a) – In response to a comment from Universal Cement, this condition, which sets the emission limits for the Kiln System as it refers to Attachment 2, Table I, also now explicitly states the compliance time periods or averaging times for the limits for hourly emissions and the lb/ton emissions of various pollutants. For NO_x and SO₂, for which continuous emissions monitoring will be conducted, the hourly limits apply on an hourly basis, consistent with the emission rates used in the modeling for the hourly NAAQS. The hourly limit for PM (filterable), for which continuous monitoring will also be conducted, applies on a daily or 24-hour basis. This is appropriate as there are not NAAQS for PM (only PM₁₀ and PM_{2.5}) and the PM standard of the NESHAP has a longer averaging time, 30 operating days. The hourly limit for CO, which would also be continuously monitored, will also apply on a daily or 24-hour basis. While there is a 1-hour CO NAAQS, the modeling for CO emissions indicates maximum 1-hour impacts that are less than 1/24 of the 1-hour significant impact level for CO ($37.13 \mu\text{g}/\text{m}^3$ compared to $2,000 \mu\text{g}/\text{m}^3$, for maximum impacts that are less than 1/50 of the significant impact level). The lb/ton limit for mercury applies as an average of 30 operating days as the limit is the standard for mercury set by the NESHAP, consistent with Condition 2.1.3-1(a)(ii)(A). Finally, the limit for GHG applies as the running total of 12 months of data, consistent the averaging time specified by Condition 2.1.2(b)(i). These additional provisions are needed in Condition 2.1.6(a) to explicitly state the averaging times associated with the limits for various pollutants, particularly as continuous emission monitoring is conducted for a number of pollutants. For pollutants for which monitoring is not conducted, clarification is also provided as demonstrations of compliance made with emission testing are generally based on the average of three runs, each nominally one hour in duration, or in some cases, the average of three test runs as provided as provided by 40 CFR 60.8(f).

Condition 2.1.7-2(a)(iii) – To respond to a public comment, further requirements have been added for

testing of the kiln for emissions of HCl, H₂S, VOM, PM_{2.5}, lead and sulfuric acid mist, pollutants for which the permit is based on the plant not being a major or significant source of emissions. The additional requirements will facilitate practical enforceability of the permit limits for emissions of these pollutants, as it should institutionalize operation of the kiln to maintain a good margin of compliance with the permit limits established for these pollutants. This is accomplished as the permit specifically requires additional emission testing if an emission test does not show compliance with a subject limit with a “good” margin of compliance. If a test only shows an “acceptable” margin of compliance, between 5 and 15 percent, further testing for the pollutant is required within one year. If a test shows a small margin of compliance, less than 5 percent, further testing is required within 120 days.

Condition 2.1.7-2(a)(iv) – In response to various public comments, requirements for emission testing are included in the issued permit specifically related to the use of tires in the fuel supply to the kiln. Testing is required for metals, PM_{2.5}, and VOM. As expressed in comments, these are key pollutants of concern for which emission monitoring would not be conducted or not otherwise be addressed by provisions of the NESHAP. Using its general authority, the Illinois EPA could extend this emission testing to other pollutants, such as sulfuric acid mist, if testing of the kiln without tires data showed levels of emissions that indicated that such testing should also be conducted for tires.

Condition 2.1.9(i) - Recordkeeping is required to verify compliance with the annual limit for the operating hours of the kiln.

Condition 2.1.9(d) (ii) – Recordkeeping is required for usage of fuels by the kilns to verify compliance with the restrictions use of tires and the implementation of the provisions for use of tires during trial periods that are to include certain emission testing.

Condition 2.1.9 (d)(v) – In response to a comment from Universal Cement, in the issued permit, this condition for records for sorbent usage by the absorber on the kiln specifies that only records of purchased sorbent (rather than recycled and new sorbent) are required. This clarifies the intent of the recordkeeping requirement in the draft permit. In particular, the information for sorbent usage is intended to track purchases of sorbent if the sorbent material generated as a byproduct of the operation of the kiln is not sufficient or adequate for the proper functioning of the absorber/scrubber system.

Condition 2.2.6 – In response to a comment from Universal Cement, this condition, which sets the emission limits for the Finish Mill as it refers to Attachment 2, Table II, also now explicitly states the averaging time associated with hourly emission limits. The circumstances are similar to those for the limits for the kiln system, where the draft permit did not account for the fact that emission tests for particulate matter consist of three (or two) runs each nominally one-hour in duration.

Condition 2.4.5(e) - In response to a public comment, a limit on the annual operating hours of the coal mill has been included in the issued permit. The circumstances are similar to those for the limit on the annual operating hours of the kiln system.

Condition 2.4.9(b)(v) – Recordkeeping is required to verify compliance with the annual limit on the operating hours of the coal mill.

Condition 3.2(a) – A note is included to make clear that prior notification to the Illinois EPA is not required for routine opacity observations that are conducted for emission units and operations at the plant. Such a requirement would delay such observations, interfering with the source’s ability to conduct opacity observations as needed or when a certified opacity observer is otherwise present at the plant that could make such observations. The requirement for prior notification applies to opacity observations that are conducted as part of performance testing, i.e., formal demonstration of compliance with opacity

standards, as required by certain rules.

Attachment 1 – In the summary of the plant’s permitted emissions, the total permitted PM and PM₁₀ emissions for raw material handling operations have each been set at 33.6 tons per year (a reduction from 33.8 and 33.7 tons per year, respectively, in the draft permit). This reflects corrections to information transfer and arithmetic errors that occurred during the preparation of Attachment 2, Table III, in the draft permit.

Attachment 2, Table I – In the issued permit, the kiln’s permitted emissions of lead are lower than in the draft permit. This reflects a correction by Universal Cement to a factor that was inappropriately used in the application to determine the kiln’s potential emissions of lead. Namely, the potential lead emissions are now based on a factor for a cement kiln with a fabric filter rather an electrostatic precipitator.

Attachment 2, Table I – In response to a comment, in addition to being stated in Condition 2.1.6, the kiln’s permitted emissions of GHG, as CO₂e, are now also listed in this table.

Attachment 2, Table III – Errors in Table III, which list emission limits for raw material handling operations have been corrected, in response to a comment from Universal Cement. The totals for the individual limits did not sum correctly. Review revealed that certain emission rates in the application had not been correctly carried over into the table. With the correction of these errors, the total permitted PM, PM₁₀, and PM_{2.5} emissions from raw material handling, while higher than the erroneous totals in the draft permit, are now slightly lower than were listed for these operations in Attachment 1 of the draft permit.

**ATTACHMENT 2: RESPONSES TO COMMENTS REQUESTING SPECIFIC CHANGES
TO THE TERMS OF THE DRAFT PERMIT**

1. In Conditions 1.2(a)(i)(A) and (B), which deal with the emissions offsets for the proposed plant for NO_x and SO₂, the word “maintain” should be changed to “provide,” to indicate that the Permittee must “provide” emissions offsets.

In response to this comment, these conditions in the issued permit require the Permittee to both “provide” and “maintain” emissions offsets. This is consistent with relevant obligations under 35 IAC 203.302(a) and 203.602, which require, respectively, that emission offsets be provided and maintained.

2. Condition 1.4-1(c), which addresses 35 IAC 212.313, refers to various types of emissions units including “crushers.” As there will not be any “crushers” at the proposed plant, “crushers” should not be mentioned.

This condition has not been changed in response to this comment. This condition directly reflects the language of 35 IAC 212.313. As the condition addresses a regulatory requirement, the language of this condition should be consistent with the actual language of the rule. At the same time, as this condition reflects regulatory language, it should not be construed to necessarily indicate that there would be crushers (or other types of emission units that are listed) at the plant.

3. Condition 1.7(c) should read “Fuel-fired equipment other than the kiln system **and the finish mill burner,...**”. The finish mill burner, per Condition 2.2.2(a)(ii), can only fire natural gas, not ultra low sulfur diesel.

In the issued permit, Condition 2.2.2(a)(ii) is now limited to engines, which is consistent with the original intent. In particular, the condition provides “Engines shall only be fired on ultra-low sulfur diesel.” As a result, the condition would no longer suggest that the burner in the finish mill must be fired on ultra low sulfur diesel fuel rather than natural gas.

4. Condition 1.8(a) should read that emission limits “apply at all times **during operation.**”

This condition has not been changed in response to this comment. The comment does not provide the underlying reason for the requested change nor is the reason immediately apparent. In this regard, during any period when an emission unit is not operating and does not generate emissions, it would appear implicit that the unit would comply with applicable emission limits. This would be shown by the fact that the unit is not operating.

5. Condition 1.9(a) should read “At all times **during operation,** ... operate as practical ...”

This condition also has not been changed in response to this comment. The comment does not provide the underlying reason for the requested change nor is the reason immediately apparent. In this regard, it is implicit that this general requirement for proper operation of emission units and associated control equipment would only apply when an emission unit is operating and generating emissions. This requirement does not mandate that the emission unit must operate at all times; only that when it is operated, that it be operated properly operated.

6. Condition 2.1.2(a)(i)(E) should provide flexibility in the CO₂e control technology determination, as is

allowed for SO₂ under Condition 2.1.2(a)(i)(C). To accomplish this, Condition 2.1.2(a)(i)(E) should read "...Five-stage preheater/precalciner kiln or equivalent CO₂e control system,..."

In response to this comment, this condition in the issued permit now provides appropriate flexibility, as it requires a multi-stage preheater/precalciner kiln, rather than a five-stage preheater/precalciner. This will accommodate a final design for the preheater that would have four, five or six-stages, as could be desirable to accommodate improvements in preheater technology or be needed to meet the numerical BACT limit that has been set for GHG. The specific change requested by this comment would not be appropriate as it would effectively eliminate the "control technology" component of BACT from the BACT determination made for the kiln system. Instead, the BACT determination would only reflect an emission limit for GHG, without specifying any associated control technology or approach to control of emissions.

7. In Condition 2.1.2(b)(ii), the limit for PM (Filterable), 0.01 lbs/ton clinker, for the clinker cooler, needs to include a reference to Footnote 1.

The issued permit includes the requested change. As a consequence, this limit would not apply during emission testing to calibrate the PM continuous emissions monitoring system (CEMS). This is appropriate as it may be necessary for the operation of the baghouse on the clinker cooler to be "artificially" manipulated to provide a high value of PM emissions when the CEMS on the clinker cooler is being calibrated.

8. Condition 2.1.2(d) should address both malfunctions of the clinker cooler, as well as the kiln system. Accordingly, this condition refer to "...Condition 2.1.2(b)(i) or (b)(ii),..."

The issued permit includes the requested change. This is appropriate since the circumstances of the clinker cooler with respect to malfunctions are similar to those of the kiln system.

9. In Conditions 2.1.7-1(a)(ii), (a)(iii) and (b)(ii), change the words "for" to "on," so the conditions read "... tests shall be conducted **on** the kiln ..."

The wording in the draft permit was clear so the requested changes were not made.

10. In Condition 2.1.8-1(h), the following sentence should be added, "In addition, particulate limits and CEM requirements in this permit for the kiln and clinker cooler shall be demonstrative of compliance with all opacity requirements on these units in this permit."

This condition has not been changed in response to this comment. The comment does not provide the underlying reason for the requested change or supporting justification. In this regard, while it is expected that compliance with the applicable particulate limits will, as a practical matter, assure that the kiln and clinker cooler comply with the applicable state opacity standard, 35 IAC 212.123(a), this does not provide a legal basis to bypass 35 IAC 212.123(a). In addition, the purpose of Condition 2.1.8-1(h) is to address possible conflicts between the highly technical requirements of the NESHAP and NSPS for emissions and operational monitoring, as specifically contemplated by and provided for by 40 CFR 60.62(d) and 63.1356.

11. In Condition 2.2.2(b)(i), for the finish mill, to avoid conflict with Condition 2.2.2(b)(iii), the phrase "...the following limits during any hour when fuel is not fired..." should be changed to "...the following hourly limits when fuel is not fired..."

The requested change has been made in the issued permit. The wording in the draft permit would suggest that these limits apply during any hour. However, as provided by Condition 2.2.2(b)(iii), as related to emission testing, compliance with the relevant limits is to be determined from the average of two or three tests runs, as provided by 40 CFR 60.8(f). This is an essential aspect of emission testing for particulate matter by USEPA test methods. The wording suggested by this comment would accommodate this aspect of emission testing for particulate matter.

12. In Condition 2.2.2(b)(i), there are also errors in the BACT limits for both PM/PM₁₀ (Filterable) and PM₁₀ (Total) for the finish mill when not firing fuel. The limits should be 0.0008 gr/dscf, not 0.008 gr/dscf.

These errors have been corrected in the issued permit.

13. In Condition 2.2.2(b)(ii), to avoid a conflict with Condition 2.2.2(b)(iii) and for consistency with Condition 2.2.2(b)(i), change the phrase "...the following limits during any hour in which fuel is fired" to "...the following hourly limits when fuel is fired."

The issued permit includes the requested changes. The circumstances are similar to those for Condition 2.2.2(b)(i). For this condition, a further change to the wording, i.e., changing from "in which" to "when" is needed to make the necessary change.

14. In Condition 2.2.7-1(b)(A), The reference to initial feed at (regarding initial performance testing at the finish mill) is not appropriate. Correct language should be "...but no later than 180 days after **first operation of the affected unit as a raw material dryer**, the Permittee ..."

The requested change has not been made. This condition addresses emission testing of the Finish Mill when operating as a finish mill, not when operating as a raw material dryer. This has been clarified in the issued permit.

15. The limits for the plant's GHG emissions should be included in the summaries of emission limits in the tables in Attachments 1 and 2 of the permit.

The issued permit includes the changes requested by this comment, with the limits for GHG emissions also included in the summary tables in Attachments 1 and 2 of the permit, as well as in the body of the permit.

16. "Attachment 2: Listing of Emission Units and Permitted Emission of the Plant" should have a superscripted note "b" added to the particulate "Lb/Hr" value in "Table 1: Limits for the Kiln/Raw Mill and the Clinker Cooler," except for the values for NO_x and SO₂. Note "b" should read: "**b. Compliance with this standard shall be determined by the average of 2 or 3 runs using methods indicated in sections 2.1.2.b.i and 2.1.2.b.ii.**"

The specific change requested by this comment was not made. Instead, the averaging times or compliance time periods for the emission limits for various pollutants are identified in Condition 2.1.6(a) of the issued permit. (Refer to the discussion of significant changes.)

17. Attachment 2 should have a superscripted note "c" added to the CO and VOM "Lb/Hr" values in "Table 1: Limits for the Kiln/Raw Mill and the Clinker Cooler." . Note "c" should read: "**c. Emissions limits compliance shall be based on a 30 day rolling average (and a 7 day rolling average for THC/VOM during startup and shutdown) as indicated in sections 2.1.2.b.i. and**

2.1.3-1.a.ii.B”

The specific change requested by this comment was not made. Instead, the averaging times or compliance time periods for the emission limits for various are identified in Condition 2.2.6(a) of the issued permit. (Refer to the discussion of significant changes.)

18. Attachment 2 should have a superscripted note “c” added to each of the “Lb/Hr” values in “Table II: Limits for the Finish Mill.” Note “c” should read: **“c. Compliance with this standard shall be determined by the average of 2 or 3 runs using methods indicated in section 2.2.2.b.iii.”**

The specific change requested by this comment was not made. Instead, the averaging times or compliance time periods for the various emissions are identified in Condition 2.1.6 of the issued permit. (Refer to the discussion of significant changes.)

19. In Attachment 2, the VOM emission limit in “Table II: Limits for the Finish Mill” is not correctly identified for the “Burner Off” mode of operation. The VOM emissions limit identified in the “Burner On” mode of operation for the Finish Mill (0.9 lb/hr and 2.6 t/yr) is correct, per Table A-2, Point Source Emission Rates, submitted by Universal Cement to the IEPA and dated September 14, 2010. However, the VOM limit in the “Burner Off” mode, accounting for possible use of grinding aid (but not VOM from combustion of natural gas), should be listed as 0.6 lb/hr and 2.4 t/yr, per Table A-21, Finish Mill System Grinding Air Emissions Calculations, submitted by Universal Cement to the IEPA and dated November, 2009.

The corrections to the VOM emission limits for the Finish Mill were made in the issued permit.

20. In Attachment 2, “Table III, Limits for Enclosed Material Handling and Storage Operations” has a summation error at the end of the table. The sum of the PM and PM₁₀ T/Yr values, on page 2-5, should match the correct values included in “Attachment 1: Summary of Permitted Annual Emissions of the Plant (tons/year)” under the Raw Material Handling column (namely, for PM, **33.8** tons/year, and for PM₁₀, **33.7** tons/year). An incorrect value of 16.37 T/Yr is presently shown.

The arithmetic errors identified in this comment have been corrected in the issued permit.

**ATTACHMENT 3: LISTING OF TYPOGRAPHICAL CHANGES
BETWEEN THE DRAFT PERMIT AND THE ISSUED PERMIT**

Condition 1.13(a)(ii): This condition should refer to the kiln **system** and clinker cooler, to be consistent with terminology used elsewhere in Section 1.13 of the permit.

Condition 2.1.2(a)(i)(C) should refer to a “circulating fluidized bed **absorber**,” rather than to a “circulating fluidized bed.”

Condition 2.1.3-1(a)(ii)(A): The table in this condition does not accurately reflect requirements of the NESHAP, since an oxygen correction is not present in the NESHAP standards for startup and shutdown. Accordingly, Footnote 4 for “Dioxin/Furan” and “THC or TO HAP” in the “Startup and Shutdown” column should not be present and needs to be removed.

Condition 2.3.7-3(a)(i): This condition has an incorrect cross reference to Condition 2.1.7.1(b), when addressing additional performance testing for the enclosed material handling and storage units. The cross reference should be 2.1.7-2(b).

Condition 2.2.7-3(b): This condition should cross reference Condition 2.2.7-1, rather than Condition 2.3.7-1.

Condition 2.5.1: This condition should identify the emission units as dump hoppers rather than dump pits.

Condition 2.5.5(d); This condition includes extraneous wording and an incorrect cross-reference. This condition should read “For the affected unit for fuel, the Permittee **shall** also prepare and implement an Operation and Maintenance Plan and maintain and operate this in accordance with good air pollution control practice as provided by Conditions 2.5.5(b)(i) and (c), respectively.”

Condition 2.5.7(b): In this condition, the word “shall” is missing and should be inserted: “...the Permittee **shall** also ...”

Condition 2.5.8(b): In this condition, the word “shall” is missing and should be inserted: “...the Permittee **shall** also ...”

Condition 2.5.9(b)(ii) should refer to Attachment 2, Table **V**

Condition 2.6.8(a)(ii): There is a spurious “and” in this condition. The relevant portion of the condition should read “...receiving raw materials, and receiving fuel), with...”

Condition 3.1(c)(iii): There is a spurious “and” in this condition. The relevant portion of the condition should read “...prior to the expected date. Notification of...”

Attachment 2, Table 1: The appropriate units in Table 1 for the 6.9 value for sulfuric acid mist for the Kiln and In-Line Raw Mill should be “**T/Yr**,” not “Lb/Hr.”