(Slip Opinion)

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BEFORE THE ENVIRONMENTAL APPEALS BOARD
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C.

In re:	)	
Mississippi Lime Company	)	PSD Appeal No. 11-01
Permit No. 157863AAC	)	

[Decided August 9, 2011]

REMAND ORDER

Before Environmental Appeals Judges Charles J. Sheehan, Kathie A. Stein, and Anna L. Wolgast.

IN RE MISSISSIPPI LIME COMPANY

PSD Appeal No. 11-01

REMAND ORDER

Decided August 9, 2011

Syllabus

Sierra Club asks the Environmental Appeals Board ("Board") to review certain conditions of a Clean Air Act prevention of significant deterioration ("PSD") permit the Illinois Environmental Protection Agency ("IEPA") issued to Mississippi Lime Company ("Mississippi Lime") for construction of a lime manufacturing plant in Prairie du Rocher, Randolph County, Illinois. After the petition was filed, but prior to either IEPA or Mississippi Lime filing a response brief, the Board held a status conference at which the Board suggested that, in light of the decision in *In re Vulcan Constr. Materials, LP*, PSD Appeal No. 10-11 (EAB Mar. 2, 2011), 15 E.A.D. ___, IEPA closely examine the record in the present matter and determine whether the record was sufficient to support IEPA's permit determination or whether IEPA should take a voluntary remand to supplement the record. IEPA subsequently filed a status report indicating that after further examination of the record, IEPA believed the record was sufficient to support the permit decision. IEPA and Mississippi Lime proceeded with briefing.

The contentions in the parties' briefs raise issues that fall within two broad categories: (1) IEPA's Best Available Control Technology ("BACT") analyses and permit limits for certain pollutants and (2) IEPA's determination that emissions from the proposed source would not cause or contribute to violations of certain National Ambient Air Quality Standards ("NAAQS"). Resolution of this appeal requires the Board to address two issues concerning IEPA's BACT analyses:

(1) Has Sierra Club demonstrated that IEPA clearly erred in its BACT analysis for startup and shutdown emissions?

(2) Has Sierra Club demonstrated that IEPA clearly erred in establishing the BACT limitations for sulfur dioxide ("SO_2"), nitrogen oxide ("NO_x"), and particulate matter ("PM") where (a) IEPA declined to consider performance test data at other lime kilns and relied on a design fuel with 3.5% sulfur content when establishing the SO_2 BACT limitation and (b) IEPA declined to consider performance test data at other lime kilns and applied safety margins when establishing the BACT limits for NO_x, filterable PM, and particulate matter measured as "PM_{10}"?

This appeal also requires the Board to decide the following two NAAQS issues:

(1) Has Sierra Club demonstrated that IEPA clearly erred in its application of a Significant Impact Level ("SIL") in the culpability analysis of the ambient air quality analysis for the one-hour SO_2 NAAQS?

(2) Has Sierra Club demonstrated that IEPA clearly erred by not establishing an SO_2 emissions limit or an NO_x emissions limit based on one-hour averages to protect the one-hour SO_2 and the one-hour nitrogen dioxide ("NO_2") NAAQS?

Held: The permit is remanded.

(1) IEPA failed to provide sufficient justification for determining BACT for kiln startup and shutdown emissions. IEPA eliminated natural gas as a control option because of the proposed plant site's distance from the existing natural gas pipeline. IEPA's determination that natural gas was "not commercially feasible" lacks support and does not consider the average and incremental cost-effectiveness of natural gas.

(2) IEPA failed to provide sufficient justification for the permit's BACT emissions limitations for SO_2, NO_x, and PM.

(a) IEPA failed to adequately support its determination that a 3.5% sulfur content design fuel, consisting of both coal and petroleum coke, was BACT for SO_2, particularly when IEPA had already concluded that among the technically feasible coals, coal with 3.2% sulfur content was cost effective. In declining to consider the performance test data at existing kilns that Sierra Club had identified, IEPA fundamentally misunderstood that its role as permit issuer requires the agency to investigate and examine recent regulatory determinations

(b) IEPA's administrative record does not support IEPA's assertions that compliance margins were necessary for the NO_x, filterable PM, and PM_{10} BACT limits due to variations in the effectiveness of the chosen control measures. IEPA explained neither how it derived the numerical values for the margins nor the technical or scientific bases for the margins. The BACT analyses for these pollutants also do not sufficiently assess data from other facilities that might support the proposed compliance margin. IEPA was obligated to conduct a more thorough evaluation of comparable facilities, including those that Sierra Club cited.

(3) IEPA failed to provide sufficient justification for determining that emissions from the proposed source will not cause or contribute to a violation of the one-hour SO_2 NAAQS. Although it was not improper for IEPA to use a SIL in the culpability analysis for the one-hour SO_2 NAAQS, it is unclear from the administrative record what SIL value IEPA used in the culpability analysis. U.S. Environmental Protection Agency ("EPA") guidance provides an interim one-hour SO_2 SIL of 7.85 $\mu g/m^3$, which is supported in the administrative record as a de minimis concentration, but IEPA did not explain whether or how this SIL was applied. IEPA further failed to identify whether two other values that appear in the administrative record, 7.9 $\mu g/m^3$ and 10 $\mu g/m^3$, were applied as the one-hour SO_2 SIL in the culpability analysis. Finally, to the extent that IEPA applied either 7.9 $\mu g/m^3$ or 10 $\mu g/m^3$ as the one-hour SO_2 SIL, IEPA did not demonstrate that those values represent de minimis concentrations.

(4) IEPA failed to provide sufficient justification for not establishing SO_2 and NO_x emissions limits based on one-hour averages to protect the one-hour SO_2 and the one-hour NO_2 NAAQS. IEPA's explanations for not including emission limitations for SO_2 and NO_x based on one-hour averages – that the results of other state agencies' models have "overstated impacts to such a degree that they cannot be considered credible" and that the proposed control technology at the proposed plant cannot catastrophically fail – are unsupported and anecdotal at best. In light of the EPA directive to include emission limitations based on one-hour averages, IEPA's unsupported reasoning for not doing so is inadequate.

Before Environmental Appeals Judges Charles J. Sheehan, Kathie A. Stein, and Anna L. Wolgast.

Opinion of the Board by Judge Stein:

I. *STATEMENT OF THE CASE*

Sierra Club asks the Environmental Appeals Board ("Board") to review certain conditions of a Clean Air Act prevention of significant deterioration ("PSD") permit the Illinois Environmental Protection Agency ("IEPA") issued to Mississippi Lime Company ("Mississippi Lime") for construction of a lime manufacturing plant ("Plant") in Prairie du Rocher, Randolph County, Illinois. Petition for Review and Request for Oral Argument (Jan. 26, 2011) ("Petition"). Both IEPA and Mississippi Lime responded that Sierra Club has failed to demonstrate that review is warranted. *See* IEPA Response to Petition for Review

(Apr. 29, 2011) ("IEPA Response"); Mississippi Lime's Response to the Petition (May 6, 2011) ("MLC Response").

II. *ISSUES ON APPEAL*

The contentions in the parties' briefs raise issues that fall within two broad categories: (1) IEPA's Best Available Control Technology ("BACT") analyses and permit limits for certain pollutants and (2) IEPA's determination that emissions from the proposed source would not cause or contribute to violations of certain National Ambient Air Quality Standards ("NAAQS"). Resolution of this appeal requires the Board to address two issues concerning IEPA's BACT analyses:

1. Has Sierra Club demonstrated that IEPA clearly erred in its BACT analysis for startup and shutdown emissions?[1]

2. Has Sierra Club demonstrated that IEPA clearly erred in establishing the BACT limitations for sulfur dioxide ("SO_2"), nitrogen oxide ("NO_x"), and particulate matter ("PM") where (a) IEPA declined to consider performance test data at other lime kilns and relied on a design fuel with 3.5% sulfur content when establishing the SO_2 BACT limitation and (b) IEPA declined to consider performance test data at other lime kilns and applied safety margins when establishing the BACT limits for NO_x, filterable PM, and particulate matter measured as "PM_{10}"?

This appeal also requires the Board to decide the following two NAAQS issues:

1. Has Sierra Club demonstrated that IEPA clearly erred in its application of a Significant Impact Level ("SIL") in

[1] It is unclear from the parties' submissions which pollutants are at issue in the startup and shutdown emissions.

the culpability analysis of the ambient air quality analysis for the one-hour SO_2 NAAQS?

2. Has Sierra Club demonstrated that IEPA clearly erred by not establishing an SO_2 emissions limit or an NO_x emissions limit based on one-hour averages to protect the one-hour SO_2 and the one-hour nitrogen dioxide ("NO_2") NAAQS?

III. *SUMMARY OF DECISION*

The Board concludes that Sierra Club has met its burden of establishing that IEPA clearly erred in several aspects of its permit determination. In particular, the Board holds that: (1) IEPA failed to provide sufficient justification for determining BACT for kiln startup and shutdown emissions; (2) IEPA failed to provide sufficient justification for the permit's BACT emissions limitations for SO_2, NO_x, and PM; (3) IEPA failed to provide sufficient justification for determining that emissions from the proposed source will not cause or contribute to a violation of the one-hour SO_2 NAAQS; and (4) IEPA failed to provide sufficient justification for not establishing SO_2 and NO_x emissions limits based on one-hour averages to protect the one-hour SO_2 and the one-hour NO_2 NAAQS.

IV. *STANDARD OF REVIEW*

Under the rules governing this proceeding, a PSD permit ordinarily will not be reviewed unless it is based on a clearly erroneous finding of fact or conclusion of law, or involves an important matter of policy or exercise of discretion that warrants review. *See* 40 C.F.R. § 124.19(a); Consolidated Permit Regulations, 45 Fed. Reg. 33,290, 33,412 (May 19, 1980). The Board analyzes PSD permits against the backdrop of the preamble to section 124.19, which states that the Board's power of review "should be only sparingly exercised" and that "most permit conditions should be finally determined at the [permit issuer's] level." 45 Fed. Reg. at 33,412; *accord In re Cardinal FG Co.*, 12 E.A.D. 153, 160 (EAB 2005). The petitioner bears the burden of

demonstrating that review is warranted, and the petitioner must raise objections to the permit and explain why the permit issuer's previous response to those objections is clearly erroneous or otherwise warrants review. *In re BP Cherry Point*, 12 E.A.D. 209, 217 (EAB 2005); *In re Steel Dynamics, Inc.*, 9 E.A.D. 740, 744 (EAB 2001).

V. *PROCEDURAL AND FACTUAL HISTORY*

On October 27, 2008, Mississippi Lime applied for a PSD permit to construct a lime manufacturing plant in Prairie du Rocher, Randolph County, Illinois. Mississippi Lime proposed to construct two pre-heater rotary lime kilns designed to burn solid fuel (coal and petroleum coke). Permit Section, Bureau of Air, IEPA, *Project Summary for an Application for Construction Permit/PSD Approval from Mississippi Lime Company for a Lime Manufacturing Plant in Prairie Du Rocher, Illinois* 1 (A.R. 34) ("Project Summary"). The kilns are expected to be the principal source of emissions from the Plant. *Id*. These emissions include PM,[2] SO_2, NO_x, and carbon monoxide.

On October 4, 2010, IEPA issued a draft permit for the Plant and sought public review and comment on the draft. Bureau of Air, IEPA, *Responsiveness Summary for the Public Comment Period on the Issuance of a Construction Permit/PSD Approval for Mississippi Lime Company to Construct a Lime Plant in Prairie du Rocher, Illinois* 2 (Dec. 2010) (A.R. 46) ("RTC"). IEPA also held a public hearing on the draft permit on November 19, 2010. *Id.* It issued its final permit determination on December 30, 2010, along with the response to comments in a "Responsiveness Summary for the Public Comment Period" ("Responsiveness Summary") document. *See generally* Permit

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[2] "Particulate matter is the generic term for a broad class of chemically and physically diverse substances that exist as discrete particles (liquid droplets or solids) over a wide range of sizes." National Ambient Air Quality Standards for Particulate Matter, 62 Fed. Reg. 38,652, 38,653 (July 18, 1997). Filterable particulate matter are those particles that can be captured on the filter of a stack test train. 40 C.F.R. pt. 51, subpt. A, app. A. Particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as "PM_{10}," and particulate matter with an aerodynamic diameter of 2.5 micrometers or less is referred to as "$PM_{2.5}$." *Id.*

Sec., Div. of Air Pollution Control, IEPA, *Construction Permit/PSD Approval NSPS/NESHAP Source, ID No. 157863AAC* (Dec. 30, 2010) (A.R. 47) ("Permit"); RTC. As stated above, Sierra Club filed its petition on January 26, 2011. IEPA's response to the merits of Sierra Club's petition was initially due on March 15, 2011. IEPA sought and obtained an extension of time, and after an additional adjustment to the briefing schedule, briefing was completed on May 6, 2011.[3]

VI. *ANALYSIS*

The Clean Air Act's PSD program regulates air pollution in areas of the country deemed to be in "attainment" or "unclassifiable" with respect to the NAAQS. *See* Clean Air Act ("CAA") §§ 161, 165, 42 U.S.C. §§ 7471, 7475. NAAQS are "maximum concentration 'ceilings' measured in terms of the total concentration of a pollutant in the atmosphere." Office of Air Quality Planning and Standards, U.S. EPA, *New Source Review Workshop Manual* at C.3 (draft

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[3] On March 31, 2011, the Board held a telephone status conference with counsel for Sierra Club, IEPA, and Mississippi Lime. During this status conference, the Board suggested that, in light of the Board's March 2, 2011 decision in *In re Vulcan Constr. Materials, LP*, PSD Appeal No. 10-11 (EAB Mar. 2, 2011), 15 E.A.D. ___, IEPA closely examine the record in this matter and determine whether it was sufficient to support IEPA's permit determination or whether IEPA should take a voluntary remand to supplement the record. IEPA indicated that it would examine the record and advise the Board in writing if IEPA planned to continue the briefing process before the Board. Should IEPA choose to proceed with the briefing process before the Board, the Board ordered IEPA's response to the petition to be filed no later than April 29, 2011, and Mississippi Lime's response to be filed no later than May 6, 2011. Order Requiring Status Report & Revising Briefing Schedule (Mar. 31, 2011).

IEPA filed a status report on April 15, 2011, stating that it had "conducted an examination of the record in this matter in order to determine if the record is sufficient to support the [IEPA's] permit determination[; that a] determination ha[d] been reached that the record [wa]s sufficient to support the [IEPA's] permit determination[;]" and that IEPA would file a response to the petition on or before April 29, 2011. State of Illinois Status Report Pursuant to Board Order of March 31, 2011 (Apr. 15, 2011). Accordingly, IEPA filed its response on April 29, 2011, and Mississippi Lime filed its response on May 6, 2011.

Oct. 1990) ("NSR Manual").[4] Congress charged EPA with developing NAAQS for air pollutants whose presence in the atmosphere in excess of certain concentration levels could "reasonably be anticipated to endanger public health or welfare."[5] CAA § 108(a)(1)(A), 42 U.S.C. § 7408(a)(1)(A); *see* CAA § 109, 42 U.S.C. § 7409. In geographical areas deemed to be in "attainment" for any of these pollutants, the ambient air quality meets the NAAQS for that pollutant. CAA § 107(d)(1)(A)(ii), 42 U.S.C. § 7407(d)(1)(A)(ii). In areas designated as "unclassifiable," air quality cannot be classified on the basis of available information as meeting or not meeting the NAAQS. CAA § 107(d)(1)(A)(iii), 42 U.S.C. § 7407(d)(1)(A)(iii).[6] Parties who wish to construct "major emitting facilities"[7] in attainment or unclassifiable areas must obtain preconstruction approval in the form of PSD permits to build such facilities. CAA § 165, 42 U.S.C. § 7475.

As part of the permit issuance process, the PSD regulations at 40 C.F.R. § 52.21 require, among other things, that new major stationary sources of air pollution, and any major modification of such sources, be

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[4] The New Source Review or NSR Manual is used as a guide on PSD requirements and policy in new source review workshops and training for state and federal permitting officials. Although it is not a binding U.S. EPA regulation, the Board has looked to the NSR Manual as a statement of U.S. EPA's thinking on certain PSD issues. *E.g.*, *In re ConocoPhillips Co.*, 13 E.A.D. 768, 772 (EAB 2008); *In re RockGen Energy Ctr.*, 8 E.A.D. 536, 542 n.10 (EAB 1999); *In re Knauf Fiber Glass*, *GmbH ("Knauf I")*, 8 E.A.D. 121, 129 n.13 (EAB 1999).

[5] NAAQS have been established for six criteria pollutants: sulfur dioxide, particulate matter, nitrogen dioxide, carbon monoxide, ozone, and lead. *See* 40 C.F.R. §§ 50.4 - 50.13.

[6] Areas may also be designated as "nonattainment," meaning that the concentration of a pollutant in the ambient air does not meet the NAAQS for that pollutant. CAA § 107(d)(1)(A)(i), 42 U.S.C. § 7407(d)(1)(A)(i). The PSD program does not apply, however, in non-attainment areas. *See* CAA § 161, 42 U.S.C. § 7471.

[7] A "major emitting facility" is a stationary source in any of certain listed stationary source categories that emits or has the "potential to emit" 100 tons per year ("tpy") or more of any air pollutant, or any other source that has the potential to emit 250 tpy or more of any air pollutant. *See* CAA § 169(1), 42 U.S.C. § 7479(1).

carefully reviewed prior to construction to ensure that emissions from such facilities will not cause or contribute to an exceedance of the NAAQS or applicable PSD ambient air quality "increments."[8] These permits must also require compliance with emissions limits constituting BACT to minimize emissions of regulated pollutants. CAA § 165(a)(4), 42 U.S.C. § 7475(a)(4); 40 C.F.R. § 52.21(b)(23), (j)(2)-(3).

IEPA administers the PSD program in Illinois pursuant to a delegation of authority from the U.S. Environmental Protection Agency ("EPA"), Region 5 ("Region"). *See* Prevention of Significant Deterioration Delegation of Authority to State Agencies, 46 Fed. Reg. 9580 (Jan. 29, 1981) (setting forth Delegation Agreement between State of Illinois and U.S. EPA); *In re Zion Energy, LLC*, 9 E.A.D. 701, 701 n.1 (EAB 2001). When PSD permits are issued by a state pursuant to a delegation of the federal PSD program, as is the case here, such permits are considered EPA-issued permits and, therefore, are subject to administrative appeal to the Board in accordance with 40 C.F.R. § 124.19.

A. *Sierra Club Has Demonstrated That IEPA Clearly Erred in Its BACT Analysis for Startup and Shutdown Emissions.*

New major stationary sources, such as the Plant at issue here, are subject to "best available control technology," or BACT, to minimize emissions of regulated pollutants. CAA § 165(a)(4), 42 U.S.C. § 7375(a)(4); 40 C.F.R. § 52.21(j)(2). The statute defines BACT as follows:

> The term "best available control technology" means an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this chapter emitted from or which results from any

[8] A PSD "increment" refers to "the maximum allowable increase in concentration that is allowed to occur above a baseline concentration for a pollutant." NSR Manual at C.3; *see also* 40 C.F.R. § 52.21(c) (setting forth increments for regulated pollutants).

> major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant.

CAA § 169(3), 42 U.S.C. § 7479(3); *accord* 40 C.F.R. § 52.21(b)(12) (similar regulatory definition). As the Board has explained many times, BACT is a "site-specific determination and * * * the combined results of the considerations that form the BACT analysis are the selection of an emission limitation and a control technology that are specific to a particular facility." *In re Three Mountain Power, LLC*, 10 E.A.D. 39, 47 (EAB 2001); *accord In re Christian Cnty. Generation, LLC*, 13 E.A.D. 449, 454 (EAB 2008)*; In re Prairie State Generating Co.*, 13 E.A.D. 1, 12 (EAB 2006), *aff'd sub. nom Sierra Club v. U.S. EPA*, 499 F.3d 653 (7th Cir. 2007); *In re Knauf Fiber Glass, GmbH ("Knauf I")*, 8 E.A.D. 121, 128-29 (EAB 1999).

The NSR Manual guides permit issuers reviewing new sources under the CAA and sets forth a "top-down" process for determining BACT for a particular regulated pollutant.[9] *See* NSR Manual at 1. The NSR Manual summarizes the top-down method for determining BACT as follows:

> [T]he top-down process provides that all available control technologies be ranked in descending order of

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[9] Although the top-down analysis is not a mandatory methodology, it is frequently used by permitting authorities to ensure that a defensible BACT determination, involving consideration of all requisite statutory and regulatory criteria, is reached. *In re Russell City Energy Ctr., LLC*, PSD Appeal Nos. 10-01 through 10-05, slip op. at 20 n.10 (EAB Nov. 18, 2010), 15 E.A.D. ___; *In re N. Mich. Univ.*, PSD Appeal No. 08-02, slip op at 12-13 (EAB Feb. 18, 2009), 14 E.A.D. at ___; *In re Steel Dynamics*, 9 E.A.D. 165, 183 (EAB 2000); *Knauf I*, 8 E.A.D. at 129 n.14, 134 n.25.

> control effectiveness. The PSD applicant first examines the most stringent — or "top" — alternative. That alternative is established as BACT unless the applicant demonstrates, and the permitting authority in its informed judgment agrees, that technical considerations, or energy, environmental, or economic impacts justify a conclusion that the most stringent technology is not "achievable" in that case.

NSR Manual at B.2; *accord Prairie State*, 13 E.A.D. at 13.

The NSR Manual's recommended top-down analysis employs five steps. NSR Manual at B.5-.9; *see also In re Desert Rock Energy Co.*, PSD Appeal Nos. 08-03 through 08-06, slip op. at 54-56 (EAB Sept. 24, 2009), 14 E.A.D. at ___ (summarizing steps); *Prairie State*, 13 E.A.D. at 13-14 (same). The first step requires the permitting authority to identify all potentially "available" control options. NSR Manual at B.5. Available control options are those technologies, including the application of production processes or innovative technologies, that have "a practical potential for application to the emissions unit and the regulated pollutant under evaluation." *Id.*

Once all possible control options are identified, step 2 allows the elimination of "technically infeasible" options. *Id.* at B.7. This step involves first determining for each technology whether it is "demonstrated," in other words, whether it has been installed and operated successfully elsewhere on a similar facility. *Id.* at B.17. If it has not been demonstrated, the permit issuer then determines whether the technology is both "available" and "applicable." *Id.* at B.17-.22. Technologies identified in step 1 as "potentially" available, but that are neither demonstrated nor found after careful review to be both available and applicable, are eliminated under step 2 from further analysis. *Id.*; *see e.g.*, *Prairie State*, 13 E.A.D. at 34-38 (reviewing step 2 analysis); *Cardinal*, 12 E.A.D. at 163-68 (same); *In re Steel Dynamics, Inc.*, 9 E.A.D. 165, 199-202 (EAB 2000) (same).

In step 3, the permit issuer ranks the remaining control options by control effectiveness, with the most effective alternative at the top. NSR Manual at B.7, .22; *see also In re Newmont Nev. Energy Inv., LLC*, 12 E.A.D. 429, 459-64 (EAB 2005) (evaluating challenge to step 3 analysis). In step 4, the permitting authority considers energy, environmental, and economic impacts and either confirms the top alternative as appropriate or determines it to be inappropriate. NSR Manual at B.8-.9, .26-.53. It is in this step that the permit issuer considers issues surrounding the relative cost effectiveness of the alternative technologies. *Id.* at B.31-.46. The permit issuer evaluates the economic impacts by estimating the average and incremental cost-effectiveness of the control technologies, measured in dollars per tons of pollutant emissions removed. *Steel Dynamics*, 9 E.A.D. at 202. The purpose of step 4 is to either validate the suitability of the top control option identified or provide a clear justification as to why that option should not be selected as BACT. NSR Manual at B.26; *see also Prairie State*, 13 E.A.D. at 38-51 (considering the application of step 4); *Three Mountain Power*, 10 E.A.D. at 42 n.3 (evaluating environmental impacts); *Steel Dynamics*, 9 E.A.D. at 202-07, 212-13 (remanding permit because of incomplete cost-effectiveness analysis under step 4).

Ultimately, in step 5, for the pollutant and emission unit under review, the permit issuer selects as BACT the most effective control option that was not eliminated in step 4. NSR Manual at B.9, .53. The reviewing authority should then specify an emission limit for the source that reflects the imposition of the control option selected. *Id.* at B.2, B.54; CAA § 169(3), 42 U.S.C. § 7479(3); *see also Prairie State*, 13 E.A.D. at 14, 51.

In this case, the permit provides that BACT for startup and shutdown of the lime kiln is "auxiliary fuel" defined as distillate fuel oil[10] or natural gas. Permit § 2.1.3-2.c.ii and iii. Sierra Club initially challenged the lack of a BACT analysis for this permit condition. Letter from James P. Gignac, Midwest Director, Sierra Club, to Dean Studer,

[10] In the administrative record and in the parties' briefs, the terms distillate fuel oil and diesel oil are used interchangeably.

Hearing Officer, IEPA 11 (Dec. 18, 2010) ("These fuels are lower emitting than coal, but are not equals.") ("Sierra Club Comments"). IEPA explained the following in the Responsiveness Summary:

> The permit appropriately addresses startup and shutdown of the kilns with the requirement to use either diesel fuel or natural gas as an alternative low-sulfur fuels (See Conditions 2.1.3-2(c)(ii) and (c)(iii)). The fact that this comment overlooks is that the plant site currently does not [have] natural gas service nor is it expected to have natural gas service. The permit only provides for the use of natural gas in the event that it would become available. In that case, as observed by the comment, it should be expected that the kilns would use natural gas during start and shutdown because natural gas is less expensive than distillate fuel oil.
>
> The cost of constructing a pipeline to serve the plants, estimated at $ 1.75 million cannot be considered cost-effective as secondary fuels need only be used during periods of startup and shutdown, when natural scrubbing is absent, and distillate oil, as compared to solid fuel is a low sulfur fuel.

RTC at 25 (footnotes omitted).

In its petition, Sierra Club challenged the adequacy of IEPA's BACT step 4 analysis because it did not consider the relative cost effectiveness of both natural gas and diesel fuel. Pet. at 25. IEPA responded that "[t]he permit only provides for use of natural gas in the event that it would become available." IEPA Response at 13; RTC at 25. IEPA does not expressly state that it found natural gas to be a technically infeasible control option; however, IEPA's reason for not conducting a "full blown cost effectiveness analysis" is that "natural gas simply is not

available." IEPA Response at 15 ("[IEPA] did consider natural gas but rejected it for the reasons given, it is not available.").[11]

IEPA defends the challenge to the step 4 analysis by arguing that it determined natural gas as "not available." This term is typically associated with the step 2 consideration of whether a control option is technically feasible. Because IEPA does not clearly articulate at which step of the top-down BACT analysis it eliminated natural gas as a control option for startup and shutdown emissions, the Board addresses both IEPA's step 2 and step 4 BACT analyses below.[12]

In arguing that natural gas is not a "commercially feasible" control option because it is not available, IEPA relies on Mississippi Lime's original permit application, which contemplated either natural gas or diesel fuel for kiln startup. Mississippi Lime Company, *Additional Information* 18 (June 11, 2010) ("Mississippi Lime Additional Information") (A.R. 6). The "Additional Information" document Mississippi Lime provided to IEPA explains that the proposed facility location lacks direct natural gas service, and that the estimated cost of "tapping in to the nearest natural gas line and installing all necessary distribution equipment (e.g., piping, regulators, meters, etc.)

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[11] Notably, this explanation – that IEPA "rejected" natural gas as BACT for kiln startup and shutdown because it is "not available" – is at odds with natural gas appearing in the permit as an auxiliary fuel for kiln startup and shutdown. *See* Permit § 2.1.3-2(c)(ii). Additionally, although IEPA argues that "[t]he permit only provides for the use of natural gas in the event that it would become available," IEPA Response at 13, the permit condition does not require the use of natural gas should it become "available," nor does the condition prohibit the use of distillate fuel oil once natural gas is available. Rather, the permit condition merely states: "During startup of a kiln, auxiliary fuel (i.e., distillate fuel oil or natural gas) shall be fired to bring the kiln and its associated control equipment up to the operating temperature before beginning firing of solid fuel." Permit § 2.1.3-2(c)(ii).

[12] The "Additional Information" document Mississippi Lime submitted states that "[t]he BACT analyses for this project follow the procedures outlined in the [NSR Manual]." Mississippi Lime Company, *Additional Information* 17 (June 11, 2010) ("Mississippi Lime Additional Information") (A.R. 6). Because the top-down methodology is the only BACT analysis described in great detail in the NSR Manual, the Board assumes that IEPA's BACT analyses applied the top-down methodology.

to service the proposed kilns will cost upward of $1.75 million." *Id.*; IEPA Response at 13. IEPA contends that in these circumstances, natural gas is "not available." IEPA Response at 15.

As noted above, the technical feasibility of control options is evaluated in step 2 of the top-down BACT analysis. A "control technology [that] has been installed and operated successfully on the type of source under review [] is demonstrated and [] is technically feasible." NSR Manual at B.17. An undemonstrated control technology is considered technically feasible if the technology is both "available" and "applicable." *Id.* "A control technique is considered available, within the context presented above, if it has reached the licensing and commercial sales stage of development." *Id.* at B.18. Such a technology can be obtained by commercial channels "or is otherwise available within the common sense meaning of the term." *Id.* at B.17. "The question of availability for purposes of BACT is a practical, fact determination, using conventional notions of whether the technology can be put into use." *In re Pennsauken Cnty., N.J.*, 2 E.A.D. 667, 671-72 & n.13 (Adm'r 1988) (citing Webster's New World Dictionary of the American Language 96 (2d College ed. 1972)). An available technology is "applicable" if it can reasonably be installed and operated on the source type under consideration. "Technologies identified in step one but that are not demonstrated and either not available or not applicable are eliminated under step two from further analysis." *In re Maui Elec. Co.*, 8 E.A.D. 1, 6 (EAB 1998).

The administrative record wholly lacks support for IEPA's assertion that natural gas is not technically feasible. Among other considerations, the Additional Information document plainly states that "*natural gas is a technically feasible fuel for lime kiln firing*, [and] the use of this fuel as BACT was rejected because it is not *commercially* feasible." Mississippi Lime Additional Information at 18 (emphasis added). Moreover, Mississippi Lime's ability to obtain a cost estimate for connecting the proposed facility to a natural gas line and for installing distribution equipment to service the proposed kilns indicates that natural gas is indeed available through commercial channels. *See id.* (estimating cost of "tapping in to the nearest natural gas line and

installing all necessary distribution equipment" to exceed $1.75 million). IEPA's attempts to frame the use of natural gas as an "unresolvable technical difficulty" based on the proposed plant site's distance from the existing natural gas pipeline fail to recognize that "where the resolution of technical difficulties is a matter of cost, the applicant should consider the technology as technically feasible." NSR Manual at B.19. Because IEPA's "technical" difficulty is actually merely a matter of cost, IEPA has not shown that natural gas is technically infeasible.

Moreover, IEPA inappropriately considered the cost of physical modifications needed to use natural gas during kiln startup and shutdown as a basis for determining that natural gas as a control technology was technically infeasible under step 2 of the BACT analysis. To the extent that IEPA intended its expression that natural gas was not "commercially feasible" in the Additional Information document to imply the "cost effectiveness" analysis in step 4, the administrative record supporting IEPA's decision falls short in supporting such a determination.

As previously stated, under step 4, the permit issuer considers issues related to the relative cost effectiveness of the alternative control technologies, in addition to their energy and environmental impacts. *Id.* at B.31-.46. The permit issuer evaluates the economic impacts by estimating the average and incremental cost-effectiveness of the control technologies, measured in dollars per tons of pollutant emissions removed. *Steel Dynamics*, 9 E.A.D. at 202. The permit issuer's economic impacts analysis must generally be thorough and detailed. *Id.* at 206; *e.g.*, *In re Inter-Power of N.Y., Inc.*, 5 E.A.D. 130, 149 (EAB 1994) ("Although the absence of [certain] information makes a cost-effectiveness determination more vulnerable to attack [,] we do not find the absence of such data or information fatal in this case, given the extensive information available in the record regarding other recently-permitted coal-fired fluidized boilers."). Nevertheless, in limited circumstances, a full cost analysis is not required. *E.g.*, *Prairie State*, 13 E.A.D. at 35 (eliminating an otherwise technically feasible control alternative at step 2 without undergoing a step 4 cost effectiveness analysis "where control options are * * * redundant") (citing NSR Manual at B.20-.21).

IEPA has not shown that such an exception to conducting a complete cost effectiveness analysis applies in the present case. On this record, IEPA's consideration of natural gas as BACT should have included a step 4 BACT analysis. Instead, the entirety of IEPA's analysis prior to determining natural gas "not commercially feasible" was a single cost estimate for extending natural gas service to the proposed plant. Mississippi Lime Additional Information at 18. This cost estimate failed to consider the average and incremental cost-effectiveness of natural gas. In short, the administrative record does not support IEPA's determination that natural gas for Plant startup and shutdown was "not commercially feasible" within the context of a step 4 analysis.

As the Board has stated, BACT determinations are one of the most critical elements in the PSD permitting process, must reflect the considered judgment on the part of the permit issuer, and must be well documented in the administrative record. *See Desert Rock*, slip op. at 50, 14 E.A.D. at ___; *Knauf I*, 8 E.A.D. at 132; *accord Newmont*, 12 E.A.D. at 442; *In re Gen. Motors, Inc.*, 10 E.A.D. 360, 363 (EAB 2002). Because the record before the Board is insufficient to support IEPA's BACT determination for startup and shutdown emissions, the permit is remanded on this issue.

On remand, IEPA is ordered to prepare a revised BACT analysis for startup and shutdown emissions and to reopen the public comment period to provide the public with an opportunity to review and comment on that analysis. The BACT analysis shall comply fully with the top-down method and all of its steps, including adequate step 2 and step 4 analyses.[13]

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[13] As previously mentioned, the NSR Manual is not a binding U.S. EPA regulation and, consequently, strict application top-down methodology is not mandatory, nor is it the required vehicle for making BACT determinations. *E.g.*, *Russell City*, slip op. at 20 n.10, 15 E.A.D. ___; *N. Mich. Univ.*, slip op at 12-13, 14 E.A.D. at ___. The Board carefully examines those BACT analyses that deviate from the NSR Manual's methodology to ensure that the permitting agency has set forth a defensible BACT determination that reflects consideration of all relevant statutory and regulatory criteria (continued...)

B. *Sierra Club Has Demonstrated That IEPA Clearly Erred in Establishing the BACT Limitations for SO_2, NO_X, and Particulate Matter.*

Sierra Club makes a multi-part challenge to IEPA's approach in selecting the SO_2, NO_x, and PM BACT emissions limits. First, Sierra Club asserts that IEPA's SO_2 BACT limit is clearly erroneous because there is a discrepancy between the sulfur content in the coal that the revised SO_2 BACT analysis stated was BACT (3.2%) and the sulfur content in the coal that IEPA relied on to determine the SO_2 BACT limit (3.5%). Pet. at 30-32. IEPA clarified that the BACT limit calculations contemplated the use of solid fuel that consisted of both coal *and* petroleum coke, not solely coal. IEPA Response at 22; MLC Response at 5; *see also* Project Summary at 2, 8 n.8. IEPA added that under the BACT limit, the sulfur content of such combined fuel is limited to 3.5%. IEPA Response at 22; MLC Response at 5; *see also* Project Summary at 2, 8 n.8. Second, Sierra Club also claims that IEPA clearly erred in establishing BACT limits for SO_2 by failing to impose lower permit limits based on emissions measurements (sometimes called performance test data) for the pollutant at other lime kiln facilities. Pet. at 26-30.

Additionally, Sierra Club challenges the NO_x and PM BACT limitations based on the same alleged IEPA failure to base the permit limits on emissions measurements for NO_x, filterable PM, and PM_{10} at other lime kiln facilities. *Id.* Sierra Club further disputes IEPA's explanation that application of a "safety margin" is the reason the NO_x, filterable PM, and PM_{10} BACT limits are higher than the emissions rates, and the BACT permit limits, for the other facilities Sierra Club identified. *Id.* These arguments present the following sub-issues for the Board to resolve:

1. Has Sierra Club demonstrated that IEPA clearly erred by declining to consider performance test data at other

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[13](...continued)
in the PSD permitting program. *See N. Mich. Univ.*, slip op at 12-13, 14 E.A.D. at ___, and cases cited.

lime kilns and by relying on a design fuel with 3.5% sulfur content when establishing the SO_2 BACT limitation?

2. Has Sierra Club demonstrated that when establishing the NO_x, filterable PM, and PM_{10} BACT limits, IEPA clearly erred by declining to consider performance test data at other lime kilns and by applying safety margins?

The Board addresses these sub-issues in turn.

1. *Sierra Club Has Demonstrated That IEPA Clearly Erred by Declining to Consider Performance Test Data at Other Lime Kilns and by Relying on a Design Fuel with 3.5% Sulfur Content When Establishing the SO_2 BACT Limitation.*

In its Project Summary, IEPA stated that the kilns would burn solid fuel in the form of coal and petroleum coke. Project Summary at 2; *see also* Mississippi Lime Additional Information at 25. The Project Summary also stated that BACT for SO_2 emissions was "natural scrubbing," as achieved with the limestone and lime dust produced by the lime kilns and captured by the fabric filters and that "[a]n appropriate SO_2 BACT emission limit with the scrubber is 0.645 lbs SO_2 per ton of lime produced, on a daily or 24-hour average basis." Project Summary at 7. IEPA indicated that the design fuel would have a sulfur content of 3.5%. *Id.* at 8 n.8. IEPA calculated that the kilns, which used ten tons of fuel per hour, would emit 1400 pounds of SO_2 per hour. *Id.* IEPA concluded:

> The controlled SO_2 emissions of the kiln based on a BACT limit of 0.645 pounds per ton of lime would be 32.25 pounds per hour (50 x 0.645 = 32.25). The nominal control efficiency for SO_2 achieved by natural

> scrubbing would be about 97.5 percent (1-32.25/1400)/100 = .977, ≈ 97 percent).

Id.

Sierra Club's comments challenged IEPA's failure to consider lower sulfur coals, in combination with "natural scrubbing," in the SO_2 BACT analysis. Sierra Club Comments at 5. Sierra Club also questioned IEPA's basis for deriving the emissions limit. In particular, Sierra Club commented that the actual SO_2 emissions rate data from a lime kiln in Green Bay, Wisconsin, were 600 times lower than the permitted limit, or "a range of about 0.06 - 0.08 lbs [of SO_2]/ton of lime produced." *Id.* at 8. Sierra Club added that the SO_2 emissions limit for a second kiln in Green Bay was the equivalent of 0.45 lbs/ton of lime produced, also lower than the permit limit for the Mississippi Lime facility.

IEPA recognized that the permit's SO_2 BACT limits were higher than the limits at other lime kilns. RTC at 17. Then, relying on the U.S. EPA's "Compilation of Air Pollutant Emission Factors," or "AP-42," IEPA explained that "this emission data, by itself, is of minimal value for determining BACT in the absence of relevant background information for the tested lime kilns." RTC at 17 (citing Office of Air Quality Planning & Standards, U.S. EPA, *I Compilation of Air Pollutant Emission Factors* (5th ed. Jan. 1995)). Although Sierra Club included the stack test analysis for the Green Bay kiln, which identified the lime quality, the size of the kiln, the production rate, and the test results, Pet. at 27, IEPA responded that Sierra Club's comment "[wa]s of little use in establishing [a] BACT limit unless accompanied by other supporting information. This comment did not include the needed supporting information * * *." RTC at 18. After dismissing the use of measured SO_2 emissions at other facilities to determine the SO_2 BACT limit for the Mississippi Lime facility, IEPA indicated that it calculated the BACT limit based on the sulfur content of the design fuel. *Id.*

As mentioned earlier, the permit issuer, in step 5 of the BACT analysis, selects the most stringent control alternative found at step 2 to

be available and technically feasible that was not eliminated in step 4. In establishing the actual permit limits, the permit issuer sets as BACT an emission limit or limits achievable by the facility using the emissions control alternative it selected rather than imposing a particular pollution control technology. *In re Prairie State Generating Co.*, 13 E.A.D. 1, 51 (EAB 2006), *aff'd sub. nom Sierra Club v. U.S. EPA*, 499 F.3d 653 (7th Cir. 2007); *In re Three Mountain Power, LLC*, 10 E.A.D. 39, 54 (EAB 2001); *see* 40 C.F.R. § 52.21(b)(12) (defining BACT as "an emission limitation").

The NSR Manual recognizes that there are some control techniques with a wide range of performance levels and recommends that, in identifying the performance level for such a control technique, the "most recent regulatory decisions and performance data" should be evaluated. NSR Manual at B.23. Disputes have arisen where evidence in the record establishes a range of emissions rates for the most stringent control alternative and, at step 5 of the top-down analysis, the permit issuer sets the permit's BACT limit at a different rate within the range that otherwise appears appropriate. *Prairie State*, 13 E.A.D. at 51 (citing *In re Cardinal FG Co.*, 12 E.A.D. 153, 169 (EAB 2005); *In re Kendall New Century Dev.*, 11 E.A.D. 40, 52 (EAB 2003); *Three Mountain Power*, 10 E.A.D. at 53; *In re Steel Dynamics, Inc.*, 9 E.A.D. 165, 188 (EAB 2000); *In re Knauf Fiber Glass, GmbH ("Knauf II")*, 9 E.A.D. 1, 15 (EAB 2000); *In re Masonite Corp.*, 5 E.A.D. 551, 560-61 (EAB 1994)).

The Board has previously discussed the proper consideration of performance tests in establishing final permit emissions limits. *E.g.*, *In re Newmont Nev. Energy Inv., LLC*, 12 E.A.D. 429, 441-43 (EAB 2005); *Prairie State*, 13 E.A.D. at 54. The Board explained that, for a variety of reasons, the data on past performance may show differences across sources using a given control technique. *E.g.*, *Newmont*, 12 E.A.D. at 441. Several reasons that could explain such variability in measured emissions rates include test method variability, *Knauf II*, 9 E.A.D. at 15, fluctuations in control efficiency, *Masonite*, 5 E.A.D. at 560-61, and "characteristics of individual plant processes," *In re Knauf Fiber Glass, GmbH ("Knauf I")*, 8 E.A.D. 121, 143 (EAB 1999). "The underlying

principle of all of these cases is that PSD permit limits are not necessarily a direct translation of the lowest emissions rate that has been achieved by a particular technology at another facility, but that those limits must also reflect consideration of any practical difficulties associated with using the control technology." *Cardinal*, 12 E.A.D. at 170.

Thus, the Board has held that the permitting authority is not required to set the emissions limit at the most stringent emissions rate that has been demonstrated by a facility using similar emissions control technology. *Kendall*, 11 E.A.D. at 50-54. Nevertheless, as mentioned above, "the BACT analysis is one of the most critical elements of the PSD permitting process and must, therefore, be well documented in the administrative record." *Newmont*, 12 E.A.D. at 442; *accord Knauf I*, 8 E.A.D. at 131. In particular, "the basis for choosing the alternate level (or range) of control in the BACT analysis must be documented." NSR Manual at B.24. The Board has repeatedly held that the permit issuer must provide a reasoned basis for its decision, which must include an adequate response to comments raised during the public comment period. *E.g.*, *In re Russell City Energy Ctr., LLC*, PSD Appeal Nos. 10-01 through 10-05, slip op. at 79 (EAB Nov. 18, 2010), 15 E.A.D. ___; *Knauf I*, 8 E.A.D. at 140-42; *In re Gen. Motors, Inc.*, 10 E.A.D. 360, 374 (EAB 2002); *Steel Dynamics*, 9 E.A.D. at 191 n.31; *Masonite*, 5 E.A.D. at 568-69, 572 (remanded due to incomplete BACT analysis); *In re Brooklyn Navy Yard Res. Recovery Facility*, 3 E.A.D. 867, 875 (Adm'r 1992) (remanded for failure to adequately consider public comments regarding BACT).

In this case, IEPA dismissed Sierra Club's suggestion to consider the performance test data at existing kilns due to Sierra Club not providing all the necessary information regarding the emissions from the other kilns without identifying the nature of the missing information. RTC at 17, 18. Then, IEPA stated, "The SO_2 BACT limit was determined based on the level of SO_2 control that would be required to be achieved with the proposed SO_2 control technology." *Id.* at 18. "The level of control was calculated from the sulfur content of the design fuel and the design fuel consumption rate, as was explained in the Project

Summary." *Id.* IEPA selected a 3.5% design fuel as the SO_2 BACT because a 3.5% sulfur content "design fuel is the highest sulfur content of fuel at which the lime from the kilns would meet customer specifications for product lime."[14] IEPA Response at 22; RTC at 26.

However, there is no indication that a 3.5% sulfur content design fuel was the most stringent control alternative found at step 2 to be technically feasible that was not eliminated in step 4, particularly when IEPA had already concluded that among the technically feasible coals, coal with 3.2% sulfur content was cost effective.[15] The administrative record is devoid of any analysis of why another design fuel with a lower sulfur content was not available and thus, not technically feasible, or not cost-effective. Morever, the Board finds that IEPA fundamentally misunderstands that its role as permit issuer requires the agency to investigate and examine recent regulatory determinations, especially if one is brought to the permit issuer's attention. "[T]he existence of a similar facility with a lower emissions limit creates an obligation for [the permit applicant and permit issuer] to consider and document whether that same emission level can be achieved at [the] proposed facility." *In re Indeck-Elwood, LLC*, 13 E.A.D. 126, 183 (EAB 2006). In the present case, IEPA was obligated to investigate and evaluate other facilities, including the Green Bay kiln that Sierra Club identified.

Additionally, even if IEPA adequately supported its determination that a 3.5% sulfur content design fuel was the BACT,

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[14] "The coal and petroleum coke would be blended to stay within this level." IEPA Response at 22; RTC at 26.

[15] In response to Sierra Club's comments concerning use of a lower sulfur coal, IEPA obtained and provided a cost-effectiveness analysis for alternative low-sulfur solid fuel in the Responsiveness Summary. IEPA explained that in addition to the local high sulfur coal, the new cost-effectiveness analysis considered "two alternative coals, coal from a local reserve of low sulfur coal whose continuing availability is uncertain[,] and Powder [River B]asin coal." RTC at 27. The analysis provided the following sulfur contents for the various coals: for the local low sulfur coal, 1.4%; for the Powder River Basin coal, 0.6%; and for the local high sulfur coal, 3.2%. *Id.* IEPA's analysis determined the local high sulfur coal with 3.2% sulfur content to be the most cost effective.

IEPA does not adequately explain how, based on that control technology, IEPA derived the SO_2 BACT limitations. The calculations presented in the project summary appear to demonstrate the efficiency of the control – approximately 97% – based on a 0.645 pounds SO_2 per ton of lime emission rate, *see* Project Summary at 8 n.8, rather than explain how IEPA concluded that a 0.645 pounds SO_2 per ton of lime limitation was BACT.

Accordingly, the permit is remanded on this issue. On remand, IEPA is ordered to prepare a revised BACT analysis for SO_2 and to reopen the public comment period to provide the public with an opportunity to review and comment on this analysis. In conducting this analysis, IEPA should follow and fully comply with the top-down method or another defensible BACT analysis.[16]

2. *Sierra Club Has Demonstrated That When Establishing the NO_x, Filterable PM, and PM_{10} BACT Limits, IEPA Clearly Erred by Declining to Consider Performance Test Data at Other Lime Kilns and by Applying Safety Margins.*

When Sierra Club faulted IEPA for failure to consider actual NO_x emissions rate data from other kilns and provided actual emissions data from a lime kiln in Green Bay, Wisconsin, RTC at 22; Sierra Club Comments at 10, IEPA tacitly acknowledged the discrepancy between the NO_x emissions at the Green Bay plant and the emissions limit for the proposed plant by attributing the discrepancy to "a margin of safety to account for normal variation in the effectiveness of control measures."

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[16] As previously mentioned, the NSR Manual is not a binding U.S. EPA regulation and, consequently, strict application of the top-down methodology is not mandatory, nor is it the required vehicle for making BACT determinations. *E.g.*, *Russell City*, slip op. at 20 n.10, 15 E.A.D. at ___; *In re N. Mich. Univ.*, PSD Appeal No. 08-02, slip op at 12-13 (EAB Feb. 18, 2009), 14 E.A.D. at ___. Nevertheless, a permit issuer's BACT determination must consider all requisite statutory and regulatory criteria, and the Board will closely scrutinize those BACT analyses that do not follow the methodology set forth in the NSR Manual. *See N. Mich. Univ.*, slip op at 12-13, 14 E.A.D. at ___, and cases cited.

RTC at 22. IEPA ultimately chose a NO_x BACT limit in the permit that is approximately 20% greater than the emissions rate at the Green Bay kiln and stated that this margin was reasonable in light of the variability in control measures. *Id.* Similarly, when Sierra Club asserted that the PM limits in the permit were higher than the 4.80 lbs/hr limit set for another lime kiln in Wisconsin (known as the Graymont kiln), Sierra Club Comments at 11, IEPA responded that the permit limits were less stringent than the emissions limit for the Wisconsin lime kiln to include a "'margin of safety' to account for normal variation in particulate emissions for a control system."[17] RTC at 24.

As mentioned earlier, the permitting authority is not required to set the emissions limit at the most stringent emissions rate that has been demonstrated by a facility using similar emissions control technology, *Russell City*, slip op. at 79, 15 E.A.D. at ___, and the permitting authority retains discretion to set BACT levels that "do not necessarily reflect the highest possible control efficiencies but, rather, will allow permittees to achieve compliance on a consistent basis." *Steel Dynamics*, 9 E.A.D. at 188; *accord Three Mountain Power*, 10 E.A.D. at 53. However, consistent with the Board's numerous holdings that the permit issuer must provide a reasoned basis for its permit decision, the decision "to select an alternate level (or range) of control in the BACT analysis must be documented." NSR Manual at B.24.

IEPA's selection of the proper "achievable" emissions limits and IEPA's use of a "safety margin" (also referred to as a "compliance margin" or "safety factor" in Board decisions) for the NO_x, filterable PM, and PM_{10} BACT limits are intertwined. "A challenge to a permitting authority's use of safety factors [] is not easily entertained separate and apart from the permitting authority's analysis of the record evidence pertaining to achievable emissions limits. This is the case

[17] IEPA determined the BACT for particulate emissions from the kilns to be fabric filtration or baghouses and set the following limits: a 0.14 lb/ton of lime produced, 3-hour average, for filterable particular matter; 0.18 lb/ton of lime produced, 3-hour average, for PM_{10}; and 0.105 lb/ton of lime produced, 3-hour average, for $PM_{2.5}$. Project Summary at 9; Permit §§ 2.1.3-2.b.i.A-C.

because the concept of a 'safety factor' is intended to allow the permitting authority flexibility in setting the permit limits where there is some degree of uncertainty regarding the maximum degree of emissions reduction that is achievable." *Prairie State*, 13 E.A.D. at 55. For this reason, the Board considers these two issues together.

The Board recently addressed the issue of compliance margins or safety factors in detail, explaining:

> [The Board] ha[s] approved the use of a so-called "safety factor" in the calculation of the permit limit to take into account variability and fluctuation in expected performance of the pollution control methods. *See, e.g.,* [*Knauf II*, 9 E.A.D. at 15 (EAB 2000)] ("There is nothing inherently wrong with setting an emissions limitation that takes into account a reasonable safety factor."). As we noted in [*Masonite*, 5 E.A.D. 551 (EAB 1994)], where the technology's efficiency at controlling pollutant emissions is known to fluctuate, "setting the emissions limitation to reflect the highest control efficiency would make violations of the permit unavoidable." 5 E.A.D. at 560.
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> In essence, [U.S. EPA] guidance and our prior decisions recognize a distinction between, on the one hand, measured "emissions rates," which are necessarily data obtained from a particular facility at a specific time, and on the other hand, the "emissions limitation" determined to be BACT and set forth in the permit, which the facility is required to continuously meet throughout the facility's life. Stated simply, if there is uncontrollable fluctuation or variability in the measured emission rate, then the lowest measured emission rate will necessarily be more stringent than the "emissions limitation" that is "achievable" for that pollution control method over the life of the facility.

In re Vulcan Constr. Materials, L.P., PSD Appeal No. 10-11, slip op. at 30, 15 E.A.D. at ___ (EAB Mar. 2, 2011) (quoting *Russell City*, slip op. at 78-79, 15 E.A.D. at ___ (quoting *Newmont*, 12 E.A.D. at 441-42)).

In determining whether the selection of a compliance or safety margin is appropriate, the Board's analysis is fact- and case-specific. *Russell City*, slip op. at 80, 15 E.A.D. at ___ (citing *Prairie State*, 13 E.A.D. at 55 (explaining that the "appropriate application of a safety factor in setting an emission limit is inherently fact-specific and unique to the particular circumstances of the selected technology, the context in which it will be applied, and available data regarding achievable emissions limits")). In each case, the Board examines the specific facts and circumstances in order to determine if the record fully supports the compliance or safety margin and reflects the permit issuer's considered judgment.[18] *Id*. at 86, 15 E.A.D. at ___ . While a well-supported compliance or safety margin will generally be upheld by this Board, a compliance or safety margin can cross the line from permissible to impermissible where it is "excessively large or is not sufficiently documented and supported." *Id*., 15 E.A.D. at ___. Thus, "selection of

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[18] As this Board stated in *Russell City*:

> The Board has upheld a range of safety factors, compliance factors, and/or safety margins. *E.g.*, *Newmont*, 12 E.A.D. at 459-64 (upholding the permit issuer's limit based on a control efficiency of 66.5%, where reductions of up to 80 to 90% "can be achieved"); *Kendall*, 11 E.A.D. at 50-54 (upholding permit issuer's selection of 25 ppmvd, even though similar facility has a 20 ppmvd limit); *Steel Dynamics*, 9 E.A.D. at 188 (upholding the permit issuer's decision to use "the most stringent PM limit ever imposed" on similar facilities, 0.0018, rather than the "lowest ever achieved," .0001 grains per standard cubic feet); *Knauf II*, 9 E.A.D. at 15 (upholding permit issuer's use of a 25% safety factor); *Masonite*, 5 E.A.D. at 560-61 (upholding permit issuer's selection of a 95% control efficiency rather than vendor's proposed guarantee of 97%); *In re Pennsauken Cnty, N.J.*, 2 E.A.D. 768, 769-70 (Adm'r 1989) (concluding that 35.7% removal efficiency rate, as opposed to the 50% rate suggested by petitioners, was not clear error).

Russell City, slip op. at 85-86, 15 E.A.D. at ___.

a reasonable safety factor is not an opportunity for the permittee to argue for, or for the permit issuer to set, a safety factor that is not fully supported by the record, or that does not reflect the exercise of the permit issuer's considered judgment in determining that the emissions limit, including the safety factor, constitutes BACT." *Id*., 15 E.A.D. at ___.

In *Russell City*, the Board upheld a compliance margin for the permit's NO_2 startup emissions limits while recognizing that "it could be argued that the compliance margins selected here tend towards the more generous side." *Id*., 15 E.A.D. at ___. The Board did so, however, noting that the permit issuer had conducted an extensive BACT analysis, including an analysis of data from several other facilities. *Id*., 15 E.A.D. at ___. Upon review of that data, the permit issuer concluded that a compliance margin was needed to ensure that emissions limits could be reasonably achieved over time. *See id*. at 66-67, 15 E.A.D. at ___. Although petitioners in that case cited data from other facilities, such as the Palomar Energy Center in California, with lower NO_2 startup emissions rates, the permit issuer nevertheless determined that a higher limit was appropriate for the Russell City facility. The permit issuer in *Russell City* stated, in part, that:

> [T]he data from [the Palomar Energy Center in California] includes only five available data points for cold starts, which does not generate a great deal of statistical confidence that the maximum seen in this data set is representative of the maximum that can be expected over the entire life of the facility. Moreover, the wide variability in the data that is available highlights the variability in individual startups, underscoring the need to provide a sufficient compliance margin to allow the facility to be able to comply during all reasonably foreseeable startup scenarios. For both of these reasons, the Air District has concluded that a cold startup limit of 480 pounds of NO_2 is a reasonable BACT limit that is consistent with

> the startup emissions performance seen at the Palomar facility.

Id. at 67, 15 E.A.D. at ___ (quoting permit issuer's "Additional Statement of Basis"). Upon review, the Board concluded that the compliance margin was rational in light of the evidence in the record. As the Board stated:

> [The permit issuer] repeatedly emphasized the wide variability in the facility data, and the record amply supports these statements. The performance data for cold startups at Palomar, for example, ranges from 22 to 375 pounds (or 26 to 435 pounds depending on which air district's calculations is considered), which is a large range. [The permit issuer] also provided several reasons for the wide variability across sources, as noted above. [The permit issuer's] other explanation for its use of a compliance factor for cold startups – that it only had a small number of data points – is consistent with the Board's discussion of the consideration and significance of long-term data in *Newmont*, where the Board explained that "because 'emissions limitation' is applicable for the facility's life, it is wholly appropriate for the permit issuer to consider, as part of the BACT analysis, the extent to which the available data demonstrate whether the emissions rate at issue has been achieved by other facilities over the long term." 12 E.A.D. at 442.

Id. at 84, 15 E.A.D. at ___ (citations omitted). The Board concluded that the use of a compliance factor was well-supported and reflected the considered judgment of the permit issuer.

In contrast, the matter before the Board in the present case does not contain sufficient record support for the use of a compliance margin for emissions of either NO_x, filterable PM, or PM_{10}. Despite Mississippi Lime's claim that "[i]t is clear from the record that the proposed lime

kilns with 'natural scrubbing,' start up and cool down cycles, variations in fuel characteristics, and other operational variabilities, are known to have fluctuations in emissions," MLC Response at 2, neither Mississippi Lime nor IEPA have directed the Board to those supporting portions of the administrative record. Unlike *Russell City*, but strikingly similar to *Vulcan*, the BACT analyses in this case do not include any discussion of what an appropriate compliance margin should be and why the margin should be set at a particular level. Indeed, the BACT analyses make no mention of the need for a compliance margin in establishing the permit's PM or NO_x emissions limits. Nor do the analyses sufficiently assess data from other facilities that might support the proposed compliance margin. This is a salient omission, and indeed IEPA was obligated to conduct a more thorough evaluation of comparable facilities, including those Sierra Club cited. In fact, IEPA did not address the data concerning other kilns' emissions until the Responsiveness Summary, and only to summarily reject Sierra Club's contentions. Moreover, IEPA's only justification for the compliance margins in this case is contained in IEPA's Responsiveness Summary. Those responses in the Responsiveness Summary, however, contain only a cursory and unpersuasive explanation for a compliance margin.

Although permit issuers retain discretion to set BACT levels that "do not necessarily reflect the highest possible control efficiencies but, rather, will allow permittees to achieve compliance on a consistent basis," *Newmont*, 12 E.A.D. at 442 (quoting *Steel Dynamics*, 9 E.A.D. at 188), IEPA has not demonstrated that such reasoning is applicable here. *Accord Prairie State*, 13 E.A.D. at 55; *Three Mountain Power*, 10 E.A.D. at 53. In this case, the administrative record reflects only IEPA's conclusory assertions that a margin of compliance is appropriate.

As to the specific pollutants, although IEPA demonstrated that the NO_x BACT limit in the permit is approximately 20% greater than the emission rate at the Green Bay kiln, IEPA does not describe how it

determined this particular margin was reasonable.[19] RTC at 22. The first time IEPA addressed a safety margin for the NO_x emissions was in the Responsiveness Summary, in which IEPA stated:

> Considering that BACT limits must be achievable, which necessitates a set with a margin of safety to account for normal variation in the effectiveness of control measures, it is reasonable that is 20 percent higher than emission rates measured during testing of the cited kiln. Moreover, as the proposed kilns would have continuous emissions monitoring systems for NO_x, one could argue that measured emissions of the cited kiln support a limit that is higher than the limit that has been set.

Id. (footnote omitted). This justification for the margin of compliance is lacking. IEPA relies on "normal variation in the effectiveness of control measures," yet IEPA neither asserts nor provides support that such variation in the effectiveness of the chosen control measure for NO_x exists or that, even if it did, twenty percent is an appropriate and supportable margin. Moreover, it is unclear how the kiln that Sierra Club identified in its comments became what appears to be the baseline from which IEPA calculated the safety margin.

With respect to particulate matter, IEPA again addressed the safety margins for the first time in the Responsiveness Summary, where IEPA stated:

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[19] IEPA's argument that Sierra Club failed to preserve the safety margin issue for appeal, IEPA Response at 20, lacks merit. IEPA's response to Sierra Club's comments regarding IEPA's failure to consider lower BACT limits at other facilities explained that the permit BACT limits were due to safety margins. An explanation that the BACT limits incorporated safety margins was not provided in the permit record prior to the Responsiveness Summary. Thus, the Responsiveness Summary was the first time IEPA mentioned that the BACT limits included safety margins. Accordingly, IEPA's reasoning was not ascertainable before the close of public comment and may be challenged on appeal. 40 C.F.R. §§ 124.13, .19; *see also Prairie State*, 13 E.A.D. at 45 n.41.

> Considering the need for a "margin of safety" to account for normal variation in particulate emissions for a control system [that] is properly operated and maintained, the emission rate measured at the Graymont Kiln supports the BACT limits set for particulate emissions of the proposed kilns.

Id. at 24 (footnotes omitted). IEPA further noted, "For an emission unit controlled by a fabric filter it is certainly reasonable that considerations of a safety factor lead to an emission limit that is twice the emission rate measured in any particular test that is representative of proper operation of such unit and associated filter." *Id.* at 24 n.28. IEPA concluded:

> In addition to the usual consideration for the "safety factor" that should be reflected in these limits, another factor is that a limit is being set for total particulate, including both filterable and condensable particulate. This raises uncertainty as to the test method used to measure condensable particulate in that test as compared to revised test method for measurement of condensable particulate recently adopted by USEPA.

Id. at 24 n.29. As with the margin of safety for NO_x emissions, IEPA's responses are conclusory. The administrative record does not support IEPA's assertion that a variation in the effectiveness of the chosen control measure for particulate matter exists, nor is there any explanation of how IEPA derived the numerical value for the margin and whether the assertions IEPA proffers have any technical or scientific basis.

While the Board generally upholds a well-supported compliance or safety margin, the record must contain a sufficient explanation and justification for the permit issuer's determination to include any safety margin as well as sufficient justification for the particular safety margin selected. IEPA's failure to include explanations in its BACT analyses and the conclusory statements in responding to comments on this issue are insufficient. IEPA fails to provide an adequate rationale as to why compliance margins are appropriate in this case. Significantly, even if

IEPA had established the need for compliance margins, the record is wholly devoid of explanations for the actual margins. While there may be valid reasons for including compliance margins, IEPA has failed to sufficiently articulate those reasons or to provide the necessary record support. Under these circumstances, as *Russell City* clearly stated could occur, *see Russell City*, slip op. at 86, 15 E.A.D. at ___, the compliance margins in this case are impermissible. Thus, the limitations cannot be justified as BACT on this record.

The permit is therefore remanded on the BACT limitations for NO_x, filterable PM, and PM_{10}. On remand, IEPA must explain how it derived the BACT limitations for NO_x, filterable PM, and PM_{10}, and demonstrate that the limits constitute BACT. IEPA must also either (1) provide sufficient rationales for including compliance margins, as well as sufficient rationales for the sizes of any such margins, fully consistent with the Board's precedents, or (2) remove the compliance margins from the permit. Should IEPA choose to retain compliance margins, it must reopen the public comment period to provide the public with an opportunity to submit comments.[20]

C. *Sierra Club Has Demonstrated That IEPA's Application of a SIL in the Culpability Analysis of the Ambient Air Quality Analysis for the One-hour SO_2 NAAQS is Clearly Erroneous.*

As stated above, applicants for PSD permits must, among other things, demonstrate, through analysis of the anticipated air quality impacts associated with their proposed facilities, that their facilities' emissions will not cause or contribute to an exceedance of any applicable NAAQS. *See* CAA § 165(a)(3), 42 U.S.C. § 7475(a)(3); 40 C.F.R. § 52.21(k)-(m). Specifically, the statute prohibits the construction of a major emitting facility unless

[20] The Board's case law, including *Russell City*, describes the level of analysis and documentation required to support such a determination, including the importance of carefully evaluating multiple sources and data points as well as information such as recent permit limits at other similar facilities.

> the owner or operator of such facility demonstrates * * * that emissions from construction or operation of such facility will not cause, or contribute to, air pollution in excess of any * * * national ambient air quality standard in any air quality control region * * *.

CAA § 165(a)(3)(b), 42 U.S.C. § 7475(a)(3)(b). The performance of an ambient air quality and source impact analysis, pursuant to the regulatory requirements of 40 C.F.R. § 52.21(k), (l) and (m), as part of the PSD permit review process, is the central means for preconstruction determination of whether the source will cause or contribute to an exceedance of the NAAQS. *See In re Haw. Elec. Light Co.*, 8 E.A.D. 66, 73 (EAB 1998).

An air quality analysis generally proceeds in stages, beginning with a preliminary analysis that uses modeling to predict air quality impacts based solely on the proposed facility's emissions. NSR Manual at C.24. This preliminary analysis does not take into account existing ambient air quality or emissions from other sources. *Knauf I*, 8 E.A.D. 121, 149 (EAB 1999). The results are used to determine whether a full impact analysis is required.[21] The results of the preliminary analysis are compared to the "significant ambient impact levels" or "significant impact levels" set forth in the NSR Manual. NSR Manual at C.28. If the modeled impacts (predicted emissions) from the proposed facility are less than the SILs for all pollutants at all locations, the permit applicant generally is not required to conduct a full impact analysis. *Id.* at C.24. However, if the modeled impacts from the facility are greater than the SIL for a pollutant at any location, a full impact analysis is recommended for that pollutant. *Id.* at C.25, .52. The full impact analysis considers emissions from the proposed source in addition to the emissions from

[21] The preliminary analysis is also used to define the impact area within which a full impact analysis – if conducted – is carried out. NSR Manual at C.24. The impact area includes all locations where the predicted increase in emissions from the proposed source exceeds the SIL. *Id.*

any existing sources and "background" emissions within the impact area defined during the preliminary analysis.[22] *Id.*

If the full impact analysis predicts NAAQS violations at particular locations and times, a culpability analysis may be conducted to determine the extent to which the proposed facility is predicted to contribute to the identified violations. The modeled emissions increase at the location and time of a predicted NAAQS violation is compared to the SIL. *Id.* at C.52. If such a modeled emissions increase is less than the SIL, the predicted emissions increase is not considered a significant ambient impact, and "the source will not be considered to cause or contribute to the violation * * *. In such a case, the permitting agency, upon verification of the demonstration, may approve the permit." *Id.*

The use of a SIL in ambient air quality analyses is rooted in the de minimis doctrine, which allows an administrative agency to "overlook circumstances that in context may fairly be considered de minimis." *Ala. Power Co. v. Costle*, 636 F.2d 323, 360 (D.C. Cir. 1979) ("It is commonplace, of course, that the law does not concern itself with trifling matters * * *.") (footnotes omitted). The D.C. Circuit specifically recognized that U.S. EPA may exempt de minimis matters from the statutory commands of the Clean Air Act. *Id*. In particular, the *Alabama Power* court acknowledged EPA's discretion to exempt from new source review "some emissions increases on grounds of de minimis or administrative necessity." *Id.* at 400.

U.S. EPA has "long interpreted the phrase 'cause, or contribute to' [in CAA § 165(a)(3)] to refer to significant, or non-de minimis, emission contributions." *In re Prairie State Generating Co.*, 13 E.A.D. 1, 105 (EAB 2006), *aff'd sub. nom Sierra Club v. U.S. EPA*, 499 F.3d 653 (7th Cir. 2007). When U.S. EPA introduced the concept of SILs, U.S. EPA explained that "since the air quality impact of many sources fall off rapidly to insignificant levels, [U.S.] EPA does not intend to

[22] The so-called "background" emissions consist of secondary emissions that arise from residential, commercial and industrial growth that accompanies the new activity at the source. NSR Manual at C.25.

analyze the impacts of a source beyond the point where the concentrations from the source fall below certain levels." 1977 Clean Air Act; Prevention of Significant Air Quality Deterioration, 43 Fed. Reg. 26,379, 26,398 (June 19, 1978). Accordingly, the use of a SIL in the culpability analysis for the one-hour SO_2 NAAQS is not improper, and IEPA did not clearly err by using a SIL. *Prairie State*, 13 E.A.D. at 105. However, when applying a SIL in a culpability analysis to conclude that modeled impacts are de minimis, and thus, exempt from regulation, the permitting agency "must follow a rational approach to determine what level of emission is a de minimis amount." *Ala. Power*, 636 F.2d at 405. It is this use of a SIL that is at issue here.

In this case, the administrative record reflects the use of three different one-hour SO_2 SIL values – 10 µg/m^3, 7.9 µg/m^3, or 7.85 µg/m^3 – in the course of determining that the Plant would not cause or contribute to a violation of the one-hour SO_2 NAAQS. Shell Engineering & Associates ("Shell Engineering") conducted Mississippi Lime's air quality analyses to assess the potential effect of the proposed plant on the ambient air quality. Project Summary at 10. Shell Engineering indicated in a modeling supplement for one-hour SO_2 that it performed a preliminary impact analysis, determined the ambient background value of one-hour SO_2, and conducted a full-impact analysis. Shell Engineering & Associates, *Modeling Supplement – One-hour SO_2 Ambient Air Quality Impact Analysis – Prairie du Rocher Lime Plant* 7-9 (July 26, 2010) ("One-Hour SO_2 Modeling Supplement") (A.R. 13) (Pet. Ex. 6 at 17-19). Because the predicted impact of the proposed source and all outside sources exceeded the one-hour SO_2 NAAQS, Shell Engineering conducted a "culpability analysis" to assess whether the proposed project "contributed significantly to the exceedance of the standard at the exact time and location where the exceedance was predicted by modeling." *Id.* at 9 (Pet. Ex. 6 at 19). The culpability analysis "remove[d] from consideration all hours at individual receptors where the lime plant project was predicted to contribute less than 10 µg/m^3." *Id.* Thus, according to Shell Engineering's modeling supplement, the culpability threshold, or 1-hour SO_2 SIL, used in the model was 10 µg/m^3. *Id.*; *see also* RTC at 30-31.

IEPA explained that "[s]ince there was not yet a SIL developed for the new one-hour SO_2 standard, [IEPA] and [U.S. EPA Region V recommended to the applicant that the modeling methodology provided by [U.S.] EPA for the new one-hour NO_2 standard be adapted for SO_2. Therefore, the applicant used a screening level of 10 $\mu g/m^3$ (which corresponds to 4 ppb)." RTC at 30-31 (citing Notice Regarding Modeling for New Hourly NO_2 NAAQS (rev. 2/25/10), http://www.epa.gov/scram001/no2_hourly_NAAQS_aermod_02-25-10.pdf) ("February 2010 NO_2 NAAQS Guidance"). IEPA does not elaborate when or how it and the Region recommended the modeling methodology to Mississippi Lime. The modeling supplement does not explain how Shell Engineering derived the 10 $\mu g/m^3$ SIL, other than asserting that IEPA and the Region approved of it. One-Hour SO_2 Modeling Supplement at 9 (Pet. Ex. 6 at 19).

The Project Summary that accompanied the draft permit provides a cursory review of the air quality analysis, with most of the information provided in tables. In particular, IEPA explained that it determined the "maximum impact of the proposed lime plant by itself." Project Summary at 10. These results are reflected in Table 1 of the Project Summary and indicate that the proposed Plant's maximum predicted impact on one-hour SO_2 was 11.40 $\mu g/m^3$, and that the SIL was 7.9 $\mu g/m^3$, the second of the three different SILs that appear in the administrative record. *Id.* at 11. Table 3 provides the results of the full-impact analysis, but neither the table nor the Project Summary discusses whether a culpability analysis was conducted or a SIL was applied.

As IEPA correctly noted in its Responsiveness Summary, U.S. EPA has not yet promulgated a final one-hour SO_2 SIL. In August 2010, less than a month after Shell Engineering completed its one-hour SO_2 modeling supplement for Mississippi Lime, U.S. EPA established an interim one-hour SO_2 SIL of 3 ppb, or 7.85 $\mu g/m^3$, that it "intended to use as a screening tool for completing the required air quality analysis

for the new one-hour SO_2 NAAQS under the federal PSD program[.]"[23] Memorandum from Anna Marie Wood, Acting Dir., Air Quality Policy Div., Office of Air Quality Planning & Standards, U.S. EPA, to Reg'l Air Div. Dirs., *General Guidance for Implementing the 1-hour SO_2 NAAQS in PSD Permits, Including an Interim 1-hour SO_2 SIL* 5 (Aug. 23, 2010) ("U.S. EPA 1-Hour SO_2 NAAQS Guidance Memo"). The memorandum then explained how U.S. EPA derived the interim SIL. Because IEPA issues PSD permits pursuant to the federal program, the interim SIL is applicable to IEPA-issued permits.

Precisely which one-hour SO_2 SIL value that IEPA used for the ambient air quality analyses of the proposed facility is unclear because there are discrepancies between several documents in IEPA's administrative record. Three documents – Shell Engineering's SO_2 modeling supplement, the Project Summary that accompanied the draft permit, and IEPA's Responsiveness Summary – reflect and discuss two different values as the SIL. The administrative record does not explain

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[23] U.S. EPA also made the interim SIL available for states to use when implementing their authorized PSD permitting programs. Memorandum from Anna Marie Wood, Acting Dir., Air Quality Policy Div., Office of Air Quality Planning & Standards, U.S. EPA, to Reg'l Air Div. Dirs., *General Guidance for Implementing the 1-hour SO_2 NAAQS in PSD Permits, Including an Interim 1-hour SO_2 SIL* 5 (Aug. 23, 2010) ("U.S. EPA 1-Hour SO_2 NAAQS Guidance Memo"). U.S. EPA's guidance memorandum stated:

> States may also elect to choose another value that they believe represents a significant air quality impact relative to the 1-hour SO_2 NAAQS. The EPA-recommended interim 1-hour SO_2 SIL is not intended to supersede any interim SIL that any state chooses to rely upon to implement a state PSD program that is part of an approved SIP, or to impose the use of the SIL concept on any state that chooses to implement the PSD program-in particular the ambient air quality analysis-without using a SIL as a screening tool. Accordingly, states that implement the PSD program under an EPA-approved SIP may choose to use this interim SIL, another value that may be deemed more appropriate for PSD permitting purposes in the state of concern, or no SIL at all.

Id.

the apparent discrepancy between the 7.9 µg/m^3 SIL documented in the Project Summary and the 10 µg/m^3 SIL provided in both the modeling supplement and the Responsiveness Summary. Then in this appeal, IEPA's response brief does not discuss a 7.9 µg/m^3 SIL, but acknowledges use of the 10 µg/m^3 SIL, IEPA Response at 7 (quoting RTC at 30), and also confusingly references a third SIL, 7.85 µg/m^3. *Id.* at 8 (stating that IEPA's audit of the modeling "indicate[s] that exeedances of the one hour NAAQS for SO_2[] do not occur where contributions of SO_2 from [Mississippi Lime's] kilns made a significant impact under the new SO_2 SIL of 7.85 µg/m^3") (citing Email from Matt Will to Chris Romaine, *Responses to Mississippi Lime Comments Part II* (Dec. 29, 2010) ("Matt Will Email") (IEPA Ex. 2)). The sole document in the administrative record that mentions the application of a 7.85 µg/m^3 SIL is an email. IEPA does not identify the roles of the email sender and recipient, and the email itself is too vague to conclude that IEPA used a 7.85 µg/m^3 SIL in the one-hour SO_2 ambient air analysis or show the results of any analysis using such a SIL.[24]

Even if it were clear as to which concentration – 10 µg/m^3, 7.9 µg/m^3, or 7.85 µg/m^3 – IEPA used as the one-hour SO_2 SIL for the culpability analysis, only the 7.85 µg/m^3 SIL is supported in the administrative record as a de minimis concentration. EPA 1-Hour SO_2 NAAQS Guidance Memo at 5. Moreover, the sole document mentioning

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[24] The email states in pertinent part:

> I don't know where the 3 µg/m^3 for SO_2 that the Sierra Club cites comes from but 7.85 µg/m^3 was for the SIL for SO_2 was set on August 23, 2010, after the modeling for SO_2 had been submitted. The 3 µg/m^3 might be confused with the 3 ppb which is equivalent to 7.85 µg/m^3. Previous to August 23rd, the SIL had not officially been set for SO_2 and the consultant assumed all receptors were significant in the modeling for SO_2. Audit runs for the culpability analysis for SO_2 indicate that exeedances of the one hour NAAQS for SO_2[] do not occur where the contributions of SO_2 from the Mississippi Lime kilns make a significant impact under the new SO_2 SIL of 7.85 µg/m^3.

Matt Will Email at 2.

the 7.85 µg/m^3 SIL does not explain whether or how this SIL was applied. *See* Matt Will Email. The 7.9 µg/m^3 SIL appears only once in the administrative record and without any explanation or reference to external documentation, in the Project Summary, Table 1.

As to the 10 µg/m^3 SIL, Shell Engineering's 1-Hour SO_2 Modeling Supplement states that "this concentration SIL was approved by IEPA and EPA Region V." 1-Hour SO_2 Modeling Supplement at 9 (Pet. Ex. 6 at 19). However, the modeling supplement does not support this statement, and IEPA has not directed the Board to documentation in the administrative record that reflects this approval. Nevertheless, the Responsiveness Summary further implies that, due to the absence of a SIL for the new one-hour SO_2 standard, IEPA adapted U.S. EPA's recommended modeling methodology for the one-hour NO_2 NAAQS, as provided in a February 25, 2010 guidance document, to derive the one-hour SO_2 SIL of 10 µg/m^3, which corresponds to 4 ppb.[25] *See* RTC at 30 (citing February 2010 NO_2 NAAQS Guidance); *see also* IEPA Response at 7. The cited EPA guidance for the one-hour NO_2 standard – the Notice Regarding Modeling for the New Hourly NO_2 NAAQS – does not appear to provide guidance for determining what level of emissions have a de minimis impact on the 1-hour NO_2 NAAQS. Rather, this guidance document provides "procedures for calculating the NO_2 design value for comparison to the 1-hour NAAQS." February 2010 NO_2 NAAQS Guidance.

The administrative record does not illuminate IEPA's claimed application of the reasoning or methodology described in the February 2010 NO_2 NAAQS guidance to derive the 10µg/m^3 one-hour SO_2 SIL. Additionally, IEPA's explanation in the Responsiveness Summary ignores U.S. EPA's subsequent issuance on June 29, 2010 of a more detailed memorandum addressing the one-hour NO_2 NAAQS and

[25] Shell Engineering completed these analyses prior to U.S. EPA's issuance of the August 23, 2010 one-hour SO_2 NAAQS guidance memorandum and the interim SIL.

actually providing an interim one-hour NO_2 SIL.[26] *See* Stephen D. Page, Dir., Office of Air Quality Planning & Standards, U.S. EPA, to Reg'l Air Div. Dirs., *General Guidance for Implementing the 1-hour NO_2 NAAQS for the Prevention of Significant Deterioration Program* (June 29, 2010) ("U.S. EPA 1-hour NO_2 NAAQS Guidance Memo"). This latter document described U.S. EPA's derivation of an interim one-hour NO_2 SIL and explained U.S. EPA's reasons for concluding that the interim one-hour NO_2 SIL was reasonable. The August 23, 2010 memorandum for the one-hour SO_2 NAAQS relied on the June 29, 2010 1-hour NO_2 NAAQS memorandum to derive the interim SO_2 SIL of 3 ppb, or 7.85 $\mu g/m^3$. U.S. EPA 1-hour SO_2 NAAQS Guidance Memo at 6. Essentially, the 1-hour SO_2 NAAQS memorandum adopted the reasoning that U.S. EPA had used to derive the interim one-hour NO_2 SIL, and the interim one-hour NO_2 SIL (4 ppb) and the interim one-hour SO_2 SIL (3 ppb) are both 4% of the respective NAAQS. *Id.* Accordingly, IEPA has not shown that any of the U.S. EPA guidance documents support the use of a 10$\mu g/m^3$ one-hour SO_2 SIL.

IEPA's administrative record is unclear as to which SIL the agency applied in its culpability analysis for the one-hour SO_2 NAAQS. In addition to this lack of clarity, to the extent that IEPA employed a 7.9 $\mu g/m^3$ or 10$\mu g/m^3$ one-hour SO_2 SIL, IEPA failed to substantiate the reason for doing so.[27] Accordingly, the permit is remanded on this issue.

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[26] U.S. EPA issued the June 29, 2010 1-hour NO_2 NAAQS memorandum several days before Shell Engineering completed the modeling supplement for the one-hour NO_2 ambient air quality impact analysis.

[27] The Board does not decide whether it would be permissible to use a one-hour SO_2 SIL other than 7.85 $\mu g/m^3$ in a culpability analysis.

D. *Sierra Club Has Demonstrated That IEPA Clearly Erred by Not Establishing an SO_2 Emissions Limit or an NO_x Emissions Limit Based on One-hour Averages to Protect the One-hour SO_2 and the One-hour NO_2 NAAQS.*

The permit sets forth the following emission limits for SO_2 and NO_x: 0.645 lbs of SO_2 per ton of lime, daily (24-hour) average (BACT limit); 32.3 lbs of SO_2 per hour, 3-hour average ("short-term" limit); 3.5 lbs of NO_x per ton of lime, daily (24-hour) average (BACT limit); and 175.0 lbs of NO_x, per hour, 3-hour average ("short-term" limit). Permit §§ 2.1.3-2, 2.1.6(a). Sierra Club alleges that these permit conditions for SO_2 and NO_x are not protective of the one-hour NAAQS for either SO_2 or NO_2 because, although the modeling analyses used to demonstrate compliance with the NAAQS incorporated the maximum emission rates for SO_2 and NO_x, the emissions limits in the permit for those pollutants are not based on the aforementioned maximum emission rates. Pet. at 21. In particular, Sierra Club asserts that although IEPA's models "assumed maximum emission rates over a period of a second or an hour," the permit limits are not based on these emission rates and do not protect the one-hour NAAQS. *Id.* In its comments, Sierra Club alleged that "a 3-hour average would allow all of the emissions to occur during one hour, effectively tripling the mass emissions rate assumed by Illinois EPA in the modeling." Sierra Club Comments at 12.

U.S. EPA's *Guideline on Air Quality Models*, Appendix W to 40 C.F.R. Part 51, provides recommendations on modeling techniques and guidance for estimating pollutant concentrations in order to assess control strategies and to determine emission limits.[28] Section 10.2.3.1 states, "Emission limits should be based on concentration estimates for the averaging time that results in the most stringent control

[28] U.S. EPA originally published its *Guideline on Air Quality Models* in April 1978 and incorporated it by reference into the PSD regulations in June 1978. Revision to the Guideline on Air Quality Models, 70 Fed. Reg. 68,218, 68,218 (Nov. 9, 2005); *see* 40 C.F.R. § 52.21(*l*)(1) (specifying that all estimates of ambient concentrations must be based on applicable air quality models, databases, and other requirements set forth in the *Guideline on Air Quality Models* at part 51, appendix W).

requirements." 40 C.F.R. pt. 51, app. W, § 10.2.3.1.a. EPA guidance related to the one-hour SO_2 NAAQS further states:

> Because compliance with the new SO_2 NAAQS must be demonstrated on the basis of a 1-hour averaging period, the reviewing authority should ensure that the source's PSD permit defines a maximum allowable hour emission limitation for SO_2, regardless of whether it is derived from the BACT top-down approach or is the result of an air-quality based emissions rate. Hourly limits are important because they are the foundation of the air quality modeling demonstration relative to the 1-hour SO_2 NAAQS.

U.S. EPA 1-Hour SO_2 NAAQS Guidance Memo at 7. Although U.S. EPA's one-hour NO_2 NAAQS guidance is silent on this issue, significant portions of the one-hour SO_2 NAAQS guidance echo the language in the one-hour NO_2 NAAQS guidance. *Compare* U.S. EPA 1-hour SO_2 NAAQS Guidance Memo *with* U.S. EPA 1-hour NO_2 NAAQS Guidance Memo. Accordingly, the Board believes that it is reasonable to infer that U.S. EPA expects "PSD permit[s] [to] define a maximum allowable hour emission limitation" for NO_x to protect the one-hour NO_2 NAAQS.

IEPA's response to Sierra Club's comments and response brief both state that due to the recent promulgation of the one-hour NAAQS for SO_2 and NO_2, the new NAAQS are not addressed in "historic USEPA guidance for PSD modeling." RTC at 32; IEPA Response at 9. IEPA adds:

> The preliminary experience of many state agencies is that the traditional approach to modeling can be overly conservative when used with these new standards, providing results that overstate impacts to such a degree that they cannot be considered credible. In particular, the dispersion modeling would assume that three worst case conditions occur simultaneously, maximum

> background ambient air quality hourly concentrations from a year of monitoring, maximum short-term emission rates from existing sources, and worst-case hourly meteorological conditions for dispersion of emissions. Given these circumstances, it is appropriate to set short-term limits for SO_2 and NO_x on a three hour averaging time to ameliorate for the unrealistic nature of the modeling process as it acts to overstate impacts.

RTC at 32-33; IEPA Response at 9-10. Additionally, IEPA refuted the possibility that the example that Sierra Club provided in its comments could occur:

> [T]he specific circumstances that [Sierra Club's] comment speculates upon, i.e., with "triple emissions" occurring in a single hour, are not possible for the proposed kilns. The SO_2 and NO_x emissions of the kilns are not controlled by natural scrubbing and process measures that cannot catastrophically fail, resulting in a scenario approaching the one postulated in this comment.

RTC at 33. Read in context, IEPA's final sentence in this response appears to have added an additional word, "not," before "controlled," as the Board believes that IEPA intended to rebut Sierra Club's claim and to convey that the proposed control technology "cannot catastrophically fail." Nevertheless, even with this correction, IEPA's response does not provide the necessary foundation for the Board to conclude that IEPA exercised considered judgment in the decision not to establish permit limits for NO_x and SO_2 based on one-hour averages.

IEPA's record for this permit lacks a coherent, well-reasoned explanation of the decision. Even though the U.S. EPA guidance memorandum on the one-hour SO_2 NAAQS was issued after Shell Engineering developed the models used for the ambient air quality analyses, U.S. EPA issued the memorandum prior to the completion of the draft permit, and more importantly, the memorandum was available

at the time that IEPA completed its Responsiveness Summary. Yet IEPA does not explain its decision not to follow the clear directive that "the reviewing authority should ensure that the source's PSD permit defines a maximum allowable hour emission limitation for SO_2." U.S. EPA 1-Hour SO_2 NAAQS Guidance Memo at 7. IEPA's explanations for not including emission limitations for SO_2 and NO_x based on one-hour averages – that the results of other state agencies' models have "overstated impacts to such a degree that they cannot be considered credible" and that the proposed control technology at the proposed plant cannot catastrophically fail – are unsupported and anecdotal at best. In light of the express EPA directive to include emission limitations based on one-hour averages, IEPA's unsupported reasoning for not doing so is inadequate.

The permit is therefore remanded on this issue. On remand, IEPA must either include maximum allowable hourly emissions limitations for SO_2 and NO_x and explain how it concluded that the limitations are protective of the respective one-hour NAAQS or provide sufficient rationale for not including such emissions limitations. In either case, IEPA must reopen the public comment period to provide the public with an opportunity to submit comments.

VII. *ORDER*

The Board remands the permit. On remand, IEPA must: (1) Prepare a revised BACT analysis for startup and shutdown emissions, and reopen the public comment period to provide the public with an opportunity to review and comment on this analysis;[29] (2) Prepare a revised BACT analysis for NO_x, filterable PM, and PM_{10} and reopen the public comment period to provide the public with an opportunity to

[29] Although adherence to the NSR Manual's top-down BACT analysis is not required, permitting authorities often employ it to ensure a defensible BACT determination. Should IEPA follow the top-down method that the NSR Manual describes, the BACT analysis shall comply fully with the method and all of its steps and include adequate step 2 and step 4 analyses. Should IEPA employ an alternative method to determine BACT, it must ensure that all regulatory and statutory criteria are considered and appropriately applied. *See Knauf Fiber Glass, GmbH*, 8 E.A.D. 121, 130-31 n.14.

review and comment on this analysis. Among other matters, the BACT analysis shall, at a minimum include appropriate consideration of performance test data at other lime kilns. IEPA must also either (a) provide sufficient rationales for including compliance margins, as well as sufficient rationales for the sizes of any such margins, fully consistent with the Board's precedents, or (b) remove the compliance margins from the permit; (3) Identify with specificity the one-hour SO_2 SIL, if any, used in the ambient air quality analysis for the one-hour SO_2 standard, and if IEPA used a one-hour SO_2 SIL, explain in detail (including supporting documentation) whether U.S. EPA approved the SIL and the basis for IEPA's conclusions that the SIL would have a de minimus impact on the one-hour SO_2 NAAQS. IEPA must reopen the public comment period to provide the public with an opportunity to submit comments on the air quality analysis and any data pertaining to the SIL; and (4) Either include maximum allowable hourly emissions limitations for SO_2 and NO_x and explain how IEPA concluded that the limitations are protective of the respective one-hour NAAQS or provide sufficient rationale for not including such emissions limitations. In either case, IEPA must reopen the public comment period to provide the public with an opportunity to submit comments.

After IEPA completes its analyses on remand and issues the final permit decision pursuant to 40 C.F.R. § 124.15(a),[30] anyone dissatisfied

[30] As in *In re Vulcan Constr. Materials, LP*, PSD Appeal No. 10-11 (EAB Mar. 2, 2011), 15 E.A.D. ___, the Board's decision in this case includes a broad remand on significant and foundational issues, including the BACT and air quality analyses, and it will require a reopening of the comment period and reissuance of the permit. Under the facts of this case, where the significant issues to be addressed on remand will necessitate reopening the comment period, IEPA must comply with all applicable standards in effect at the time the permit is issued on remand. *In re Shell Gulf of Mex.*, OCS Appeal No. 10-01 through 10-04, slip op. at 66 n.76 (EAB Dec. 30, 2010), 15 E.A.D. ___; *In re Shell Gulf of Mex.*, OCS Appeal No. 10-01 through 10-04, at 19-25 (EAB Feb. 10, 2011) (Order on Motions for Reconsideration and/or Clarification) ("Shell Clarification Order"). Since U.S. EPA has authority to lawfully exercise, "through an appropriate process, any discretion it has to interpret what 'all applicable standards in effect' means to a particular source being permitted," Shell Clarification Order at 24, IEPA should confer with U.S. EPA as to whether U.S. EPA plans to exercise any such (continued...)

with IEPA's decisions must file a petition seeking the Board's review in order to exhaust administrative remedies pursuant to 40 C.F.R. § 124.19(f)(1)(iii). Any such appeal shall be limited to issues IEPA addressed on remand.

So ordered.

[30](...continued)
discretion that would affect Mississippi Lime.

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing Remand Order in the matter of *Mississippi Lime Co.*, PSD Appeal No. 11-01, were sent to the following persons in the manner indicated:

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Annette Duncan
Secretary