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Exhibit 2

December 18, 2010

VIA UNITED STATES MAIL

Illinois Environmental Protection Agency
Dean Studer, Hearing Officer
Re: Mississippi Lime
1021 N. Grand Ave. E.
P.O. Box 19276
Springfield, IL 62794-9276

Dean.studer@illinois.gov

Re: Comments on Draft Prevention of Significant Deterioration Construction Permit for Mississippi Lime, Draft Permit No. 15786AAC/08100063

Dear Mr. Studer:

These comments are submitted on behalf of the Sierra Club and its 800,000 members, including 26,000 members in Illinois regarding the draft air permit for Mississippi Lime's coal-fired lime plant.

For the reasons set forth below, IEPA must deny the draft permit, as it fails to meet the requirements of the Clean Air Act. If IEPA does not deny the permit, Mississippi Lime must submit an amended application including the required information and analyses and IEPA must redraft substantially the permit terms and conditions, renotice the revised draft permit, and provide the public with a meaningful opportunity to comment on the revised draft permit.

1. The Modeling shows that Violations of Short-term (1-hour) SO2 and NOx NAAQS Will Be Violated.

IEPA's Project Summary contains a table purporting to show the results of ambient air quality impact analysis (modeling).[1] Table 1 shows the impacts predicted from the plant, and Table 3 shows the cumulative NAAQS analysis from the plant, other nearby sources, and background.

Table 1: Lime Plant Maximum Impacts (micrograms/cubic meter or ug/m^3)

Pollutant	Averaging Period	Maximum Predicted Impact	PSD Significant Impact Level
NO_2	1-hour	55.5	7.5
	Annual	2.25	1
PM_{10}	24-hour	7.96	5
	Annual	30.52	1
$PM_{2.5}$	24-hour	4.54	1.2
	Annual	1.14	0.3
SO_2	1-hour	11.40	7.9
	3-hour	10.36	25
	24-hour	4.54	5
	Annual	0.55	1
CO	1-hour	66.47	2,000
	8-hour	29.66	500

[1] Because the PM2.5 24-hour standard is expressed as a "probabilistic form" as a percentile (e.g., 98th percentile). This means that if the 98th percentile of monitored values is added to a 98th percentile of modeled values, there is a possibility that the result will under-represent the maximum possible 98th percentile of the total impact of background plus point sources in the area. Therefore, EPA's guidance issued March 23, 2010, says that to predict the 24-hour PM2.5 NAAQS impacts, the design value background concentration should be added to the average of maximum 24-hour impacts for five years of meteorological data. See Stephen D. Page, OAQPS, Modeling Procedures for Demonstrating Compliance with PM2.5 NAAQS at pp. 7-8 (March 23, 2010). Specifically, the guidance states:

> For the 24-hour NAAQS analysis, the modeled concentrations to be added to the monitored 24-hour design value should be computed using the same procedure used for the preliminary analysis based on the highest average of the maximum modeled 24-hour averages across 5 years for NWS meteorological data or the maximum modeled 24-hour average for one year of site-specific meteorological data. As noted above, use of the average modeled concentration across the appropriate time period more accurately characterizes the modeled contribution from the facility in relation to the NAAQS than use of the highest modeled impact from individual years, while using the average of the first highest 24-hour averages rather than the 98th percentile (8th highest) values is consistent with the screening nature of $PM_{2.5}$ dispersion modeling. Furthermore, combining the 98th percentile monitored with the 98th percentile modeled concentrations for a cumulative impact assessment could result in a value that is below the 98th percentile of the combined cumulative distribution and would, therefore, not be protective of the NAAQS.

Table 3: Results of Analysis of Maximum Ambient Concentrations (ug/m^3)

Pollutant	Averaging Period	Maximum Modeled Impact	Background Concentration	Projected Overall Concentration	NAAQS
NO_2	1-hour	65.10	117.00	182.10	188
	Annual	12.96	30.19	43.15	100
PM_{10}	24-Hour	31.45	65.00	96.45	150
	Annual	9.34	24.00	33.34	50
$PM_{2.5}$	24-hour	6.12	26.70	32.22	35
	Annual	1.49	12.10	13.59	15
SO_2	1-hour	11.40	174.00	185.40	198

Note that the IEPA modeling analysis predicts maximum 1-hour SO2 impacts of 11.40 ug/m3 and maximum 1-hour NOx impacts of 65.10 ug/m3. It is not clear what emission rates IEPA assumed for this modeling analysis. There are no 1-hour limits in the permit and the limits in Condition 2.1.3-2.b.i. do not apply during all periods of operation. Therefore, we assume that IEPA used the limits in condition 2.1.6(a) to conduct the modeling. (We not elsewhere in these comments that the limits relied upon by IEPA must be averaged over no longer than 1-hour and must apply during all period of operation, without exception).

Especially concerning, however, is the fact that IEPA's modeling results in Tables 1 and 3, above, do not correspond to the modeling done by the applicant and submitted in June, 2010. In that modeling, which used SCREEN3 and modeled only one of the two kilns, the applicant modeled much higher 1-hour impacts:

Table 3-2 Start-up Load Results

Startup Model - Coal/Coke and LSD Diesel - Concentration Results

Coal and Diesel Fuel: Fuel is used to warm up the kiln, then is gradually replaced with coal

Single Kiln example

Pre-coal warm-up		SO2 Highest Concentration ug/m3	Distance from Source m	CO Highest Concentration ug/m3	Distance from Source m	NO2 Highest Concentration ug/m3	Distance from Source m
Load 1	25% of temp	3.40	315	2.38	315	11.45	315
Load 2	50% of temp	4.75	315	3.35	315	16.08	315
Load 3	75% of temp	6.33	447	4.46	447	21.39	447
Load 4	100% of temp	5.96	463	4.20	463	20.13	463
Post-coal ramp-up							
Load 5	25% load	12.25	422	34.29	422	58.00	422
Load 6	50% load	15.54	479	51.98	479	78.99	479
Load 7	75% load	19.86	473	76.84	473	108.10	473
Load 8	Full Operating load	**21.25**	**536**	**82.71**	**536**	**115.70**	**536**

Again, these are the maximum impacts from only one kiln. Adding the other kiln, as well as all nearby sources and background, would provide even higher results. Note that IEPA predicted the Mississippi Lime impacts to be about half of what the applicant predicted the impacts to be from only one kiln (see Load 8 Full Operating load Post-coal ramp-up). Also note that when the predicted impacts from the applicant's June, 2010, analysis is added to IEPA's background concentrations from the Project Summary, the results are far in excess of the NAAQS—which still does not account for the impacts from other nearby sources that would further increase the results.

On June 28, July 6, July 15, and July 30, 2010, Mississippi Lime submitted revised modeling. Again it should be noted that there are discrepancies between the inputs for stack temperature and velocity that were used in the various models run by the applicant. This further highlighting that these parameters need to be made into enforceable permit requirements to ensure the modeling is representative of worst case conditions.

The July 30, 2010, submittal contained a 1-hour SO2 NAAQS modeling analysis. That analysis predicted a maximum modeled impact of 2757.4 ug/m3. This far exceeds the applicable NAAQS, so the applicant conducted a so-called "culpability analysis" to assess "if the lime plant PSD project contributed significantly to the exceedance of the standard at the exact time and location where the exceedance was predicted by modeling." That analysis assumed that the kilns did not contribute (above a de minimum amount) to any predicted violation of the NAAQS as long as the kiln's contribution was less than 10 ug/m3. However, EPA guidance recommends using a significant impact level of only 3 ug/m3 and notes that a SIL constituting 5% of a NAAQS (or more) is too high to be considered de minimus. The 10 ug/m3 SIL that the applicant used is over 5% of the NAAQS. It is not clear from the record, but it appears very likely that if a 3 ug/m3 SIL is used, the plant contributes significant amounts to violations of the 1-hour SO2 NAAQS.

2. IEPA Must Ensure That The Modeling Was Done Based On Worst Case Conditions And Make Enforceable Any Assumptions About Operations That Could Vary.

As IEPA is aware, NAAQS modeling must be done based on worst case operations. Permit limits can be taken into account, but only to the extent that they necessarily change the worst case conditions (i.e., the averaging time matches the model inputs and there are not exceptions to the permit limits). In addition to emission rates, however, there are other inputs to the model that significantly affect the modeling results. These include, for example, the stack flow rate/velocity and temperature. See e.g., Start-up Modeling Supplement- Permit Application, Prairie du Rocher Lime Plant, Table 3-1 Startup Load Parameters (June 8, 2010). These conditions have to be input to the model, but can vary with operations, and have dramatic impacts on the modeling results. Similarly, the applicant submitted modeling results on July 14th for a "breakdown" scenario, which it defined as "idling" one of the kilns at 70% of operating load "which would occur no more than four times in a year and which would only affect one of the two kilns at any one time." The applicant modeled this scenario with modeling inputs it used from "a similar rotary lime kiln running in an emergency idling state." In that analysis, the applicant purports to compare the impacts from the "idling" operations to "100% load" impacts. However, the "100% load" stack exhaust and exit velocity are, again, different from other models runs for NAAQS compliance.

IEPA must either model the worst possible combination of flue gas temperature and flow rate, or must make those variables enforceable in the permit to ensure that the model is representative of the worst allowable conditions at the kiln. For example, Iowa regularly makes stack flow rate and temperature enforceable permit conditions for this very reason. IEPA must do the same here.

3. IEPA Must Consider Lower Sulfur Fuels In The BACT Analysis.

The BACT analysis for SO2 appears to assume a sulfur content of the fuel coal of 3.5% sulfur. However, coal can contain as much as 5% or more sulfur and petroleum coke, which could also be burned in the kilns, can contain as much as 7 or 8% sulfur. This is extremely high. There is no apparent consideration of lower sulfur coals (in combination with "natural" scrubbing from the limestone and post-combustion controls). The application notes that coal can have sulfur contents as low as 0.5%. The application does not identify specific coal sources or sulfur contents beyond this. Instead, it does a very vague comparison between a generic high sulfur coal and a generic low sulfur coal. It concludes that the cost effectiveness of using the generic low sulfur coal is $366/ton of SO2 removed. Yet, based on what appears to be (at best) an incremental cost effectiveness analysis, the application concludes that low sulfur coal is not cost effective. This is erroneous.

First, the analysis is too vague to provide a meaningful independent review. The coal types and basis for the price assumptions are not provided. According to EIA data, low sulfur western coal is generally cheaper than higher sulfur coal from Illinois or central Appalachia. Moreover, Illinois Basis or central Appalachian high sulfur coal is typically over $2.00/MMBtu. Yet, the application assumes $1.44/MMBtu for high sulfur coal and $1.55/MMBtu for low sulfur coal.

Second, the "SO2 emissions" for each coal type in the application is not supported by anything in the record. The reduction in SO2 emissions by switching to low sulfur coal appears understated.

Third, the use of incremental cost effectiveness alone to reject a clean fuel (or any BACT option) is not supported by law. Incremental cost effectiveness can only be used in combination with average cost-effectiveness and only to distinguish between two technologies on the dominant cost curve. That was not done here.

Incremental cost effectiveness is an optional consideration that must always be paired with average cost effectiveness. *NSR Manual* at B.41 ("incremental cost effectiveness should be examined in combination with the total cost effectiveness in order to justify elimination of a control option."), B.43 ("As a precaution, differences in incremental cost among dominant alternatives cannot be used by itself to argue one dominant alternative is preferred to another."). The *NSR Manual* warns that "undue focus on incremental cost effectiveness can give an impression that the cost of a control alternative is unreasonably high, when, in fact, the total cost effectiveness, in terms of dollars per total ton removed, is well within the normal range of acceptable BACT costs." *Id*. at B.45-.46.

The use of incremental cost effectiveness is limited. It is only used to compare "dominant" alternative pollution control options. *NSR Manual* at B.43. This requires plotting all pollution control options to create an "envelope of least-cost alternatives" "depicted by the curvilinear line connecting" the control options. *NSR Manual* at B.41-.43 and Figure B-1. Incremental cost effectiveness is the difference in total annual costs between two contiguous control options that are on the dominant control curve. *Id*. The consideration of incremental cost effectiveness is not to be used to reject an option merely because it costs more—even if it costs twice as much—as the next dominant alternative. *Id*. at B.43.

Furthermore, the fundamental point to cost-effectiveness analysis is to document the different, if any, between the permittee's cost/ton to use a control option (here low sulfur coal) and the cost/ton of others using that same control option. Other similar lime kilns have fuel sulfur limits that result in lower emissions that being proposed as BACT for this plant. For example, the Superior, Wisconsin, kiln has a fuel sulfur content of 2%. A permit issued for a kiln at that plant in the 1990s contains a BACT requirement that the kiln only fire coal with a sulfur content of less than or equal to 1%. See Wisconsin PSD Permit No. 93-DBY-074 (June 1, 1994). A federally-issued (under a then-delegated PSD program) in Wisconsin for the Western Lime kiln in Green Bay, Wisconsin, contains a BACT limit based on coal with a sulfur limit of 0.9%. See Preconstruction Review and Preliminary Determination on a Proposed Modification of A Rotary Lime Kiln for The Western Lime and Cement Co., New Source Review #MIN-10-DLJ-81-05-180 (Jan 13, 1982). This is lower than the fuel assumed by IEPA for Mississippi Lime, but still high.

Western low sulfur coal typically has a sulfur content around 0.5- 0.6%, representing an 83% fuel sulfur content reduction from the coal apparently assumed by IEPA for the Mississippi Lime plant. Applying a 97% "natural" scrubbing control effectiveness (which is what IEPA assumes), the resulting emissions would be below 6 pounds per hour—which represents a significant reduction from the proposed limits.

There was no apparent consideration of lower sulfur coal by IEPA. Once this is done, a new public comment opportunity is required. The applicant's consideration of low sulfur coal is conclusory, unsupported by any evidence, and makes assumptions that on their face look erroneous. Moreover, the entire point of cost-effectiveness analysis—comparing the cost for the permittee to the cost experienced at other facilities using the same control—was clearly not done. There is no reason that Mississippi Lime's cost/ton of controlling SO2 with low sulfur coal is outside the range of those—like Western Lime in Wisconsin—who also use low sulfur coal. (It should also be remembered that cost of control analysis are accurate within a range of about +/- 30%, so the cost to Mississippi Lime would have to exceed the costs to other kilns by at least that much to conclude that the control option is not cost effective). Here, the cost/ton of $366 dollars assumed by the applicant—which is too high for the reasons above—is nevertheless well within the range of cost effective.

4. IEPA Failed To Consider Technically Feasible Pollution Controls In The BACT Analysis

IEPA does not appear to have considered a scrubber for SO2 emissions from the lime kilns, despite requiring a scrubber as the basis for BACT for the recently-proposed permit for Vulcan Construction Materials. In the project summary for Vulcan, IEPA states that:

> The Illinois EPA has determined that BACT for SO2 emissions from the kiln as it processes Dolomitic limestone to be a spray dryer absorber. Natural scrubbing, as achieved simply with the lime kiln, is not adequate and must be supplemented with an add-on scrubber system. An appropriate SO2 BACT emission limit with the scrubber is 2.20 lbs SO2 per ton of stone feed to the kiln, 3- hour average, subject to downward adjustment (as low as 1.8 lbs/ton of stone feed) based on evaluation of the actual operation and SO2 emissions of the kiln with planned improvement.

The fact that a dry scrubber (in addition to "natural" scrubbing from the lime product) has been required in a different permit for a similar plant demonstrates that a scrubber is available, technologically feasible, and cost effective. Absent specific findings (supported be hard data in the record) that there are site-specific reasons distinguishing the Mississippi Lime kilns from the Vulcan kiln, IEPA must establish BACT limits based on the use of a dry scrubber.

Moreover, the prior permit for the Vulcan plant (issued in 2002) required the use of a wet scrubber to meet a BACT limit of 2.76 lbs SO2/ton stone feed. While that scrubber has not be constructed, the fact that IEPA found a wet scrubber to be available, technically feasible and cost effective means that Mississippi Lime and IEPA have an extremely high burden to find that it is not applicable to the Mississippi Lime kilns here.

Further still, wet scrubbers have been applied to at least five cement kilns in the United States for control of SO2 emissions and, therefore, wet scrubbing technology is available transfer technology for application to a lime kiln. Wet scrubbers also reduce HCl and mercury and should therefore also be considered the basis for case-by-case MACT for HCl and mercury emissions. Transfer technology is "available" technology for purposes of a BACT analysis. Therefore, even if a scrubber was not already required for Vulcan—it must be considered because it is a transfer technology from cement kilns.

5. The BACT Analysis Does Not Consider Lower Emission Rates Being Achieved In Practice.

However, as noted in comments filed by EPA Region 5 with the Wisconsin DNR in July, 1996, the Western Lime Kiln #2 in Green Bay had actual emission rates far lower than its permitted limits. The tested rate, 0.1 lbs SO2/hour for a 375 ton per day (15 ton/hour) rotary lime kiln, was 600 times lower than the permitted limit. In 2002 that kiln emitted at 1.26 lb SO2/hour at 39.97 tons/hour stone feed and in 2006, it emitted at 1.2 lbs SO2/hour at 33.31 tons of stone input rate. That emission rate from the Western Lime kiln represents a range of about 0.06 – 0.08 lbs/ton of lime produced; which represents a limit that is a factor lower than the proposed BACT limit in the draft permit. Moreover, the design of the Mississippi Lime kilns being proposed should be more efficient, and therefore lower emitting per unit of output, than the older Green Bay kiln.

IEPA has not considered this experience from the Wisconsin kiln, or any other operating experience at other kilns. The Project Summary, which is the only statement of basis provided for the draft permit limits, concludes that "[a]n appropriate SO2 BACT emission limit with the scrubber is 0.645 lbs SO2 per ton of lime produced, on a daily or 24-hour basis." First, it is not clear what IEPA means by "the scrubber" because there is no post-kiln scrubber required for this plant. Second, there is no basis or explanation for how IEPA arrives at 0.645 lb/ton based on the pollution controls accepted by IEPA as BACT. There is no apparent basis, either, for rejecting lower experienced emission rates at other similar kilns like the one in Green Bay.[2]

[2] Note also that the Green Bay kiln (kiln #2) has a BACT limit for SO2 of 9.0 lbs/hour, which based on that kiln's capacity, is the equivalent to 0.45 lbs/ton of lime produced. See Permit 07-JGB-245 (Sept. 11, 2008). While higher than actual operating experience at that kiln, this limit is lower than the one proposed for the more efficient (and therefore lower emitting) kilns at issue here.

Moreover, as IEPA is aware from its own internal memo on this topic, many lime kilns have achieved emissions much lower than the limits being proposed in the draft permit here. A November 14, 2000, memo from John Reed, IEPA, to Robert Smet, IEPA, lists numerous stack tests from the AP-42 documentation (i.e., background U.S. EPA relied upon to set the AP-42 factors). Those prior stack tests show SO2 emissions of 0.013 and 0.15 lbs SO2/ton stone, both of which are lower than the 0.645 lbs SO2/ton lime limit here (assuming 1 tons lime/2 tons stone).

6. The BACT Analysis For NOx Is Inadequate.

The Project Summary vaguely discusses an SCR device with supplemental flue gas reheat (following the particulate matter control). However, it is unclear why IEPA rejected the use of an SCR with flue gas reheat. IEPA needs to specify the basis for its decision. Notably, the application notes that reheat would be necessary, but then abruptly concludes that SCR is not technically feasible. There is not discussion about why reheat—a generally accepted practice for pollution controls—makes that control not feasible.

First, a properly designed SCR can avoid problems associated with high dust. For example, cement kilns at Solnhofer, Germany, and Cementeria di Monselice, Padova Province, Italy, have been operating high dust SCRs. See e.g., Dr. Al Armendariz, The Costs and Benefits of Selective Catalytic Reduction on Cement Kilns for Multi-Pollutant Control (Feb. 11, 2008).

Second, recent BACT determinations for cement kilns have determined SCR (or sometimes SNCR) to be BACT. The analysis leading to those conclusions should be equally applicable to lime kilns.

Third, there is no dispute that SCR with flue gas reheat (i.e., tail end SCR) is technically feasible. It has been applied to kilns, specifically cement kilns.[3] In fact, LaFarge is installing an SCR on its cement kiln in Joppa, Illinois. There is no basis in the record for why this technology cannot be transferred to a lime kiln. Even if IEPA made such a determination, it must provide the specific assessment, data, and calculations it relied upon. (A mere assertion is insufficient).

IEPA's analysis must also account for the fact that SCRs remove not only 90%+ of NOx, but also about 80% of carbon monoxide and 70% of VOCs. Any cost effectiveness analysis of an SCR must account for these multi-pollutant benefits from the SCR. Additionally, if located prior to wet scrubbing, the SCR can oxidize mercury making it more

[3] See http://www.greenlink.org/index.php?mact=News,cntnt01,print,0&cntnt01articleid=36&cntnt01showtemplate=false&cntnt01returnid=74; http://www.vemos.hr/images/vemos_elex/SCR%20Monselice%20Dec07-ELEX.pdf;

soluble and more amenable to removal through wet scrubbing. Furthermore, the removal of VOCs with an SCR necessarily include removal of volatile HAPs. SCR also can achieve greater than 99% destruction of dioxins and furans. Because of these benefits for HAP removal, use of an SCR must also be considered as part of the case-by-case MACT analysis.

Moreover, fifteen cement kilns in the United States have Selective Non-Catalytic Reduction (SNCR) technology. This technology has been recognized as applicable to lime kilns also. In a 2008 BACT analysis in the Vulcan Construction Materials application, Vulcan recognized that SNCR has been applied to rotary lime kilns.

Further still, the IEPA's analysis lacks any investigation into actual emission rates at other kilns. The Western Lime kiln in Green Bay, which should have higher emission rates that the kilns proposed here because it is not design with the higher efficiency planned for the Mississippi Lime kilns, has emissions data showing NOx emissions below 2.94 pounds per ton of lime. See Wisconsin DNR Preliminary Stack Test Review, March 21, 2006. That lower NOx emission rate occurred while the CO emissions were also at approximately 1.75 pounds per ton of lime. In other words, the kiln achieved a much lower emission rate for both NOx and CO than the draft permit here would require as BACT. This has been achieved over time, as evidenced by the April 25, 2002, March 10, 2004, and November 28, 2007 results. See Review of Stack Test Results for Western Lime Co., (May 31, 2002); Preliminary Stack Test Review (May 20, 2004); Preliminary Stack Test Review, Western Lime Corp (Jan. 2, 2008).

7. CO BACT Should Consider Regenerative Thermal Oxidization (RTO)

The Wisconsin DNR determined a RTO to be technically feasible for a lime kiln in Superior, Wisconsin. According to the Wisconsin DNR's Preliminary Determination (statement of basis), RTO technology has been applied to cement kilns with similar practices to rotary lime kilns. Illinois EPA apparently has not considered this technology for Mississippi Lime, but must do so. U.S. EPA Region 5 commented on Wisconsin DNR's analysis that the RTO would reduce VOCs and condensable PM in addition to CO, so the cost of the RTO must be spread between all affected pollutants.

RTO controls are regularly required to control emissions from spent grain dryers in the corn based ethanol industry. The cost of control for those devices, and their energy and emissions impacts (nominal increases in some pollutants due to natural gas combustion in the RTO) should not be significantly different than if RTO technology was applied to the lime kilns. Moreover, at least one cement kiln uses RTO technology to control total hydrocarbons (THC) and CO. The technology results in 98% control of both THC and CO.

8. BACT for PM should Be No More Than 4.80 lbs/hour

The limits for PM in the draft permit are much higher than the BACT limits of 4.80 lbs/hour established as BACT for the CLM Lime Kiln (now Graymont). That plant, with a 6/1/94 BACT determination date, has a 500 ton per day kiln with a much lower effective permit limit than proposed in the draft permit here. On January 19, 2006, the facility tested compliance with that limit (including both front have and backhalf condensable PM) and showed emissions of 1.7 lbs/hour, while operating at 33.31 tons of stone input per hour. This rate is lower than 0.11 lbs of total PM per ton of lime produced, which is significantly lower than the proposed BACT for this facility. See Wisconsin DNR Preliminary Stack Test Review, March 21, 2006.

9. BACT During Startup and Shutdown Must Be Determined Through an On-the-Record Top-Down BACT Analysis; Which Will Likely Establish BACT Based on Natural Gas.

IEPA notes that startup and shutdown will be done with either gas or distillate fuel oil. These fuels are lower emitting than coal, but are not equals. Natural gas has a much lower emission profile than fuel oil. IEPA has not done any analysis for BACT during startup and shutdown, but we presume that any such analysis would rank natural gas higher than distillate oil. Additionally, because gas is cheaper than oil, it is unlikely that any BACT analysis would conclude that emission limits should be based on oil instead of gas. Wisconsin DNR established BACT for a lime kiln in Superior, Wisconsin, for periods of startup based on the requirement to use only natural gas.

10. IEPA Has Not Sufficiently Explained Why Lower BACT Limits For Other Lime Kilns Should Not Apply

The Western Lime Corp. kiln in Schoolcraft County, Michigan has a BACT limit of 0.83 lbs SO2 per ton of stone feed. Assuming that 1 pound of stone feed equates to 0.5 pounds of produced lime, this limit is significantly below the proposed limits for Mississippi Lime here.

11. IEPA Must Ensure Compliance With Any NAAQS or Increments Adopted And/Or Revised Before This Permit Becomes Final.

U.S. EPA is currently reconsidering the current NAAQS for ozone and has proposed to revise it downward. Additionally, based on a remand from the D.C. Circuit, U.S. EPA is reassessing the current fine particulate matter NAAQS (PM2.5) and is likely to revise it downward. EPA is further considering the NAAQS for CO. In addition to these ongoing processes, U.S. EPA may establish new NAAQS and/or increments that will be effective before this permit becomes final. To the extent such new standards are adopted, IEPA must ensure compliance with each and every one before this permit can become final.

12. The Emission Limit Averaging Times In Condition 2.1.6 (Or Whatever Emission Rate IEPA Used To Model NAAQS and Increment) Must Be Set At No Longer Than The Applicable NAAQS or Increment Standard.

IEPA establishes limits in the Draft Permit for NOx and SO2 based on 3-hour averages. See e.g., Draft Permit Conditions 2.1.3-2.b. and 2.1.6. However, the most stringent NAAQS standards are averaged over 1 hour periods. A 3-hour average does not ensure compliance with a 1-hour standard. For example, a 3-hour average would allow all of the emissions to occur during one hour, effectively tripling the mass emission rate assumed by IEPA in the modeling. IEPA must ensure that the averaging time for the SO2 and NOx limits that IEPA used to model NAAQS compliance are set at no greater than 1-hour averaging periods.

Additionally, IEPA should verify that the conditions modeled in the "Breakdown Scenario" modeling submitted by the applicant on July 28, 2010, are not permitted. Specifically, that analysis showed that the "breakdown" and "idling" scenario would result in higher emissions that allowed in Draft Permit Condition 2.1.6.a., and would result in modeled impacts above the NAAQS. This analysis is concerning because it suggests that the applicant may expect to operate in the "breakdown" or "idling mode" and, therefore, it should be clear that such operations would be violations of the permit.

13. The IEPA Has Not Established A Basis for The BACT Limits for Fugitive Dust Sources

The IEPA has not provided any basis for the limits it contends are BACT for sources other than the kilns. At best, the Project Summary makes conclusions that certain limits are BACT. A complete top-down analysis must be made available to the public so that we can review how you determined the limits and comment on that basis. When conducting that analysis, the IEPA should consider the zero percent opacity limits established by Wisconsin DNR for non-kiln sources at the Superior, Wisconsin, lime kiln.

14. IEPA Must Require Site-Specific Pre-Construction Monitoring.

Under the PSD program, a permit may not issue to a project that threatens air quality standards, including National Ambient Air Quality Standards and PSD "increments." See 42 U.S.C. § 7475(a)(3). Protection of air quality is the purpose of the PSD provision-- to "ensure that the air quality in attainment areas or areas that are already 'clean' will not degrade." *Alaska Dep't* at 470. To accomplish this, an applicant must conduct a preapplication analysis of air quality, as well as a modeling demonstration showing protection of ambient air quality standards after construction of the proposed source. Post-construction monitoring may be required as well to ensure that no violations occur.

The Clean Air Act requires an applicant to "conduct such monitoring as may be necessary to determine the effect which emissions from any such facility may have, or is having, on air quality in any area which may be affected by emissions from such source." 42 U.S.C. § 7475(a)(7). More specifically, at a minimum, the full PSD review must "be preceded by an analysis… by the State… or by the major emitting facility applying for such permit, of the ambient air quality at the proposed site and in areas which may be affected…" 42 U.S.C. § 7475(e)(1). This "preconstruction" analysis "*shall include* continuous air quality monitoring data *gathered for purposes of determining* whether emissions from such facility will exceed the [NAAQS or PSD increment]." 42 U.S.C. § 7475(e)(2) (emphasis added). The Act specifies that this data "shall be gathered over a period of one calendar year preceding the date of application for a permit under this part unless the State… determines that a complete and adequate analysis for such purposes may be accomplished in a shorter period." *Id.* Federal and state regulations similarly require the applicant to submit a pre-application analysis of ambient air quality in affected areas that includes at least one year of representative continuous air quality monitoring data.

During the application phase, the applicant must demonstrate that

> allowable emission increases from the proposed major source or major modification, in conjunction with all other applicable emissions increases or reduction, including secondary emissions, shall not cause or contribute to air pollution in violation of either of the following:
>
> (a) Any national ambient air quality standard in any air quality control region.
>
> (b) Any applicable maximum allowable increase over the baseline concentration in any area.

Compliance with the NAAQS "is based upon the total estimated air quality, which is the sum of the ambient estimates resulting from existing sources of air pollution (modeled source impacts plus measured background concentrations) and the modeled ambient impact caused by the applicant's proposed emissions increase… and associated growth." *NSR Manual* at C.3. Under the "PSD increment" analysis, project emissions, plus all other applicable emissions, cannot exceed the amount of each pollutant that may be allowed in an attainment area. The regulations also explicitly list sources of emissions that are exempted from the PSD increment, i.e., that are in the baseline and do not consume increment.

The Act makes clear that preconstruction monitoring: (i) is required; (ii) must precede the analysis under §7475(a); (iii) must be conducted at the proposed site and affected areas specifically for the purpose of PSD permitting; and (iv) must occur for at least 12 months unless, pursuant to the applicable regulations, a shorter period is allowed. *See* 42 U.S.C. § 7475(e)(2); s*ee also U.S. v. Louisiana-Pacific Corp*., 682 F.Supp. 1141, 1146 (D. Colo. 1988). The plain language does not allow monitoring data gathered for a different purpose (such as state air quality planning) to be substituted.

It is undisputed that no pre-construction monitoring was done for purposes of assessing NAAQS or PSD increment impacts from the proposed kiln and associated equipment. Rather, IEPA apparently relied on an existing series of air quality monitors that were installed for purposes other than permitting the Mississippi Lime kilns. Background concentrations from as far away as St. Clair County and Houston were used. This reliance on regional monitoring is erroneous and unlawful.

Without conceding that the plain language of the Act requires preconstruction monitoring[4], we note that the regional monitors used by IEPA failed to meet U.S. EPA's requirements for a waiver of preconstruction monitoring. To receive approval to use data from a regional site, an applicant typically files a waiver request. A waiver request may only be granted if the applicant shows that valid, sufficient, and representative ambient air quality data already exist from regional monitoring stations. *NSR Manual* at C.18-19. This is a difficult showing to make, requiring specific demonstrations on specific factors; it would only be possible in very limited circumstances. *Id*.

Under EPA guidance, existing monitoring data from regional sites is only sufficient to supplant the need for site-specific monitoring when specific determinations are made as to the data's adequacy. These determinations include:

(1) monitor location;

(2) quality of the data; and

(3) "currentness" of the data.

NSR Manual at C.19 (citing the "PSD Monitoring Guideline"); *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*, EPA-450/4-87-007 (May 1987) (hereinafter "*Guidelines for PSD*")[5]; *see also In re Northern Michigan University Ripley Heating Plant,* 14 E.A.D. __, Slip Op. at 62-63 (EAB Feb. 18, 2009) (remanding due to

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[4] We do not concede that EPA has authority to waive site-specific monitoring, in light of the plain language of the Clean Air Act and applicable regulations, which require monitoring. However, even assuming that EPA can waive monitoring in specific, limited, instances, it only does so to the extent that existing monitoring meets EPA's express minimum criteria.

[5] The Guidelines are incorporated into 40 C.F.R. Pt. 51 Appx W, which in turn is incorporated into part 52.

agency's failure to explain how monitoring data from existing regional monitors satisfy the Act or EPA monitoring guidance); *Hibbing Taconite*, Slip Op. at 20 ("EPA allows substitution of existing representative data in lieu of having the source generate its own preconstruction monitoring data, *provided* these data meet the criteria in the 'Ambient Monitoring Guidelines for the Prevention of Significant Deterioration' (July, 1980)" (emphasis added)). If existing data are not "representative" based on the criteria in EPA's published guideliens, "the applicant *must* proceed to establish a site-specific monitoring network." *NSR Manual* at C.19 (emphasis added); *see also Louisiana Pacific*, 682 F.Supp. at 1153 (EPA refused to waive pre-construction monitoring required by 40 C.F.R. § 52.21(m)).

The monitoring data IEPA used for background concentrations fulfill none of the requirements of U.S. EPA's guidance, which IEPA has previously adopted as the standard for when regional monitoring data can be substituted for site-specific data. Pursuant to the applicable minimum standards for using monitoring data from existing ambient air quality monitors to determine baseline air quality for PSD permitting, the data must be representative of three specific areas:

(1) the location(s) of maximum concentration increase from the proposed source or modification,
(2) the location(s) of the maximum air pollutant concentration from existing sources, and
(3) the location(s) of the maximum impact area, i.e., where the maximum pollutant concentration would hypothetically occur based on the combined effect of exiting sources and the proposed new source or modification.

Guidelines for PSD at § 2.4.1; *see also Hibbing Taconite*, 2 E.A.D. at 850. The monitors providing the data used by IEPA as background here are 20 miles or more away from the proposed kilns, whereas the maximum impacts from the kiln are all within 1 km. Therefore, the existing monitors are nowhere near the location of the maximum increase in ambient PM, PM10, PM2.5, NOx, SO2, or CO concentrations from the proposed kilns, the maximum impact from existing sources nearby to the proposed facility, or the location of the maximum impact from existing and proposed sources, much less the location of *all three* as required to substitute existing monitoring data. In fact, none of the modeling in the record even modeled an area extending out to where the existing monitors used by IEPA are located. (In other words, the modeling which is supposed to capture all areas of any significant impacts do not overlap with any existing monitor locations.) In short, the preconstruction monitoring does not meet the location criteria and the permit cannot be issued.

Additionally, this is a "Case II" or "Case III" in the monitoring guidelines. The record, including the PM2.5, NOx and SO2 modeling by the applicant showing violations of the

NAAQS and attributing those violations to non-Mississippi Lime sources, clearly demonstrates that this area is not free of impacts from other facilities. Moreover, to the extent the monitoring used by IEPA as representative of "background" around the proposed plant is actually representative, that monitoring demonstrates that there are large impacts to ambient air quality by existing sources. Put another way, the monitoring IEPA itself attempts to rely on belies any claim that this is a "Case I" in the guidelines.

Second, even if existing air quality monitors could be used to determine ambient air quality for permitting the proposed plant under limited circumstances, the data must meet the same quality standards that on-site monitoring must meet. At a minimum, this includes:

1) continuous instrumentation monitoring
2) documented quality control, including calibration, zero and span checks, and control checks;
3) calibration and span gases should be working standards certified by comparison to Nation Bureau of Standards gaseous Standards Reference Material;
4) minimum 80% data recovery.

It is not clear that these data quality requirements were met and there is no documented quality control, calibration or minimum data recovery. Notably, the Monitoring Guidelines have different criteria for regional ambient monitoring for SIP planning and non-attainment designations than for PSD monitoring. Merely asserting that the monitors meet the criteria for SIP-planning and attainment determination purposes does not mean the monitors meet the enhanced requirements for PSD monitoring.

Moreover, even if the IEPA concludes that the existing regional monitors meet all of the criteria in the Ambient Air Monitoring Guidelines for use in lieu of site-specific preconstruction monitoring, IEPA must make a record (including specific facts and evidence and not conclusory statements) showing that each of the factors in the Guidelines is met. For example, what is the basis for any conclusion that the St. Clair County monitor, apparently used as background for 1-hour NOx and 1-hour SO2, meets the location criteria and data quality criteria from the Guidelines? What basis, if any, does IPEA have for determining that the Houston, Illinois, monitor that was used for PM2.5, meets those criteria?

15. The Permit Must Contain BACT For Greenhouse Gas Emissions, Including CO2.

Significant emissions of CO2 will be exhausted to the atmosphere from the proposed lime kilns. The draft permit fails to satisfy the minimum requirements of the Clean Air Act because it does not contain a "best available control technology" ("BACT") analysis (or any other limit) for carbon dioxide (CO2). In light of the United States EPA's recent draft greenhouse gas endangerment finding, its approval of CO2 limits in California auto emission standards (and all states adopting California's standards) and the Environmental Appeal Board's recent decisions related to CO2 and other greenhouse gases, the IEPA must either reissue a draft permit that contains a BACT limit for CO2 (and if emitted, N2O, methane, and other greenhouse gases). Moreover, even if BACT for CO2 was not already required, it is clear that it will be required no later than January 2, 2011, according to EPA statements. This permit will not be final until well after that date. Therefore, BACT for these pollutants must be included. Because no draft limits have been provided and no public comment period has been provided for BACT limits for greenhouse gases, at a minimum, at new public comment period must be provided and new BACT limits adopted for the kilns.

It is beyond dispute that greenhouse gas ("GHG") pollution is a major contributor to climate change, which is likely to have numerous and severe adverse public health, environmental, and economic impacts. As the Director of the Kansas Department of Health and the Environment recently stated in denying a permit application for the proposed 1,400 MW Holcomb coal plant, "it would be irresponsible to ignore emerging information about the contribution of carbon dioxide and other greenhouse gases to climate change and the potential harm to our environment and health."[6] It would also be contrary to law because the Clean Air Act requires that binding BACT limits be placed on any major new or modified source of GHG emissions because GHGs are "subject to regulation under the Act." 42 U.S.C. §§ 7475(a)(4), 7479(3); 40 C.F.R. § 51.166(b)(49).

Global warming is a threat to public health, welfare, and the environment. As the United States Environmental Protection Agency ("EPA") recently found in a proposed rule on greenhouse gas endangerment:

> The evidence points ineluctably to the conclusion that climate change is upon us as a result of greenhouse gas emissions, that climatic changes are already occurring that harm our health and welfare, and that the effects will only worsen over time in the absence of regulatory action. The effects of climate change on public health include sickness and death…The effects on welfare embrace every category of effect described in the Clean Air Act's definition of "welfare" and, more broadly, virtually every facet of the living world around us. . . . In both magnitude and probability, climate change is an enormous problem.[7]

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[6] Kansas Dept. of Health and the Environment, Press Release: KDHE Electric Denies Sunflower Electric Air Quality Permit (Oct. 18, 2007) (attached as Exhibit 1).

[7] EPA Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Proposed Rule, 74 Fed. Reg. 18886, 18904 (April 24, 2009).

The effects of climate change include "heat waves, more wildfires, degraded air quality, more heavy downpours and flooding, increased drought, greater sea level rise, more intense storms harm to water resources, harm to agriculture, and harm to wildlife and ecosystems." *Id*. at 1.

EPA's recent pronouncement is based on well-established facts that the international scientific and regulatory community has known for over a decade. The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and the United Nations Environment Programme in 1988 to comprehensively and objectively assess the scientific, technical, and socio-economic information relevant to human-induced climate change, its potential impacts, and options for adaptation and mitigation.[8]

The IPCC reports[9] include the following significant findings, many of which will have significant impacts in Illinois:

- In North America, major challenges are projected for crops that are near the warm end of their suitable range or depend on highly utilized water resources;
- Approximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperatures exceed 1.5-2.5 Degrees Celsius;
- Even the most stringent mitigation efforts cannot avoid further impacts of climate change in the next few decades, which make adaptation essential, particularly in addressing near term impacts. Unmitigated climate would, in the long term, be likely to exceed the capacity of natural, managed and human systems to adapt.
- Fuel switching from coal to gas, renewable heat and power (hydropower, solar, wind, geothermal and bioenergy), and early applications of carbon capture and storage (*e.g.*, storage of removed carbon dioxide from natural gas) are key mitigation technologies and practices currently commercially available.

Illinois agriculture is particularly sensitive to warming because of the existing threats of heat waves, flooding and drought. The drought emergency declared in the state in 2005 illustrates one of the problems global warming poses in the coming decades. The Union of Concerned Scientists estimate that by 2100, average summer temperatures in the state could increase between 9-17 degrees. Rain would occur less often, but would come in more severe downpours, resulting in major flooding. Unless releases of global warming

[8] More information about the IPCC is available at http://www.ipcc.ch/about/index.htm.

[9] The IPCC reports are available at available at http://www.ipcc.ch/ipccreports/assessments-reports.htm.

pollution are curbed and then significantly decreased, global warming pollution will continue to pose significant threats to the health, welfare, and economy of Illinois.[10]

Global warming also exacerbates the problem of ground-level ozone ("smog"), intensifying the public health dangers associated with air quality violations. Breathing ozone can trigger a variety of health problems, including chest pain, coughing, throat irritation, and congestion, and repeated exposure can lead to bronchitis, emphysema, asthma, and permanent scarring of lung tissue. In addition, global warming will result in increased surface water evaporation, which in turn could lead to more wildfires and increased dust from dry soil, both of which generate particulate matter emissions. Particulate matter triggers a host of health problems, including aggravated asthma, development of chronic bronchitis, irregular heartbeat, nonfatal heart attacks, and premature death in people with heart or lung disease.

The IPCC reports authoritatively document the adverse environmental and socio-economic impacts of global warming at local, regional, national, and global scales, and the primary role of the burning of fossil fuels, including coal, in causing global warming. The evidence in the IPCC reports conclusively shows that greenhouse gases, including CO2 and N2O and methane, endanger public health, welfare, and the environment. The United States government recently officially adopted this conclusion.

New evidence suggests that even the alarming estimates of the dire threat of the pending global climate meltdown by the IPCC are too conservative and that the threat of global warming may be even more imminent than originally anticipated. A recent study found that from 2000 to 2006, the average growth in GHG emissions was 3.3% per year, compared to 1.3% per year during the 1990s.[11] The study estimates that the climate meltdown is happening faster than previously feared, and attributes this to recent growth in carbon intensity, and decreasing efficiency in carbon sinks on land and in oceans.

While global warming will have a significant impact on the human environment, IEPA did not consider these effects. Consideration of the direct and collateral effects from construction of the proposed plant must be analyzed before any permit decision is made. Moreover, limits on the global warming pollution from the proposed plant must be included in the permit.

Given the threat posed by global warming, it is now more important than ever to implement the federal Clean Air Act's requirement to impose stringent BACT limits on GHG emissions from coal-fired facilities. The PSD program requires that each "new major

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[10] *See* National Wildlife Federation, Global Warming and Illinois, *available at* http://www.nwf.org/GlobalWarming/pdfs/Illinois.pdf.

[11] *See* http://www.ucar.edu/news/releases/2008/climate-threat.jsp.

stationary source shall apply best available control technology for *each regulated new source review pollutant* that it would have the potential to emit in significant amounts." 40 C.F.R. §§ 52.21(j), 51.166(j)(2) (emphasis added). A "regulated new source review pollutant" includes any pollutant for which there is a national ambient air quality standard ("NAAQS"), a standard promulgated under Section 111 of the Act, and "any pollutant that otherwise is subject to regulation under the Act." 40 C.F.R. §§ 52.21(b)(50), 51.166(b)(49). The Clean Air Act itself also makes clear that the BACT requirements extend to "each pollutant subject to regulation under the Act." 42 U.S.C. §§ 7475(a)(4), 7479(3). This includes carbon dioxide, which is already regulated under the Delaware SIP (which is adopted into federal law under the Clean Air Act), the municipal solid waste landfill New Source Performance Standard, 40 C.F.R. §§ 60.33c, 60.751; 63 Fed. Reg. 2154-01 (Jan. 14, 1998), through the California vehicle emission standards, and through CAA section 821 and its various implementing regulations (explained in detail in section 2 below).

The Clean Air Act defines "air pollutant" expansively to include "any physical, chemical, biological, radioactive . . . substance or matter which is emitted into or otherwise enters into the ambient air." 42 U.S.C. § 7602(g)(emphasis added). The U.S. Supreme Court recently confirmed in *Massachusetts v. EPA*, 127 S.Ct. 1438 (2007), that greenhouse gases fit within this expansive definition. The Court held that it is "unambiguous" that the "sweeping definition" of air pollutant found in the Act "embraces all airborne compounds of any stripe," including CO2 and other greenhouse gases." *Id*. at 1459-60.

Following up on that decision, on April 17, 2009, EPA issued a draft endangerment finding for carbon dioxide and other greenhouse gases.[12] EPA has now officially declared that carbon dioxide and other greenhouse gases are air pollutants that "may be reasonably anticipated to endanger public health and welfare," as defined under the Clean Air Act. Although CO2 is already regulated under other parts of the Clean Air Act, as explained in detail below, with a final endangerment finding, EPA is obliged to begin the process of regulating global warming pollution from motor vehicles. Clean Air Act Section 202 specifically states that EPA "shall" (*i.e.*, must, not may) regulate pollutants once they are found to endanger public health or welfare.

In addition to being an "air pollutant," CO2 also qualifies as subject to regulation under the Clean Air Act because it is actually regulated under the Act. In particular, Section 821 of the Clean Air Act Amendments of 1990 required EPA to promulgate regulations to require certain sources, including coal-fired electric generating stations, to monitor CO2 emissions and report monitoring data to EPA. 42 U.S.C. § 7651k note.

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[12] EPA, Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, ("Endangerment finding"), 74 Fed. Reg. 18886 (April 24, 2009) (also available at http://epa.gov/climatechange/endangerment/downloads/GHGEndangermentProposal.pdf).

Section 821, and the EPA regulations promulgated jointly pursuant to that section and other CAA sections, plainly make CO2 “subject to regulation” under the Clean Air Act. The U.S. Supreme Court has found recordkeeping and reporting requirements to constitute regulation in other contexts. *Buckley v. Am. Constitutional Law Found., Inc.*, 525 U.S. 182, 204 (1999) (holding that compelled reporting of ballot initiative petition circulators’ names was impermissible regulation of speech and association rights); *Riley v. Nat’l Fed’n of the Blind, Inc.,* 487 U.S. 781, 798-99 (1988) (compelled reporting of professional fundraiser status is impermissible regulation of speech); *Buckley v. Valeo*, 424 U.S.1, 66-68 (1976) (evaluating recordkeeping, reporting, and disclosure requirements as regulation of political speech). Therefore, by requiring “regulation” of CO2 in Section 821, Congress clearly made CO2 “subject to regulation” for purposes of the Act’s Section 165 BACT provisions. Enforcement of Section 821 is accomplished through the enforcement mechanism in the Act, 42 U.S.C. §§ 7413(a)(4), (b)(2), 7604(a)(1), and a violator is subject to the penalty provisions of the Act. 42 U.S.C. § 7651k(e).

In 1993, EPA made CO2 further subject to regulation under the CAA by promulgating regulations at 40 C.F.R. Part 75. Those regulations generally require monitoring of carbon dioxide emissions through installation, certification, operation, and maintenance of a continuous emission monitoring system or an alternative method, 40 C.F.R. §§ 75.1(b), 75.10(a)(3); preparation and maintenance of a monitoring plan, 40 C.F.R. § 75.33; maintenance of certain records, 40 C.F.R. § 75.57; and reporting of certain information to EPA, including electronic quarterly reports of carbon dioxide emissions data, 40 C.F.R. §§ 75.60 – 64. Additionally, 40 C.F.R. § 75.5 prohibits operation of an affected source in the absence of compliance with the substantive requirements of Part 75, and provides that a violation of any requirement of Part 75 is a violation of the Clean Air Act. These regulations are located in Title 40, Chapter I, Subchapter C, which makes them “regulation[s] under the Act,” according to EPA’s only official interpretation. *See* 43 Fed. Reg. 26,388, 26,397 (June 19, 1978); Deseret, Slip Op. at 41 (holding that the fact that CO_2 is regulated by rules contained in 40 C.F.R. Subchapter C “augers in favor” of a conclusion that CO_2 is “subject to regulation under the Act,” based on EPA’s official interpretation in its 1978 rulemaking).

Furthermore, EPA has identified the CO2 monitoring and reporting requirements in Part 75 as applicable Clean Air Act requirements that must be incorporated into Title V operating permits. 40 C.F.R. § 71.2. Numerous states, including Illinois, Wisconsin, Indiana, and Michigan have included CO2 monitoring, record keeping, and reporting requirements in Title V permits. EPA has also enforced these CO2 monitoring regulations under the

Clean Air Act on a number of occasions.[13] It is, therefore, undeniable that CO2 is subject to regulation under the Clean Air Act.

In addition to section 821 of the Act, and its implementing regulatory requirements, greenhouse gases such as CO2 and methane are also regulated as a component of landfill gases. EPA also promulgated emission standards for municipal solid waste (MSW) landfill emissions in Subchapter C. 40 C.F.R. §§ 60.33c, 60.752. "MSW landfill emissions" are defined as "gas generated by the decomposition of organic waste deposited in an MSW landfill or derived from the evolution of organic compounds in the waste." 40 C.F.R. § 60.751. EPA has specifically identified CO_2 as one of the components of the regulated "MSW landfill emissions." *See* Air Emissions from Municipal Solid Waste Landfills – Background Information for Final Standards and Guidelines, U.S. EPA, EPA-453/R-94-021 (Dec. 1995) (explaining "MSW landfill emissions, or [landfill gas], is composed of methane, CO_2, and NMOC.").[14] Thus, CO_2 is regulated through the landfill emission regulations at 40 C.F.R. Part 60 Subparts Cc, WWW. *See also* 56 Fed. Reg. 24468 (May 30, 1991) ("Today's notice designates air emissions from MSW landfills, hereafter referred to as 'MSW landfill emissions,' as the air pollutant to be controlled").

Greenhouse gas emissions-- including CO_2—were central to the landfill NSPS. The NSPS Rule was designed, in part, to control emissions of the trace amounts of non-methane organic compounds in the gas. When EPA issued its final rule requiring control of landfill gas emissions—consisting almost entirely of two greenhouse gases, including CO_2, and only traces of other compound—it was doing so based on the agency's determination that the emissions "contribute[] to global climate change." In fact, based on quantities of gas, the rule can best be described as a limit on CO_2 and methane and secondarily a limit on other constituents of landfill gas. Landfill gas emissions contain approximately 50% methane, 50% carbon dioxide, and less than 1% non-methane organic compounds. In a background technical document for that regulatory process, EPA, as early as March 1991, acknowledged that air emissions of greenhouse gases, including carbon dioxide and methane "contribut[ed] to the phenomenon of global warming," and that the "global warming effects" of those emissions posed "potential adverse health and welfare effects." *See* Exhibit 10 at 2-15. EPA noted that while, at the time, there was uncertainty as to the timing and ultimate magnitude of global warming, there was already a "strong scientific agreement" that the increasing emissions of greenhouse gases "will lead to temperature increases" and that efforts were underway to develop control options. One of the specific

[13] *See, e.g., In re City of Detroit, Dept. of Public Lighting, Mistersky Power Station,* Docket No. CAA_05-2004-0027, Consent Agreement and Final Order ¶ 7 (May 10, 2004) (attached as Exhibit 8); *In re Indiana Mun. Power Agency*, Docket No.CAA-05-2000-0016, Compl. ¶¶ 5, 14-15, 34-37.

[14] *Available at* http://www.epa.gov/ttn/atw/landfill/landflpg.html.

justifications that EPA articulated for adopting the Rule (particularly at the level of stringency chosen) was to limit emissions of methane to avoid global warming impacts. *See* 56 Fed. Reg. 24468, 24481 (March 12, 1996) ("[i]n considering which alternative to propose as BDT, EPA decided to consider both NMOC's and methane reductions"); 61 Fed. Reg. 9905, 9906 ("Briefly, specific health and welfare effects from [landfill gas] emissions are as follows . . . methane emissions . . . contribute to global climate change as a major greenhouse gas"); *id*. at 9914 (anticipated "methane reductions . . . are also an important part of the total carbon reductions identified under the Administration's 1993 Climate Change Action Plan"). EPA further noted in the preamble to the final rule that "[c]arbon dioxide is also an important greenhouse gas contributing to climate change," and quantified the benefits of the rule based on "equivalent reduction in CO_2." 56 Fed. Reg. at 24472 (stating that "1.1 to 2.0 billion trees would need to be planted . . .to achieve an equivalent reduction in CO_2 as achieved by today's proposal"). Clearly, then, global warming impacts of landfill gas emissions were central to the NSPS standards. The NSPS standard for landfill gases includes numerous steps and requirements to reduce emissions of methane and CO2. As such, under any reasonable interpretation of "regulated," these pollutants are regulated under the Clean Air Act and a BACT limit is required.

Further still, even if IEPA were to give an incredibly restrictive interpretation to the Clean Air Act, CO2 is still subject to regulation under the Act through EPA's recent approval of amendments adding various CO2 regulations to the SIP for the state of Delaware. 73 Fed. Reg. 23,101 (April 29, 2008); 40 C.F.R. § 52.420(c). EPA determined that the submission satisfied the requirements under CAA § 110(a), and published notice of its approval of the SIP revision in the Federal Register on March 5, 2008. 73 Fed. Reg. 11845. EPA allowed for public comment and, on April 29, 2008, EPA published notice of its Final Rule approving the SIP revision, effective May 29, 2008, in the Federal Register. 73 Fed. Reg. 23101 (April 29, 2008). Both the proposed and final rule notices state that EPA's approval of Delaware's Regulation 1144 was "under" and "in accordance with the Clean Air Act." 73 Fed. Reg. at 11845; 73 Fed. Reg. at 23101.

The Delaware SIP amendments establish CO2 emission limits and operating requirements, record keeping and reporting requirements, and CO2 emissions certification, compliance, and enforcement obligations for new and existing stationary electric generators. Del. Admin. Code 7 1000 1144. The approved Delaware SIP limits emissions of CO2 from certain electric generators to the following rates:

Existing Distributed Generators	1,900 lbs/MWh
New Distributed Generators	1,900 lbs/MWh (if installed between effective date and 1/1/2012)

	1,650 lbs/MWh (if installed on or after 1/1/2012)
New Distributed Generators that use Waste, landfill or digester gases	1,900 lbs/MWh

Delaware Department of Natural Resources and Environmental Control, Division of Air and Waste Management, Air Quality Management Section, Regulation No. 1144 § 3.2.1 – 3.2.2.

In adopting Delaware Regulation 1144 into Subchapter C, EPA was clear that it was adopting limits on CO_2 emissions under the Clean Air Act:

> Regulation No. 1144 contains provisions to control the emissions of nitrogen oxides (NOx), nonmethane hydrocarbons (NMHC), particulate matter (PM), sulfur dioxide (SO2), carbon monoxide (CO), *and carbon dioxide (CO2)* from stationary generators in the State of Delaware.
>
> Regulation No. 1144 establishes emission standards in pounds per megawatt-hour (lbs/MWh) of electricity output under full load design conditions or at the total load conditions specified by the applicable testing methods.
>
> …
>
> **CONCLUSIONS AND RECOMMENDED AGENCY ACTION:**
>
> Regulation No. 1144 adopted by the State of Delaware will result in the control of NOx, NMHC, PM, SO2, CO*, and CO2 emissions from stationary generators* and will help the State in attaining compliance with the 8-hour ozone NAAQS. EPA approval of the SIP revision is recommended.

Memorandum from Rose Quinto, Environmental Engineer Air Quality Planning Branch, U.S. EPA Region 3, Re: Technical Support Document - Delaware; Regulation No. 1144 – Control of Stationary Generator Emissions (January 25, 2008) (emphasis added).

EPA's approval was made "in accordance with the Clean Air Act," 73 Fed. Reg. 23,101, and by approving inclusion of these provisions into Delaware's SIP, the agency confirmed that CO2 is "subject to regulation" under the Act, as SIPs are developed pursuant to Sections 110 and 113 of the Act, 42 U.S.C. §§ 7410, 7413, and become federally enforceable parts of federal law upon approval. *El Comite Para El Bienestar de Earlimart v. Warmerdam*, 539 F.3d 1062, 1066 (9th Cir. 2008); *Espinosa v. Roswell Tower, Inc.*, 32 F.3d 491, 492 (10th Cir. 1994); *Her Majesty the Queen in Right of the Province of Ontario v. City of Detroit*, 874 F.2d 332, 335 (6th Cir. 1989). As such, the Delaware SIP approval also demonstrates that CO2 is subject to regulation under the Clean Air Act for purposes of triggering the BACT requirements.[15]

In the Fiscal Year 2008 Consolidated Appropriations Act, Congress specifically required EPA to undertake rulemaking to establish monitoring and reporting requirements for all greenhouse gases (including CO2), economy wide. H.R. 2764; Public Law 110–161, at 285 (enacted Dec. 26, 2007). Congress made clear that the agency is "to use its existing authority under the Clean Air Act" including "existing reporting requirements for electric generating units under section 821 of the Clean Air Act" in adopting these regulations.[16] This action by Congress not only confirms that section 821 is part of the Clean Air Act, but also establishes a separate and distinct statutory obligation to regulate CO2 through mandatory emission monitoring requirements under the Act. In fact, the EPA's regulatory obligations under the Appropriations Act are much broader than the agency's duties under section 821 as the Appropriations Act requires *economy wide* reporting. Such requirements are further evidence that CO2 is actually regulated under the Clean Air Act.

On July 8, 2009, EPA published final notice of its approval of numerous states and air districts' (in total 13 states and the District of Columbia) regulation of greenhouse gases through section 209(b)[17] of the Act. 74 Fed. Reg. 32,744. The California standards

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[15] U.S. EPA letter to Clerk of the Board regarding In re Deseret and Delaware SIP approval, September 9, 2008 (attached as Exhibit 12).

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

[17] Section 209(b), 42 U.S.C. § 7543(b), provides:

> **(b) Waiver**
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> **(1)** The Administrator shall, after notice and opportunity for public hearing, waive application of this section to any State which has adopted standards (other than crankcase emission standards) for the control of emissions from new motor vehicles or new motor vehicle engines prior to March 30, 1966, if the State determines that the State standards will be, in the aggregate, at least as protective of public health and welfare as applicable Federal standards. No such waiver shall be granted if the Administrator finds that—
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> **(A)** the determination of the State is arbitrary and capricious,
>
> **(B)** such State does not need such State standards to meet compelling and extraordinary conditions, or
>
> **(C)** such State standards and accompanying enforcement procedures are not consistent with section 7521 (a) of this title.

approved by EPA include emission limits for four greenhouse gases: CO_2, methane (CH_4), nitrous oxide (N_2O), and hydrofluorocarbons (HFCs). Id. at 32,746. While EPA elected not to address whether its decision resulted in CO_2 and other greenhouse gases being "subject to regulation" under the Act for purposes of PSD, and left that decision to another forum, id. at 32,783, this is that other forum. There is no other interpretation of EPA's decision but that it resulted in the four greenhouse gases at issue (CO_2, CH_4, N_2O and HFCs) being regulated under the Act and subject to PSD permitting. Therefore, emissions of these pollutants, in any amounts, from the facility requires a BACT limit for each.

Carbon dioxide is already regulated under the Clean Air Act for the many reasons explained above. Additionally, it is clear that all greenhouse gases are subject to regulation under the Clean Air Act. "Subject to regulation" means "capable of being regulated" and is not limited to pollutants that are "currently regulated." Federal regulations define "regulated NSR pollutants" to include not only air pollutants for which there are NAAQS under Section 109 of the Act, standards of performance for new sources under Section 111 of the Act, or standards under or established by Title VI of the Act (relating to acid deposition control), but also "[a]ny pollutant that is otherwise subject to regulation under the Act." 40 C.F.R. §§ 52.21(b)(50) & 51.166(b)(49).

a) CO_2 Is Regulated Under 35 Ill. Admin. Code § 201.141, Which Is Incorporated Into the Illinois SIP.

CO_2 is also currently subject to regulation under the Clean Air Act because 35 Ill. Admin. Code § 201.141 prohibits emissions of CO_2 that cause "air pollution." "Air pollution" is "the presence in the atmosphere of one or more air contaminants in sufficient quantities and of such characteristics and duration as to be injurious to human, plant, or animal life, to health." 35 Ill. Admin. Code § 201.102. The definition of air pollution is self implementing and does not require pollutant-specific standards or regulations to be adopted first. *See e.g., Fleishmann Malting Co. v. Ill. Pollution Control Bd*., 329 N.E.2d 282, 285 (Ct. App. 5th Dist. 1975) (and collected cases).

Based on EPA's endangerment finding, the work of the IPCC, and numerous respected scientific bodies, there is no question that CO_2 emissions are causing global

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

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

warming and will continue to do so until abated, and that global warming is injurious to human, plant and animal life. *See* discussion, infra. Therefore, uncontrolled CO2 emissions cause air pollution and are prohibited, to the extent they contribute to deleterious air pollution through global warming, by 35 Ill. Admin. Code § 201.141. That section is included in the Illinois SIP, which is part of 40 C.F.R. Chapter I, Subchapter C. In short, CO2 is subject to regulation under the Clean Air Act and a BACT limit is required before a PSD permit can issue.

b) Illinois Has the Authority Under Section 165 of the Clean Air Act and State Air Pollution Laws to Impose BACT or Stricter Limits on Greenhouse Gas Emissions From the Proposed Coal Plant.

In addition to being *required* by the Clean Air Act to impose BACT limits on greenhouse gas emissions from the proposed facility, the IEPA is authorized to take steps to avoid or minimize such GHG emissions, including the authority to require a BACT analysis and BACT-level emission limits and/or GHG offsets. One source of such authority is Section 165(a)(2) of the Clean Air Act. Section 165(a)(2) grants a permitting authority broad discretion to impose permit conditions beyond the baseline requirements of BACT in order to protect air quality. *In re Prairie State Generating Co.*, PSD Appeal No. 05-05, slip op. at 40 (E.A.B. 2006), *quoting NSR Manual* at B.13. Thus, the IEPA could and should elect to approve a PSD permit only where the permit requires construction of a plant that fully incorporates all available measures for reducing GHGs, adopts appropriate GHG-related emission limits, and/or imposes GHG offset requirements. Under Section 165(a)(2), IEPA should consider such additional permit conditions on its own. *Id*.

In addition, the BACT provisions themselves, 42 U.S.C. § 7479(3), authorize a state permitting agency to take steps to protect air quality that go beyond the bare minimum requirements of BACT. EPA has also recognized that "a PSD permitting authority still has an obligation under section 165(a)(2) to consider and respond to relevant public comments on alternatives to the source," and that a "PSD permitting authority has discretion under the Clean Air Act to modify the PSD permit based on comments raising alternatives or other appropriate considerations." Brief of the EPA Office of Air and Radiation and Region V, *In re Prairie State*, PSD Appeal 05-05, 12 E.A.D. 176 (EAB, Aug. 24, 2006). Here, these comments expressly require IEPA to fulfill this duty. Moreover, the EAB has made clear that a permitting authority has discretion to modify a permit based on consideration of "alternatives," whether or not the commenters raise the issues:

> Indeed, the permit issuer is not required to wait until an "alternative" is suggested in the public comments before the permit issuer may exercise the discretion to consider the alternative. Instead, the permit issuer may identify an

> alternative on its own. This interpretation of the authority conferred by CAA section 165(a)(2)'s reference to "alternatives" is consistent with the Agency's longstanding policy that, . . . "this is an aspect of the PSD permitting process in which states have the discretion to engage in a broader analysis if they so desire."

See In re Prairie State, PSD Appeal 05-05 (Aug. 24, 2006) (quoting the NSR Workshop Manual at B.13).

In fact, under this authority, a permitting authority can engage in a wide-ranging exploration of options. Under this authority the IEPA clearly has the discretion to require specific evaluation and control of carbon dioxide emissions, and/or to require other action to mitigate potential global warming impacts. Failure to do so in this case is a material breach of the agency's obligations to the people of Illinois and the United States.

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

Additionally, under § 165(a)(2) of the Act, IEPA must consider the "no-build" option, whereby IEPA would deny the PSD permit based on policy considerations related to carbon dioxide and other harmful emissions.

Accordingly, even assuming that IEPA could lawfully issue a PSD permit for the facility without establishing BACT limits for GHGs, the agency has the duty and authority under Section 165 of the Clean Air Act to require GHG emission limits, application of all measures and technologies available to reduce GHG emissions, impose GHG offset measures, and any other appropriate alternatives and options in order to avoid or minimize the GHG emissions from the plants.

c) IEPA Must Ensure Emissions of Global Warming Pollutants Comply With Illinois's SIP-Approved Ambient Air Standard for CO2.

IEPA is prohibited from granting this permit without mitigating the global warming impacts because it would allow the project proponent to emit carbon dioxide and other greenhouse gases such as nitrous oxide in such quantities that would cause or tend to cause air pollution. The State Implementation Plan states: "[N]o person shall cause or threaten or allow the discharge or emission of any contaminant into the environment in any State so as, either alone or in combination with other sources, to cause or tend to cause air pollution in Illinois." 35 Ill. Admin. Code § 201.141.

The term "air pollution" is further defined to mean "the presence in the atmosphere of one or more air contaminants in sufficient quantities and of such characteristics and duration as to be injurious to human, plant, or animal life, to health." 35 Ill. Admin. Code § 201.102. While IEPA has previously taken the untenable position that greenhouses gases are not pollutants, that conclusion cannot stand a court review. Nor, is it likely IEPA would still cling to that erroneous interpretation of law in light of recent U.S. EPA regulations controlling emissions of greenhouse gases. Greenhouse gases plainly fit within this definition of air pollution and adding more global warming pollution will accelerate global warming and cause further harm human, plant and animal life. The earth is already beyond safe levels of greenhouse gases in the atmosphere, and adverse impacts are beginning and will continue as a result.

The Intergovernmental Panel on Climate Change[18] ("IPCC") found that total GHG emissions have grown since pre-industrial times, with an increase of 70% between 1970 and 2004.[19] Of primary concern is Carbon Dioxide ("CO2"), which is emitted in much larger quantities than any of the other greenhouse gases and is responsible for close to 85% of the total U.S. GHG inventory.[20] CO2 emissions have grown between 1970 and 2004 by about 80% (28% between 1990 and 2004).[21] In 2006, U.S. fossil fuel combustion produced 5,637.9 metric tons of carbon dioxide, and emissions from coal alone used in electricity

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[18] The IPCC is perhaps the leading source of research and data regarding climate change, its causes, and its impacts. The IPCC is charged with comprehensively and objectively assessing the scientific, technical and socio-economic information relevant to human-induced climate change, its potential impacts, and options for adaptation and mitigation. The IPCC has released four assessments – in 1990, 1995, 2001, and 2007 – so far, each one stating with greater confidence than the one before that the climate change situation has become increasingly dire.

[19] Exhibit 14, IPCC Working Group III, Climate Change 2007: Mitigation, Summary for Policy Makers ("IPCC Working Group III Report") at ES-3.

[20] Exhibit 15, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006, EPA #430-R-08-005, April 2008, ("EPA Inventory 1990-2006") at ES-4, Figure ES-4.

[21] Exhibit 14, IPCC Working Group III Report at ES-3.

generation accounted for over 2,000 million metric tons of CO_2 in 2006.[22] Indeed, coal is the largest contributor to anthropogenic CO_2 increases into the atmosphere.[23]

Atmospheric CO_2 concentrations are reaching dangerous and unprecedented levels.[24] The global atmospheric concentration of CO_2 has increased from a pre-industrial value of about 280 parts per million (ppm) to 379 ppm, in 2005. The Atmospheric concentration of CO_2 in 2005 exceeds by far the natural range over the last 650,000 years (180-300 ppm) as determined from ice cores.[25] In fact, CO_2 levels are far outside their range of the past 800,000 years for which ice core records of atmospheric composition are available.[26] As further reference, fossil fuels burned now by humans in one year contain the amount of carbon buried in organic sediments in approximately 100,000 years.[27]

Evidence shows emissions rates continue to rise. A recent study found that from 2000 to 2006, the average emissions growth rate was 3.3% per year, compared to 1.3% per year during the 1990s.[28] The U.S. E.P.A. found that total U.S. emissions have risen by 14.7 percent from 1990-2006.[29] According to one expert, "The world is already at or above the worst case scenarios.... In terms of emissions, we are moving past the most pessimistic estimates of the I.P.C.C. and by some estimates we are above that red line."[30] Looking forward, the International Energy Agency ("IEA") estimates a 57% jump in CO_2 emissions

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[22] Exhibit 15, EPA Inventory 1990-2006 at ES-5, 7; Exhibit 19.2, EPA Inventory 1990-2006, at A-3. This report expresses these figures as teragrams of CO_2 equivalent ($TgCO_2$). One teragram is equal to one million metric tons.

[23] Exhibit 16, "Dr. James E. Hansen Direct Testimony," In re Interstate Power and Light Company, before the Iowa Utilities Board, Docket No. GCU-07-01 ("Hansen Testimony"), at 3. Dr. Hansen is Director of the Goddard Institute for Space Studies. A trained physicist and astronomer, Mr. Hansen has focused on climate and global change for about twenty-five years.

[24] Exhibit 16, Hansen Testimony at 3.

[25] Exhibit 17, IPCC Working Group I, Climate Change 2007: The Physical Science Basis, Summary for Policymakers ("IPCC Working Group I Report") at ES-2.

[26] Exhibit 16, Hansen Testimony at 21.

[27] Id. at 25.

[28] Exhibit 23, Canadell, J.G., C.L. Quere, M.R. Raupach, C.B. Field, E.T. Buitehuis, P. Ciais, T.J. Conway, N.P. Gillett, R.A. Houghton, and G. Marland, "Contributions to accelerating atmospheric CO_2 growth from economic activity, carbon intensity, and efficiency of natural sinks," Proc. Natl. Acad. Sci. USA, doi 10.1073, 2007.

[29] Exhibit 15, EPA Inventory 1990-2006 at ES-3.

[30] Elizabeth Rosenthal, "U.N. Report Describes Risks of Inaction on Climate Changes," The New York Times, November 17, 2007, online at: http://www.nytimes.com/2007/11/17/science/earth/17climate.html?pagewanted=1&ei=5070&en=89a5dc9c06ef997d&ex=1195966800.

between 2005 and 2030, with the U.S., China, Russia and India contributing two-thirds to this increase.[31]

The sheer volume of CO_2 in the air diminishes our planet's ability to process the amount of CO_2 that humans unleash into the atmosphere. The earth is able to ingest atmospheric CO_2, but only to a certain point. Commonly referred to as "carbon sinks," oceans and forests absorb CO_2 from the atmosphere. Human sources of CO_2, such as power plant emissions, have disrupted this carbon cycle: the ocean's uptake of CO_2 slows as its CO_2 concentrations increase, and in some cases oceans are reaching their saturation points.[32] Once the saturation point is reached, a carbon sink is no longer able to absorb carbon emissions and it may actually begin releasing excess carbon into the atmosphere. For example, one study, published in May 2007, shows that the Southern Ocean—which accounts for 15% of Earth's carbon sinks—has gradually slowed in its ability to absorb carbon dioxide from the atmosphere since 1990.[33] Another study suggests that a similar reduction in oceanic absorption of carbon dioxide has occurred in the northern Atlantic Ocean.[34] The inevitable result of such carbon cycle disruption is the dominance of CO_2 in the atmosphere, which is creating and will continue to wreak catastrophic consequences for humans and other species.[35]

Rising atmospheric CO_2 concentrations is a leading cause of global warming.[36] In fact, the IPCC reports CO_2 as the most influential factor contributing to global warming.[37] Based on more than 29,000 observational data series, from 75 studies, the IPCC has concluded that "Warming of the climate system is unequivocal."[38] The IPCC reports the temperature increase since the 1950s is very likely due to the increase in human caused

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[31] International Energy Agency, World Energy Outlook 2007, China and India Insights, ("IEA World Energy Outlook 2007") at Executive Summary 11.

[32] Exhibit 16, Hansen Testimony at 49; Exhibit 26, Le Quere, C., C. Rodenbeck, E.T. Buitenhuis, T.J. Conway, R. Langenfelds, A. Gomez, C. Labuschagne, M. Ramonet, T. Nakazawa, N. Metzl, N. Gillett, and M. Heimann, "Saturation of the Southern Ocean CO2 sink due to recent climate change," *Science*, 316 (5832), 1735-1738, 2007.

[33] Le Quere, C., et.al., "Saturation of the Southern Ocean CO2 sink due to recent climate change," *Science*, 316 (5832), 1735-1738, 2007.

[34] Schuster, U., and A.J. Watson, "A variable and decreasing sink for atmospheric CO2 in the North Atlantic," *J. Geophysical Res.*, 112, C11006, doi:10.1029/2006JC003941, 2007

[35] Exhibit 16, Hansen Testimony at 31.

[36] IPCC Working Group I Report at ES-3-4, Figure SPM.2; Exhibit 25, IEA World Energy Outlook, 2007, at Executive Summary 11; *See also* Exhibit 16, Hansen Testimony at 3.

[37] IPCC Working Group I Report at ES-2-4, Figure SPM.2. A factor's radiative forcing is the influence the factor has on tending to warm or cool the planet.

[38] Id, at ES-5.

GHG pollution, and cannot be due to natural causes alone. [39] Put another way, as NASA scientist explained, when discussing warming in Antarctica, "It's extremely difficult to think of any physical way" the increase in greenhouse gases could *not* lead to global warming.[40]

The IPCC measured direct indicators of climate change, including global average air and ocean temperatures, ice and snow melt patterns, rising sea levels, changes in arctic temperatures, ocean salinity, and wind patterns, and incidence of extreme weather events. The following are among the reports' more alarming conclusions:

- Eleven of the last twelve years (1995-2006) rank among the 12 warmest years in the instrumental record of global surface temperature (since 1850).[41]
- Total temperature increase from 1850-1899 to 2001-2005 is .76 degrees C.
- The average atmospheric water vapor content has increased since at least the 1980s over land and ocean as well as in the upper troposphere. The increase is broadly consistent with the extra water vapor that warmer air can hold.
- Average Northern Hemisphere temperatures during the second half of the 20th century were very likely higher than during any other 50-year period in the last 500 years and likely the highest in at least the past 1300 years.
- Glacial lakes are growing in number and size, permafrost regions are experiencing ground instability and hydrological systems suffer from increased runoff and earlier spring peak discharge, effecting the thermal structure and water quality of glacier-fed lakes and rivers.
- Global average sea level rose at an average rate of 1.8 mm per year between 1961 and 2003. The rate was faster over 1993-2003, about 3.1 mm per year.
- Average arctic temperatures increased at almost twice the global average rate in the past 100 years.
- Satellite data since 1978 show that annual average arctic sea ice extent has shrunk by 2.7% per decade.

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[39] Id. at ES-10

[40] Kenneth Chang, "Study Finds New Evidence of Warming in Antarctica," The New York Times, January 22, 2009, online at http://www.nytimes.com/2009/01/22/science/earth/22climate.html?sq=antarctic%20is%20warming&st=cse&scp=1&pagewanted=print

[41] *See also,* National Oceanic and Atmospheric Administration, National Climatic Data Center 2006 Annual Report at ii ("Multiple paleoclimatic studies indicate that recent years, the 1990s, and the 20th century are all the warmest, on a global basis, of at least the last 1000 years.").

- Temperatures at the top of the permafrost layer have generally increased since the 1980s in the Arctic by up to 3 degrees C. The maximum area covered by seasonally frozen ground has decreased by about 7% in the Northern Hemisphere since 1900.

- Increased precipitation and increased drying has been observed in different global regions.

- Changes in precipitation and evaporation over the oceans have increased ocean salinity in low-latitude waters and decreased salinity in high-latitude waters.

- The uptake of anthropogenic carbon since 1750 has led to the ocean becoming more acidic with an average decrease in pH of .1 units.

- Mid-latitude westerly winds have strengthened in both hemispheres since the 1960s.

- More intense and longer droughts have been observed over wider areas since the 1970s.

- In the past 50 years, cold days, cold nights and frost have become less frequent, while hot days, hot nights and heat waves have become more frequent.

- There is observational evidence for an increase in intense tropical cyclone activity in the North Atlantic since about 1970, correlated with increases of tropical sea surface temperatures.

In light of these findings, climate scientists urge immediate action to curtail CO2 and other GHG emissions. Rajendra Pachauri, and IPCC scientist and economist asserts, "If there is no action before 2012, that's too late…. What we do in the next two to three years will determine our future. This is the defining moment."[42] Dr. Hansen opines that the single most important action needed to decrease the present planetary imbalance driving climate change is curtailment of CO2 emissions from coal burning.[43]

It is important to note that increasing emissions of CO_2 and other greenhouse gases may also be compounding the dangers of climate change by creating self-triggering feedback loops.[44] For example, the melting of Arctic ice, which occurs as the atmosphere

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[42] Elisabeth Rosenthal, "U.N. Chief Seeks More Climate Change Leadership," The New York Times, Nov. 18, 2007, online at http://www.nytimes.com/2007/11/18/science/earth/18climatenew.html?ex=1195966800&en=da2bc03ef46b3ee3&ei=5070&emc=eta1

[43] Exhibit 16, Hansen Testimony at 6.

[44] Exhibit 17, IPCC, Climate Change 2007: Synthesis Report: Summary for Policymakers, at 7-8.

warms, can trigger additional warming because ice is more reflective of the Sun's heat than is the land and ocean that replaces the melting ice. In other words, as the planet's surface albedo (or reflectivity) lowers, the planet absorbs more sunlight, leading to further warming. As such, it is possible that increased CO_2 emissions will lead to a tipping point beyond which climate change will rapidly accelerate beyond what the scientific models currently predict.

There is no doubt, then, that greenhouse gases (including CO2, N2O and methane) threaten human health and the environment. Indeed, the IEA has warned, "Urgent action is needed if greenhouse-gas concentrations are to be stabilised at a level that would prevent dangerous interference with the climate system." Specifically, the Agency focused on the dangers posed by the increased construction of coal-fired power plants. According to the IEA, "government action must focus on curbing the rapid growth in CO_2 emissions from coal-fired power stations – the primary cause of the surge in global emissions in the last few years."[45] Numerous additional scientific studies directly link climate change with significant public health, environmental, economic, and ecological impacts.[46] Such impacts include direct heat-related effects, extreme weather events, climate-sensitive disease impacts, air quality effects, agricultural effects (and related impacts on nutrition), wildlife and habitat impacts, biodiversity impacts, impacts on marine life, property damage, and social disruption (such as population displacement).[47]

The IPCC reports and other studies provide compelling evidence of dramatic changes in Earth's climatic systems. Changes in climatically sensitive indicators support the inference that the average temperature in the Northern Hemisphere over the last half-century is likely higher than at any time in the previous 1,300 years, while ice core records indicate that the polar regions have not experienced an extended period of temperatures significantly warmer than today's in about 125,000 years.[48]

The IPCC, other agencies and scientists report numerous long-term changes occurring across many different climate sectors. These observed changes applied to scientific modeling and compared against paleoclimatic data yield startling results, first and foremost being that temperature changes of a few degrees can cause large impacts.[49]

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[45] IEA World Energy Outlook 2007 at Executive Summary 12.

[46] *See, e.g.,* IPCC Working Group II Report, Climate Change 2007: Impacts, Adaptation, and Vulnerability ("IPCC Working Group II Report"); *see also* Matthias Ruth, *et al*., The US Economic Impacts of Climate Change and the Costs of Inaction, Center for Integrative Environmental Research (Oct. 2007).

[47] EPA, Climate Change, Health and Environmental Effects, available at http://www.epa.gov/climatechange/effects/health.html

[48] IPCC Working Group I Report at ES-9.

[49] Exhibit 16, Hansen Testimony at 10.

Most troubling, however, are the secondary consequences arising from seemingly insignificant temperature increases, upon sea level, the Earth's hydrological and biological systems, plant and animal habitats, weather patterns and public health.

Rising temperatures melt large Arctic and Antarctic ice sheets, filling the oceans and raising the sea level. Nasa physicist James Hansen predicts "business-as-usual" growth of GHGs will result in a sea level rise of 1 meter during this century. The IPCC calculated a sea level rise of only 21-51 centimeters by 2095, but that report omitted any calculation due to ice sheet disintegration, because the IPCC was unable to reach a consensus on the magnitude of likely ice sheet disintegration.[50] "The last time the Earth was 2-3 degrees warmer than today, about 3 million years ago, sea level was about 25 meters higher. More than a billion people live within 25 meters above sea level. The last time the planet was 5 degrees warmer, just prior to the glaciation of Antarctica, about 35 million years ago, there were no large ice sheets on the planet. If ice sheets melt entirely, sea level will rise about 70 meters."[51] Sea level is rising about 35 cm per century, which is double the rate of 20 years ago. This data contrasts with historical data, which shows sea level had been relatively stable for the past several millennia.[52] The IPCC estimates that if the Greenland Ice Sheet, which is expected to continue melting, disappears completely, the result would be a 7 meter rise in sea level.[53]

Paleoclimate data has shown a correlation between increased warming and release of methane gas. Methane gases, trapped in ocean sediments and frozen ground, can be released during periods of melt. [54] Though methane is less prevalent in the atmosphere than is CO2, it is far more effective than CO2 in trapping heat in the atmosphere.[55]

Warmer temperatures are effecting water systems and terrestrial habitats. Increased runoff from melting snow and earlier spring peak discharge not only threatens flooding, but alter the temperature and quality of glacier-fed lakes and rivers.[56] These changes in hydrology, in turn, have consequences upon aquatic plants and animals.[57] Global warming is also triggering spring-time events to occur earlier than normal. Earlier spring and warmer temperatures are forcing some animal species to migrate northward in

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[50] Id. at 16.

[51] Id. at 15.

[52] Id. at 43.

[53] IPCC Working Group I Report at ES-17.

[54] Exhibit 16, Hansen Testimony at 37.

[55] Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005, EPA #430-R-07-002, April 2007, ("EPA Inventory 1990-2005") at ES-8.

[56] IPCC Working Group II Report at ES-8.

[57] Id.

attempt to stay within their natural climate.[58] Animal species living in polar climates are not so lucky, as their habitats are shrinking with no possibility of moving northward. For example, the U.S. Fish and Wildlife Service has proposed to list the polar bear as a threatened species under the Endangered Species Act because global warming its destroying its critical habitat, Arctic sea ice.[59] Projected changes in future sea ice conditions, if realized, will result in loss of approximately 2/3 of the world's current polar bear population by the mid 21st century. Because the observed trajectory of Arctic sea ice decline appears to be underestimated by currently available models, this assessment of future polar bear status may be conservative.[60] In general, approximately 20-30% of plant and animal species are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5 degrees C to 2.5 degrees C.[61]

In addition to the evolving changes in hydrology and terrestrial climates, our planet has recently experienced and will continue to experience an increase in number and severity of extreme weather events. As global warming increases, the risks associated with catastrophic natural disasters, such as hurricanes, tornados, and tsunamis, also increase.[62] One study predicts an 8% to 16% average increase in intensity of hurricanes.[63] Another study predicts similar results for tornadoes and thunderstorms, with the most severe storms occurring more often.[64]

Numerous additional environmental impacts are likely to occur as a result of climate change.[65] These impacts include:

- 10-30% decreases in annual average river runoff and water availability in some dry regions at mid-latitudes and in the dry tropics;

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[58] Id.; Exhibit16, Hansen Testimony at 7.

[59] U.S. Dept of Interior, Fish & Wildlife Service, "12-Month Petition Finding and Proposed Rule To List the Polar Bear (Ursus maritimus) as Threatened Throughout Its Range," 72 Fed. Reg. 1064 (Jan. 9, 2007).

[60] United States Geological Survey, "Science to Inform U.S. Fish & Wildlife Service Decision Making on Polar Bears: Executive Summary," online at http://www.usgs.gov/newsroom/special/polar_bears/docs/executive_summary.pdf.

[61] IPCC Working Group II at ES-11.

[62] See, e.g., Exhibit 18, Emanuel, K., Increasing destructiveness of tropical cyclones over the past 30 years, *Nature*, online publication; published online 31 July 2005 **|** doi: 10.1038/nature03906 (2005); Exhibit 19, Knutson, T. K., and R. E. Tuleya, 2004: Impact of CO2-induced warming on simulated hurricane intensity and precipitation: Sensitivity to the choice of climate model and convective parameterization. *Journal of Climate*, 17(18), 3477-3495.

[63] Exhibit 19, Knutson, T. K., and R. E. Tuleya, 2004: Impact of CO2-induced warming on simulated hurricane intensity and precipitation: Sensitivity to the choice of climate model and convective parameterization. *Journal of Climate*, 17(18), 3477-3495

[64] Exhibit 20, Del Genio, Yao, and Jonas, Geophysical Research Letters, v.34, L16703, doi:10.1029/2007GL030525, 2007.

[65] IPCC Working Group II Report.

- Declines in water supplies stored in glaciers and snow cover, which approximately one-sixth of the world relies at least in part on for water;
- Decreased snowpack, more winter flooding, and reduced summer river flows in western North America, exacerbating competition for over-allocated water resources;
- Increased drought, coupled with increased heavy precipitation events that augment flood risks;
- Impacts to North American forests from increased pests, droughts, and fires;
- Agricultural disruption from increased droughts and heat, and declining water availability in some areas;
- Widespread coral mortality and negative impacts on their dependent species from increased temperature and acidification of the oceans;
- Loss of coastal wetlands and habitats from rising sea levels.

Public health is closely linked to climate and, therefore, it is not surprising that global climate change is expected to have numerous significant impacts on human health. The U.S. EPA warns:

> Throughout the world, the prevalence of some diseases and other threats to human health depend largely on local climate. Extreme temperatures can lead directly to loss of life, while climate-related disturbances in ecological systems, such as changes in the range of infective parasites, can indirectly impact the incidence of serious infectious diseases. In addition, warm temperatures can increase air and water pollution, which in turn harm human health.[66]

Specificly, human and public health threats from ambient air concentrations of greenhouse gases include:

- Increased heat-related mortalities stemming from dramatic increases in summer heat index values in the Northeast, Southeast, and Midwest;[67]
- Worsening of air quality problems that already impact human health, including increased concentrations of ground-level ozone and particulate

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[66] EPA, Climate Change, Health and Environmental Effects, available at http://www.epa.gov/climatechange/effects/health.html

[67] U.S. Department of State, U.S. Climate Action Report (2002) at 106; *See also,* Patz, "Impact of Regional Climate Change on Human Health," *Nature*, 438, 310-317, *available at* http://www.nature.com/nature/journal/v438/n7066/full/nature04188.html (The World Health Organization estimates climate change causes more than 150,000 deaths annually world-wide, killing a disproportionate amount of children in poor countries.)

matter, exacerbated cardiovascular and pulmonary illnesses, asthma and chronic obstructive pulmonary disorders;[68]

- Increased risk of infectious diseases, including the expansion of the range of malaria and dengue fever, and more favorable conditions for outbreaks of West Nile Virus in the Northeastern U.S.[69]
- Greater casualties from extreme weather events, such as hurricanes, droughts, floods, wildfires and severe storms.[70]

The only reasonable way to address these threats to human health is to address the underlying problem, global warming, as the U.S. public health community is not prepared for multiple, global warming induced, large scale disasters.[71]

Climate change is not limited to arctic regions or people living on the coasts. While global warming is a worldwide phenomenon, the major climate changes associated with global warming – increases in average temperature, and increased incidences of extreme heat, droughts, and heavy rain events – will be experienced throughout Illinois. For example, just a few of the likely impacts of climate change in the Midwest include:[72]

- A 6 to 10 degree increase in average winter temperatures and a 7 to 13 degree increase in average summer temperatures by the end of the century;
- A changing of the climate in to resemble that of northern Arkansas in the summer and southern Ohio in the winter;
- Increased heavy rainstorms and precipitation, yet a drier climate due to increased evaporation from the heat;
- A double or tripling of days in which the temperature exceeds 90 degrees in the Detroit area, and a five to ten fold increase in the number of days in which the temperature exceeds 97 degrees;
- A 1.5 to 8 foot decline in water levels in the Great Lakes and declines in the levels of inland lakes;
- Substantial disruption to agriculture from increased heavy rainstorms, a drier climate, increased heat, and the spread of agricultural pests;

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[68] Exhibit 21, U.S. Department of State, U.S. Climate Action Report (2002) at 107; U.S. Climate Change Science Program, *Analyses of the Effects of Global Change on Human Health and Welfare and Human Systems,* Third Review Draft, at ES-9.

[69] Exhibit 22, EPA, Climate Change, Health and Environmental Effects; Peter C. Frumhoff, *et al*., Confronting Climate Change in the U.S. Northeast: Science, Impacts, and Solutions (July 2007).

[70] U.S. Climate Change Science Program, *Analyses of the Effects of Global Change on Human Health and Welfare and Human Systems,* Third Review Draft, at ES-4.

[71] Exhibit 23, "Dr. Kristen Welker-Hood Direct Testimony," In re Interstate Power and Light Company, before the Iowa Utilities Board, Docket No. GCU-07-01, at 5,

[72] National Conference of State Legislatures (Oct. 2008); U.S. Global Climate Change Research Program, *Climate Change Impacts on the United States*, ch. 6 (2001).

- Disruption of the shipping industry, including the need for costly dredging, as a result of declining Great Lakes water levels; and
- Significant drain on public sector budgets, as infrastructure such as sewers and waste-water treatment plants will have to be upgraded to handle heavy precipitation events, and other areas will have to take steps to deal with droughts.

Additionally, U.S. EPA's endangerment finding agrees with and adds to many of these findings. EPA found, among other things:

> Concentrations of greenhouse gases are at unprecedented levels compared to the recent and distant past. These high atmospheric levels are the unambiguous result of human emissions, and are very likely the cause of the observed increase in average temperatures and other climatic changes. The effects of climate change observed to date and projected to occur in the future—including but not limited to the increased likelihood of more frequent and intense heat waves, more wildfires, degraded air quality, more heavy downpours and flooding, increased drought, greater sea level rise, more intense storms, harm to water resources, harm to agriculture, and harm to wildlife and ecosystems—are effects on public health and welfare within the meaning of the Clean Air Act.
>
> …
>
> Warming of the climate system is now unequivocal, as is evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.
>
> Global mean surface temperatures have risen by 0.74 °C (1.3 °F) over the last 100 years. Eight of the ten warmest years on record have occurred since 2001. Global mean surface temperature was higher during the last few decades of the 20th century than during any comparable period during the preceding four centuries.
>
> Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.
>
> …

Based on the total weight of evidence… it is the Administrator's judgment that current and projected levels of the mix of the six greenhouse gases endanger the public health and welfare of current and future generations.

…

Drought is expected to increase in the western U.S., where water availability to meet demands for agricultural and municipal water needs is already limited. Another projected impact in the western U.S. is decreased water availability due to a range of interconnected factors.

…

Rising sea levels could lead to salt water intrusion of coastal ground aquifers, which would further reduce freshwater availability for municipal and agricultural use among coastal communities that depend on these aquifers.

…

The U.S is projected to see an overall average increase in the intensity of precipitation events, which is likely to increase the risk of flood events, though projections for specific regions are very uncertain.

…

Increases in regional ozone pollution in the U.S. relative to ozone levels without climate change are expected due to higher temperatures and a modification of meteorological factors.

…

The IPCC reports with very high confidence that climate change impacts on human health in U.S. cities will be compounded by population growth and an aging population. The CCSP reports that climate change has the potential to accentuate the disparities already evident in the American health care systems as many of the expected health effects are likely to fall disproportionately on the poor, the elderly, the disabled, and the uninsured.

Within settlements experiencing climate change stressors, certain parts of the population may be especially vulnerable based on their circumstances. These include the poor, the elderly, the very young, those already in poor health, the disabled, those living alone, those with limited rights and power (such as recent immigrants with limited English skills), and/or indigenous populations dependent on one or a few resources.

…

As heavy rainfall events are expected to become more intense, there is an increased risk of flooding, greater runoff and erosion, and thus the potential for adverse water quality effects. Climate change will likely further constrain already over-allocated water resources in some sections of the U.S., increasing competition among agricultural, municipal, industrial, and ecological uses.

…

In the Great Lakes and major river systems, lower levels are likely to exacerbate challenges relating to water quality, navigation, recreation, hydropower generation, water transfers, and binational relationships. Higher water temperatures, increased precipitation intensity, and longer periods of low flows can exacerbate many forms of water pollution. Decreased water supply and lower water levels are likely to exacerbate challenges relating to navigation in the U.S.

…

Ocean acidification is projected to continue, resulting in the reduced biological production of marine calcifiers, including corals.

…

The Administrator concludes that, in the circumstances presented here, the case for finding that greenhouse gases in the atmosphere endanger public health and welfare is compelling and, indeed, overwhelming. The scientific evidence described here is the product of decades of research by thousands of scientists from the U.S. and around the world. The evidence points ineluctably to the conclusion that climate change is upon us as a result of greenhouse gas emissions, that climatic changes are already occurring that

> harm our health and welfare, and that the effects will only worsen over time in the absence of regulatory action. The effects of climate change on public health include sickness and death. It is hard to imagine any understanding of public health that would exclude these consequences. The effects on welfare embrace every category of effect described in the Clean Air Act's definition of ''welfare'' and, more broadly, virtually every facet of the living world around us. And, according to the scientific evidence relied upon in making this finding, the probability of the consequences is shown to range from likely to virtually certain to occur. This is not a close case in which the magnitude of the harm is small and the probability great, or the magnitude large and the probability small. In both magnitude and probability, climate change is an enormous problem. The greenhouse gases that are responsible for it endanger public health and welfare within the meaning of the Clean Air Act.

74 Fed. Reg. 18886, 18895-96, 18898-904 (April 24, 2009).

Therefore, increases greenhouse gas emissions from the proposed facility here "alone or in combination with other sources" will result in "the presence in the atmosphere of . . . air contaminants in sufficient quantities and of such characteristics and duration as to be injurious . . ." IEPA may not issue a permit that will cause additional injury to human health and the health of animal and plant life. Pursuant to 42 U.S.C. § 7475(a)(3)(A), (C), IEPA cannot issue a PSD permit for the facility unless and until the applicant demonstrates that emissions from the facility will not cause or contribute to air pollution in violation of this SIP-approved standard. Notably, the lime industry proposed steps to reduce greenhouse gas emissions more than 7 years ago.

16. The PM, PM10 and PM2.5 Emission Factors Used For Modeling Are Erroneous

The application in this case contains various emission factors for fugitive sources of particulates. Those estimates include assumptions of very high levels of controls, which the applicant apparently assumes can be achieved at all hours. For example, in Appendix C to the Application, the applicant identifies numerous fugitive emission points and assumes emission control of 75-99%. Those "controlled" emission rates were then used for modeling.

However, the emission control percentages have no apparent basis. In fact, they far overstate any possible emission control than can be assured (and be enforceable) over all periods of operation. Dust emissions from unpaved roads, as well as possible control approaches, have been widely studied. Using watering as a control technique will typically yield short-term unpaved road dust control efficiencies on the order of 50%. These studies are documented as follows:

- The Midwest Research Institute reports short-term 50% control for a water application intensity of about 0.2 gallon/yd^2/hour.[73]
- The 50% figure is presented in Fugitive Emissions and Controls, which also lists 60 to 80% controls for non-water wetting agents, and 85-90% control efficiencies for paving and sweeping.[74]
- The South Coast Air Quality Management District suggests control efficiencies of 34 to 68% for watering of unpaved roads.[75]
- The WRAP Fugitive Dust Handbook lists control efficiencies of 10% to 74% for watering of unpaved roads.[76]

Note that these are all short-term control efficiencies measured immediately after application of water. In short, we cannot find any support for the emission factors used for emission control for the emission points identified in Application Appendix C. Moreover, the emission data we can find outside the record demonstrates that the control efficiencies assumed for this permit are both too high (showing too little of the likely emissions) and not achievable over longer periods of time (e.g., longer than a few minutes or hours). Since these sources have the highest impact on the modeling results for particulates, the fact that there is nothing in the record to support any of these control efficiencies is concerning, as is the fact that the evidence we've found outside the record contradicts IEPA and the applicant's assumption.

Moreover, all emission control efficiencies assumed by IEPA depend on very high moisture content and water application. Unless water will be applied continuously (which is not even possible because of freezing conditions during at least 1/3 of the year in Illinois), even the best emission controls (which are still less effective than those that IEPA assumes) cannot be ensured. Moreover, the draft permit contains no enforceable permit conditions setting minimum moisture, minimum silt loading, or any of the other assumptions made in the applicant's Appendix C. Yet, if those conditions assumed in the

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[73] C. Cowherd, G. E. Muleski, and J. S. Kinney, Final Report: Control of Open Fugitive Dust Sources, Midwest Research Institute, September 1988, p.5-10.

[74] Howard Hesketh and Frank Cross, Fugitive Emissions and Controls, Ann Arbor Science, 1983, p. 42.

[75] South Coast Air Quality Management District, CEQA Air Quality Handbook, April 1993, pp. 11-15.

[76] Western Governor's Association, WRAP Fugitive Dust handbook, November 15, 2004, p. 3.

application are not present (and are not made enforceable) they do not represent worst case conditions and cannot be relied upon for modeling NAAQS and increment consumption.

IEPA must, at a minimum, provide a basis for the assumed control efficiencies for the various emission points other than the kilns (e.g., Application Appendix C) and do one of the following before issuing the permit:

(1) Model worst case emissions, assuming worst case silt, worst case moisture, worst case vehicle weight, worst case vehicle miles traveled, worst case vehicle weight, and worst case speed; or
(2) Establish enforceable limits for each of those factors, including sufficient monitoring and recordkeeping, to ensure that the modeling done does represent worst-case conditions.

17. The Air Quality Modeling Used Data do not Meet EPA's Meteorological Monitoring Guidance for Regulatory Modeling Applications

For air dispersion modeling purposes, airport data such as that used for the permit here are among the least desirable. Problems with location and the general quality of data are the primary concerns. The USEPA, in their Meteorological Monitoring Guidance for Regulatory Modeling Applications, summarizes these concerns about using airport data:

> For practical purposes, because airport data were readily available, most regulatory modeling was initially performed using these data; however, one should be aware that airport data, in general, do not meet this guidance.[77]

The use of antiquated airport data was initially used for simpler Gaussian dispersion models such as ISCST, ISCST2, and even ISCST3. It was also used for older, less-refined models such as MPTER, CRSTER, and COMPLEX-I/II. The key word is *initially*. Any regulatory agency, IEPA included, should be aware that continuing this outdated practice will lead to flawed air impact analyses.

This concern is particularly true here, as the kiln site modeling uses the newer AERMOD dispersion model. AERMOD requires specific parameters to characterize boundary layer and upper air dispersion in a meaningful fashion. The data collected at the Rockford Airport are simply inadequate to provide AERMOD with the required parameters

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[77] USEPA, Meteorological Monitoring Guidance for Regulatory Modeling Applications, EPA-454/R-99-05, February 2000, p. 1-1.

needed for realistic dispersion calculations. Just because one can run AERMOD with airport data does not imply that one should do so.

The major issue is the quality of the meteorological data used for this permit. It is important to remember that the airport data are not collected with the thought of air dispersion modeling in mind. For example, the airport data used here include meteorological parameters that were reported once per hour, based on a single visual observation (usually) taken in the last ten minutes of each hour. The USEPA recommends that sampling rates of 60 to 360 times per hour, at a minimum, be used to calculate hourly-averaged meteorological data.[78] Air dispersion modeling requires hourly-averaged data, which represents the entire hour being modeled, and not the once-per-hour snapshot represented by airport data.

In addition, the airport data used were not subject to the system accuracies required for meteorological data collected for air dispersion modeling. The USEPA recommends that meteorological monitoring for dispersion modeling use equipment that are sensitive enough to measure all conditions necessary for verifying compliance with the NAAQS and PSD increments. For example, low wind speeds (less than or equal to 1.0 meter per second) are usually associated with peak air quality impacts – this is because modeled impacts are *inversely* proportional to wind speed. Following USEPA guidance, wind speed measuring devices (anemometers) should have a starting threshold of 0.5 meter per second or less.[79] And the wind speed measurements should be accurate to within plus or minus 0.2 meter per second, with a measurement resolution of 0.1 meter per second.[80]

The airport data used in the modeling here, rather than being measured in 0.1 meter per second increments, are based on wind speed observations reported in whole knots. This is evidenced by examining the meteorological data files. Every modeled hourly wind speed in these data sets is an increment of whole knots. The once-per-hour observations at the Rockford Airport (in whole knots, no fractions or decimals) are simply converted to meters per second and can therefore be back-converted to the whole knot measurements originally reported by the airport.

To further exemplify the problem of using airport data, the meteorological data files from the airport include an unacceptably large percentage of calm hours. Typically, when properly measured with modern anemometers, there are only a few calm hours in a

78 Id., p. 4-2.

79 Id., p. 5-2.

80 Id., p. 5-1.

meteorological data base per year, whereas the data used here include thousands of calm hours.[81]

In AERMOD, calms are identified when the reported wind speed is 0.0 meter per second. At airports, any wind speed less than three knots (1.54 meters per second) are automatically regarded as calm, even if the wind is not entirely still. The purpose of this reporting procedure is simple: winds less than three knots do not pose a concern for pilots, so airports identify all low wind speed conditions as calm. The problem with using these data for air permitting, however, is that the best wind conditions for landing and take offs (low wind speeds) are the worst-case conditions for air modeling impacts. Using airport data that show no periods with wind speeds less than three knots results in a bias of under-predicted highest modeled air impacts. This is particularly true for low-level fugitive PM_{10} emissions, which are widely present at the site at issue here.[82]

Without a doubt, the conditions most crucial for verifying compliance with the NAAQS and PSD increments (low wind speeds) are excluded from the modeling analysis for this permit because of the use of airport data. This is particularly disconcerting here, given that AERMOD is designed to handle wind speeds less than one meter per second, but the model has not been put to this full use. Excluding the calm hours from modeled concentrations favors the project proponent and is in appropriate given the improved capabilities of AERMOD.

Sensitive and accurate measurements of wind speeds are necessary for measuring winds down to 0.5 meter per second (about one knot), which can then be used as valid hours in the air dispersion modeling analyses. There would be no need to label such low wind speed hours as calm, which will greatly increase the number of hours included in the modeling analyses. It is these low wind speed hours that must be included in the modeling data set for realistically verifying compliance with the NAAQS and PSD increments.

In addition to excluding the worst-case air quality conditions (calm hours), the airport data set has many missing hours. Together, the calm and missing hours make up a significant percentage of the total data set used for modeling. To make matters worse, the data that are used for the analyses were sanitized of the *very wind conditions that cause the highest modeled impacts*.

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

[82] Scire, Joseph S., Comments on the 9th Conference on Air Quality Modeling, Research Triangle Park, North Carolina, October 9-10, 2008.

Using low-quality airport meteorological data for modeling major sources of air pollutants, such as Mississippi Lime's proposed plant, must not be allowed. IEPA should require the facility to collect at least one-year of site-specific meteorological data consistent with USEPA Meteorological Monitoring Guidance for Regulatory Modeling Applications.

18. Additional Comments

Permit Term	Comment
Finding 3.c.Note	Greenhouse gases are pollutants that are subject to regulation under the Act. As the U.S. EPA has determined, they will be subject to regulation no later than January 3, 2011. (Sierra Club contends that they have been subject to regulation for some time already). Since the final permit decision will not be made for some time after January, 2011, IEPA must conduct a BACT analysis and other impact analyses for greenhouse gases and set stringent, enforceable emission limits for those pollutants. Additionally, because the addition of greenhouse gas BACT analyses and limits will be a significant change to the permit, IEPA must provide an opportunity for the public to comment on the analysis and the limits. The Clean Air Act requires public comment on all BACT analyses and that has not been provided for greenhouse gases. Moreover, that statement appears inconsistent with Condition 2.1.3-2. While IEPA is clear that those limits are not intended to represent BACT, it is also clear that the permit clearly limits emissions of CO2—thus constituting regulation of CO2 and requiring BACT limits.
Condition 1.3.b.	The emission monitoring for this condition is inadequate. Method 9 is only conducted infrequently and cannot be conducted at night, or when weather or light conditions are not appropriate. The permit must ensure continuous compliance. Therefore, the permit should provide adequate monitoring to ensure compliance at all periods, including at night. For example, since continuous emissions monitors are required for opacity, IEPA should clarify that those

	continuous opacity monitoring systems can be used to ensure compliance with the limit in Condition 1.3.b. The condition should also provide the language from 35 IAC 212.123(b), providing that: • emissions can never exceed 60% opacity; • emissions greater than 30% cannot occur for more than 8 minutes in any 60 minute period; • no two or more emission points can exceed 30 % opcity at the same time; and • that emissions greater than 30% opacity cannot occur more than three times in any 24-hour period. The permit should also clarify that the facility does not quality for 212.124(d) because the plant is subject to limits pursuant to section 111 and 112 of the Clean Air Act. Additionally, the phrase "except as allowed by 35 IAC 212.123(b) and 212.124" implies that opacity can exceed 30% when certain conditions set forth in 212.123(b) are met or when conditions in 212.124 are met. However, the permit does not include adequate monitoring to determine the following facts, each of which is necessary to determine whether any of the exceptions in 212.123(b) or 212.124 are met: The opacity emissions during each aggregate 8-minute period; That emissions above 30% are not simultaneously occurring at more than one emission unit located within 305 meters; A definition of startup, malfunction, and breakdown and monitoring and recordkeeping to determine whether any of those conditions is present.
Condition 1.3.c.; Condition 2.2.3-4.a.; Condition 2.4.3-3.	The permit must have specific monitoring requirements for these conditions to ensure that it is practicably enforceable by US EPA, IEPA and citizens. The permit condition, as currently drafted and lacking that specificity, is insufficient. *See McEvoy v. IEI Barge Services*, 622 F.3d 671, 679 (7th Cir. 2010). IEPA should, indeed must, provide the clarity required by the Seventh Circuit regarding how compliance with this limit should be measured in order for it to be

	enforceable.
Condition 1.10	This condition must be revised to ensure that IEPA may only supplement the requirements for recordkeeping and reporting established in the permit to make them more stringent. Conditions created in a Title I permit, such as a PSD permit, cannot be removed or made less stringent through a Title V (CAAPP) permit.
Condition 2.1.3-3.a.	This condition should specify which requirements in 40 CFR 63, Subpart AAAAA "and related provisions in 40 CFR 63, Subpart A, General Provisions" apply. This is especially important because IEPA includes one such requirement in Condition 2.1.3-3.a.ii., which could be misinterpreted to mean that only that provision applies. In fact, numerous additional requirements apply that IEPA has not identified. For example, visible emission standards in subpart AAAAA are not included in the permit but must be.
Condition 2.1.3-3.b.ii.	This condition must be revised to read: the particulate matter emissions of the affected kilns,… shall each not exceed 15 percent opacity **or** 0.30 kilograms per megagram…" Absent this revision, the permit could be misinterpreted to mean that a violation only occurs when the facility is being stack tested and there is a violation of both the 15% opacity limit and the mass limit for PM. In fact, a violation occurs at any time that the 15% opacity limit is exceeded.
Condition 2.1.3-3.b.ii.	The permit lacks sufficient monitoring and recordkeeping to determine when and if startup, shutdown or malfunction conditions are occurring. The limit purports to exempt those periods, but the permit contains no monitoring or reporting sufficient for the IEPA, U.S. EPA or the public to know whether excess emissions claimed to occur during startup, shutdown or malfunction truly occurred during one of those periods. Startup is defined as the "setting in operation of an affected facility for any purpose." Monitoring and recordkeeping sufficient to determine if excess emissions are caused by startup includes, at a minimum: • The first action that begins the process of "setting in operation of an affected facility" • The last moment when the operate is "setting in

	operation" and after which the process is "in operation." • The beginning and ending period of time for each event of "setting in operation". Shutdown is defined as "cessation of operation of an affected facility for any purpose." Monitoring and recordkeeping sufficient to determine if excess emissions are caused by shutdown includes, at a minimum: • The first action that begins the process of "cessation of operation of" the facility • The last moment when the "cessation of operation" ends • The beginning and ending period of time for each event of "cessation of operation". Malfunction is defined as "any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner." Additionally, the definition provides that "[f]ailures that are caused in part by poor maintenance or careless operation are not malfunctions." To determine whether excess emissions are attributable to malfunction, sufficient monitoring must, at a minimum, allow determination of: • The cause of the malfunction event (including whether of air pollution control equipment, process equipment, or a process); • The frequency of the specific malfunction event; • What steps are taken to prevent the specific malfunction event; • Whether all possible maintenance and operational steps were taken to prevent the specific malfunction event.
Condition 2.1.8-3.a.	This condition must also require monitoring of lime leaving the kiln. The BACT limits are set as pounds of emissions per unit of lime, but the monitoring only requires measuring limestone entering the kiln.
Condition 2.2.3-2.b.	This condition must specify which emission sources are subject to these requirements. The phrase "other affected units that are not subject to the NSPS or NESHAP shall comply" is too vague to be practicably enforceable. IEPA must, at a minimum, identify which

	units are affected by a NSPS and by a NESHAP standard and, consequently, which are covered by the limits in Condition 2.2.3-2.b. Additionally, there is no apparent basis in the permit or the Project Summary for the limits in Condition 2.23-2.b. It is not clear what the statutory basis is for these limits. Nor, to the extent they are intended to be BACT, MACT or another case-by-case limit, is there any basis in the record for IEPA's development of these limits. IEPA must provide the regulatory basis as well as the analysis behind these limits and allow for new public comment opportunity. Moreover, if these are intended to be limits for pollutants other than (or in addition to) PM—for example as using PM as a surrogate—IEPA has provided no for surrogacy. Lastly, there is no monitoring frequency required nor an identification of even which emission units must be monitored to ensure compliance with these limits.
Condition 2.2.3-3.a. and b.	These limits must specify which emission points at the facility must comply with which limits. The condition is too vague to be practicably enforceable. By merely asserting that "certain affected units" are covered and giving a vague list of examples ("i.e., crushers, grinding mills, screening operations…") IEPA has not ensured that each affected emission point is required to comply with each applicable limit, nor that the appropriate monitoring is required for each emission point.
Condition 2.2.3-4.b.	This condition requires monitoring and reporting sufficient to ensure continuous compliance during all periods of operation. There is no apparent monitoring required, much less monitoring that is sufficient to ensure continuous compliance. To the extent that the one-time opacity monitoring in Condition 2.2.7-1 is intended to be monitoring for this condition, that monitoring is insufficient. First, it occurs only once unless IEPA makes a written request. This is simply insufficient to determine compliance with continuous emissions during all hours of operation, and all operating conditions, for the life of the plant. Second, there is no correlation in the record (or anywhere else)

	between opacity from any of the emission points and mass emissions of any pollutant. Therefore, there is no basis to determine compliance with anything other than an opacity limit by measuring opacity. This does not mean that no correlation is possible—only that the IEPA has not made any correlation in the record. Similarly, if the once-per month monitoring in Condition 2.2.7-2 is intended to ensure continuous compliance it is also deficient. First, there is no basis in the record (nor is it possible to provide such a basis) for a conclusion that a once per month observation is representative of all hours of operation, and all operating conditions. Second, again, there is no correlation in the record between opacity from these sources and a mass emission rate.
Condition 2.2.6.a.	There is no apparent monitoring required for these limits. Each limit must be combined with adequate monitoring, recordkeeping and reporting to ensure that each limit is being complied with during each hour. This is not only necessary to ensure practicable enforceability, but to ensure that the modeling that was done to ensure compliance with NAAQS and increments reflects the true worst case conditions. Limits with no monitoring or with insufficient monitoring cannot ensure that the limits are representative and, therefore, that the modeling is representative of the source's operations. To the extent that the one-time opacity monitoring in Condition 2.2.7-1 or the once-per-month monitoring in 2.2.7-2 is intended to be monitoring for this condition, that monitoring is insufficient for the reasons set forth above.
Conditions 2.2.11, 2.3.11	This condition is unlawful and must be removed. The IEPA must review the specific facility being proposed, and the public must be given the opportunity to review and comment on the specific facility being proposed. A blanket condition providing that the permittee may construct something other than what was specifically proposed, specifically reviewed by IEPA, and specifically reviewed and commented on by the public circumvents the permitting process. IEPA has provided no legal basis for this provision. In

	fact, this provision violates the Clean Air Act and 40 C.F.R. § 52.21.
Condition 2.3.3-2, 2.3.6	There is no identified legal basis in the permit or the Project Summary for the limits in these conditions. It is not clear what the statutory basis is for these limits. Nor, to the extent they are intended to be BACT, MACT or another case-by-case limit, is there any basis in the record for IEPA's development of these limits. IEPA must provide the regulatory basis as well as the analysis behind these limits and allow for new public comment opportunity. Moreover, if these are intended to be limits for pollutants other than (or in addition to) PM—for example as using PM as a surrogate—IEPA has provided no for surrogacy. Lastly, there is no monitoring frequency required nor an identification of even which emission units must be monitored to ensure compliance with these limits. The only general monitoring requirements are too vague, and too infrequent to know whether and when monitoring is required and how it is to be conducted. Moreover, there is no basis in the permit for any finding (to the extent IEPA intended to make one) that generally "conduct[ing] opacity observations" is sufficient to ensure continuous compliance with the limits, or that it can determine the mass emission rates set forth (i.e., in pounds per hour and tons per year). There is no basis given for the limits, the monitoring frequency, the monitoring method, or the connection between the monitoring and the underlying limits.
Conditions 2.4.1., 2.4.2., 2.4.3-2	This condition requires compliance with a fugitive dust control plan. However, that plan is not in the draft permit materials that was made available to the public and the public has had no opportunity to review it. Nor has IEPA apparently reviewed. IEPA must review and specifically approve the plan, and the public must be given notice and an opportunity to review and comment on the plan as part of the current permitting action. IEPA must, at a minimum, provide the plan to the public and allow an opportunity to comment on it; and approve and specifically incorporate the plan into the permit.
Condition 2.4.3-2	There is no identified legal basis in the permit or the

	Project Summary for the limits in these conditions. It is not clear what the statutory basis is for these limits. Nor, to the extent they are intended to be BACT, MACT or another case-by-case limit, is there any basis in the record for IEPA's development of these limits. IEPA must provide the regulatory basis as well as the analysis behind these limits and allow for new public comment opportunity. Moreover, if these are intended to be limits for pollutants other than (or in addition to) PM—for example as using PM as a surrogate—IEPA has provided no basis or record for surrogacy. There is no monitoring frequency required nor an identification of even which emission units must be monitored to ensure compliance with these limits. The only general monitoring requirements are too vague, and too infrequent to know whether and when monitoring is required and how it is to be conducted. Moreover, there is no basis in the permit for any finding (to the extent IEPA intended to make one) that generally "conduct[ing] opacity observations" is sufficient to ensure continuous compliance with the limits, or that it can determine the mass emission rates set forth (i.e., in pounds per hour and tons per year). There is no basis given for the limits, the monitoring frequency, the monitoring method, or the connection between the monitoring and the underlying limits. Additionally, IEPA exempts periods when there is snow or ice buildup. There is no emission control during those periods of time. However, the ambient air quality modeling and increment modeling done assumes a constant high control efficient that assumes continuous application of water for dust control efficiencies at the level assumed in the emission factors assumed. Those control efficiencies cannot be met (if ever) when continuous water spraying is not used.
Condition 2.4.5.	This requirement is not enforceable as written. The requirement states that the permittee must follow practices that achieve "very effective and effective control of dust, respectively (nominal 90 percent for paved units and 75 percent control for other untis)."

	First, there is not regulatory basis given for this requirement. If it is intended to represent BACT, there was no top down analysis (or equivalent) to identify which control operations were top-ranked and used to determine these levels of control. Second, there is no basis in the record for any determination that these control efficiencies are achievable, much less on a continual basis (including periods when the source is not required to spray water, such as during snow or ice conditions). Third, there is no monitoring in the permit to be able to determine whether these control efficiencies are being met. How will IEPA (or U.S. EPA or citizens) know if control measures are achieving 80% control or 90% control on paved surfaces? Fourth, the control efficiencies in Appendix C to the application have not factual basis. There are merely assertions of 90% and 75%, and are applied to emission factors from AP-42 that are inappropriate to use to establish site-specific emissions and, further, that are calculated as long-term (annual) emissions and not daily or hourly emission rates. Fifth, a number of factors all must be present simultaneously for the emissions to be within the range being modeled. First, the control efficiency must be met (and there is no basis in the record for any of them), second the silt and moisture content must be exactly as assumed in the calculation, third the operating conditions (truck speed, truck weight, etc) must be exactly as assumed in the calculation. At a minimum, after making a specific record for each, the permit must include limits and monitoring for each of these various inputs. The general requirements to monitor some of these variables in Conditions 2.4.8-2 and 2.4.9 are not sufficient because there is no connection between the monitored values and emission rates, nor to specific percentage reductions (from an undefined baseline). Moreover, monitoring silt loading only once per month in insufficient to ensure that the silt loading is always below an apparently assumed (but not identified in the

	permit or anywhere in IEPA's permit basis) silt loading level. Truck traffic and weather affect silt loading on a short term basis and silt loading can change dramatically over the course of several hours. Measuring only every 30 days does not ensure continuous compliance. Moreover, it invites the permittee to measure silt immediately after a street sweeping—which may happen very infrequently—thereby providing no basis from which to assess representative conditions that occur during the interim period between sweeping.
Condition 2.4.4.a.	The provision in 35 Ill. Admin. Code § 212.321 must be applied and there must be sufficient monitoring and reporting added to the permit. Alternatively, if the storage piles and roadways are too disperse to reasonably allow for mass emission limits, IEPA cannot assume such mass limits for purposes of NAAQS and increment modeling as it has done here. IEPA's apparent assumption of constant enforceable emission limits on the emission points in Condition 2.4.2—which were used to model purportedly worst case emissions— and establishing limits in Condition 2.4.6a., are inconsistent with IEPA's assertion in condition 2.4.4.a. that the emissions from these same emission points are too disperse to reasonably apply the mass emission rate limits in 212.321. Either the emission rates IEPA assumed as worst case for purposes of modeling (which included impossibly optimistic constant control efficiencies) are enforceable and usable for modeling, or the emissions are too disperse to be able to apply lb/hour limits from 35 Ill. Admin. Code 212.321. It cannot be both.
Other	There is no enforceable limit on VOCs (VOM) to ensure that the plant is a minor source. There must be an enforceable limit and representative emission monitoring to ensure minor source status. This is missing from the permit

CONCLUSION

For all of the above reasons, we respectfully request that the Illinois Environmental Protection Agency fulfill its duty to protect the health and environment of Illinois' residents by denying this permit.

Submitted this 18th day of December, 2010.

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Enclosures