



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

JUL 17 2014

Mr. Ray Pilapil
Bureau of Air
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, Illinois 62794-9276

Dear Mr. Pilapil:

The U.S. Environmental Protection Agency has reviewed the draft Prevention of Significant Deterioration (PSD) permit No. 13060007 (Draft Permit) proposed by the Illinois Environmental Protection Agency (IEPA) for Cronus Chemicals, LLC, located at 765 East U.S. Highway 36 near Tuscola, Douglas County, Illinois. The proposed facility is a urea and ammonia manufacturing plant that includes reformer furnaces, flares, a natural gas-fired boiler and multiple ancillary operations. The project triggers PSD review under 40 C.F.R. § 52.21 for emissions of Nitrogen Oxides (NO_x), Carbon Monoxide (CO), Volatile Organic Compounds (VOC or VOM), Particulate Matter (PM, PM₁₀ and PM_{2.5}) and Greenhouse Gases (GHGs).

EPA has the following comments on the Draft Permit:

- 1. The permit conditions limiting the Potential to Emit (PTE) of Hazardous Air Pollutant (HAP) emissions to below major source thresholds appear to be inadequate for effectively limiting PTE.**

The Draft Permit includes HAP emission limits in Condition 2.1.6(a) (individual HAP limit for the ammonia plant; no total HAP limit); Condition 2.2.6(a) (individual and total HAP limits for the reformer furnace); Condition 2.3.6(a) (individual and total HAP limits for the boiler); Condition 2.4.6(a) (total HAP limit for the startup heater; no individual HAP limit); Condition 2.8.6(a) (total HAP emissions from equipment leaks; no individual HAP limit); Condition 2.11.5(a) (total HAP emissions from emergency generator engines; no individual HAP limit); and Condition 2.11.5(a) (total HAP emissions from fire pump engines; no individual HAP limit). Condition 1.5 suggests that these HAP emission limits are designed

to ensure that the facility is not a major source of HAPs. However, the Draft Permit does not include a limit on HAP emissions from the urea plant even though the permit record indicates that HAP emissions from the urea plant could potentially be higher than HAP emissions from the startup heater, emergency generator engines, equipment leaks and the fire pump engines combined. The Draft Permit also does not include a limit on total HAP emissions from the ammonia plant.

To ensure that the facility-wide restriction on HAP emissions is practically enforceable, the permit should:

- a. include a limit on total HAP emissions from the ammonia plant along with requirements for monitoring continuous compliance with that limit;
- b. include a limit on total HAP emissions from the urea plant along with requirements for monitoring continuous compliance with that limit;
- c. specify how the Permittee will calculate HAP emissions; e.g., using emission factors derived from stack testing, or other specified method. As currently written, the Draft Permit requires the Permittee to keep a file containing the emission factors that it uses to calculate emissions, with supporting documentation, but neither the Project Summary nor the Draft Permit specifies the emissions calculation methodology, emission factors or emission factor sources that the source is expected to use when calculating emissions. *See*, for example, Conditions 2.1.9-2(d), 2.2.9(g)(ii), 2.3.9(g)(ii) and similar conditions;
- d. require the Permittee to calculate, on at least a monthly basis, emissions of HAPs from each emission unit.

2. EPA has concerns with the GHG Best Available Control Technology (BACT) determination in Condition 2.1.2-3.

Conditions 2.1.11(a)(i) and (iii) state that the GHG BACT limit in Condition 2.1.2-3¹ “shall be lowered based on actual operation and emissions of the facility unless the Permittee demonstrates and the IEPA concurs, based on an evaluation as provided pursuant Condition 2.1.11(b), that the resulting limit cannot be reliably met without unacceptable consequences, i.e., inability to comply with other emission limits or requirements or significant risk to

¹ Condition 2.1.2-3 sets a single GHG BACT limit (tons of carbon dioxide (CO₂) equivalents (CO₂e) per year) for combined emissions from the primary reformer furnace, the auxiliary boiler, the CO₂ vent in the ammonia plant and from the CO₂ vent in the urea plant. The limit is an equation that is based on the annual quantities of ammonia sent to the urea plant and to storage for direct sale. In addition, the Draft Permit sets a higher limit during “the shakedown of the facility before commissioning of the facility is complete.”

equipment or personnel, and without unreasonable consequences, i.e., a significant increase in maintenance and repair needed for the facility.” Condition 2.1.11(a)(ii) provides that the GHG BACT limit “shall automatically be lowered” to a specified value if the Permittee fails to conduct the required evaluation or does not complete the evaluation in a timely manner. Pursuant to Condition 2.1.11(b), if the Permittee elects to perform an evaluation for GHG emissions, the evaluation would need to be completed within three years after the date that commissioning of the facility is complete or four years after initial startup, whichever occurs first (extendable by an additional two years). Condition 2.1.11(a)(iii) further provides that if the GHG BACT limit must be revised based on the evaluation, the revision would be performed through a permit revision. EPA has the following comments on these provisions:

- a. EPA recommends that the evaluation period be made mandatory. The permit conditions requiring an evaluation period and potentially a permit revision reflect an uncertainty in the proposed GHG BACT limit. As EPA has previously observed, a BACT re-evaluation is appropriate if it can be determined that errors, faulty data, or incorrect assumptions contained in the original BACT analysis resulted in what may be inappropriate BACT emission levels, and there is no indication that the applicant intentionally acted to misrepresent or conceal data in their original permit application.² EPA also recognizes that in some circumstances, it may be acceptable to establish BACT limits that can be adjusted or optimized as the performance of a technology becomes clearer after a period of operation.³ In this case, the IEPA justifies the evaluation period by pointing to “the lack of data for GHG emission rates of ammonia plants and facilities that are similar to the facility that is proposed.” Project Summary at 25. This lack of data resulted in the uncertainty with the proposed BACT limit. Given the IEPA uncertainty with the BACT limit due to insufficient emissions information, we recommend that the evaluation period not be optional.
- b. The permit should not limit the BACT limit adjustment to the limit specified in Condition 2.1.11(a)(ii). In the Project Summary, the IEPA states that “it would be unrealistic to expect that the actual performance considering the units that combust fuel, i.e., the reformer furnace and boiler, will be 20 percent better than the design performance” (Project Summary at 25) but this assertion does not appear to be supported by actual emissions data or engineering analysis. For this reason, the permit should not limit the BACT revision to the limit specified in Condition

² See Memorandum from Gary McCutchen and Michael Trutna to J. David Sullivan, “Request for Determination on Best Available Control Technology Issues --Ogden Martin Tulsa Municipal Waste Incinerator Facility”; November 19, 1987.

³ See *In re Prairie State Generating Company*, 13 E.A.D. 3, 84-85 (EAB 2006); *In re AES Puerto Rico, L.P.*, 8 E.A.D. 324, 348-350 (EAB 1999); *In re Hadson Power 14-Buena Vista*, 4 E.A.D. 258, 291 (EAB 1992).

2.1.11(a)(ii) since the results of the evaluation may reveal that a lower emission limit is achievable.

3. The permit record does not explain why the IEPA rejected the applicant's proposal to use a Continuous Emissions Monitoring System (CEMS) to monitor CO₂ emissions from the activated methyldiethanolamine (aMDEA) CO₂ vent in the ammonia plant.

To comply with the GHG emission limits for the aMDEA CO₂ vent in the ammonia plant and the pressure relief CO₂ vent in the urea plant, the Draft Permit requires the Permittee to perform representative sampling and analysis "of the CO₂ stream from the regenerator that is emitted through the affected CO₂ vents and other gas streams in the ammonia plant that are or could be vented to the affected flares during startup, shutdown or malfunctions."⁴ This sampling and analysis for CO, VOM, methane, CO₂ and HAP content would be conducted within 60 days after achieving the maximum production rate at which the ammonia plant will be operated but not later than 180 days after initial startup, and upon request. It appears that on-going periodic sampling and analysis is not required. While EPA recognizes that use of a CEMS is not the only way to accurately and reliably monitor compliance in all situations, it is unclear in this instance whether the monitoring methodology that was ultimately included in the permit is as or more accurate and reliable than the methodology proposed by the applicant. As EPA has previously noted, for long-term emissions estimates (such as annual emissions), CEMS data is expected to provide the most accurate emission estimate as emissions are being measured directly over the entire period of interest.⁵ Should the IEPA have a legitimate reason for rejecting the applicant's monitoring proposal, we recommend that the permit include a sampling and analysis frequency that is sufficient to generate data necessary to verify continuous compliance with the applicable limits for GHGs as CO₂e, CO, VOM and HAP content.

4. It is not clear why the CO₂ emissions monitoring methodologies for the reformer furnace and the boiler are significantly different.

As stated above, CO₂ emissions from the reformer furnace will be monitored by CEMS.⁶ Because the boiler will emit nearly as much GHGs as the reformer furnace (i.e., approximately one third of the facility-wide GHG emissions), and the two units are subject to the same BACT limit, it appears reasonable to expect that the CO₂ emissions monitoring

⁴ The permit also requires continuous monitoring of gas flow (scf); continuous measurement of ammonia plant production (tons/hr); measurement of key operating parameters of the ammonia plant, including temperatures in the ammonia conversion reactor and the methanation reactor, and flow of off-gas to the reformer furnace for use as fuel.

⁵ See Preferred and Alternative Methods for Estimating Air Emissions from Boilers, EIIP Volume II: Chapter 2 (1/8/2001) at 2.3-5.

⁶ As discussed above, the permit record also states that CO₂ emissions from the main CO₂ vent (i.e., the aMDEA vent) in the ammonia plant will be monitored by CEMS although the Draft Permit does not specifically require that a CO₂ CEMS be installed at the ammonia plant's main CO₂ vent.

scheme for the boiler would be similar to that required for the reformer furnace. While a CEMS is not the only accurate and reliable means for monitoring compliance in all situations, it is unclear how the IEPA determined that a CO₂ CEMS was not appropriate for the boiler and that a different methodology for measuring CO₂ emissions from the boiler was more appropriate in this case. Please explain.

5. The Draft Permit does not specify how GHG emissions (as CO₂e) from the boiler will be monitored.

Condition 2.3.9(g) requires the Permittee to keep records of its GHG emissions from the boiler including a file containing the emission factors that it uses to calculate emissions, with supporting documentation, but neither the Project Summary nor the Draft Permit specifies the emissions calculation methodology, emission factors or emission factor sources based upon which the source is expected to calculate emissions. Please specify how GHG emissions from the boiler will be monitored and how the Permittee is expected to calculate emissions.

6. The monitoring requirements for PM, PM_{2.5}, PM₁₀, VOM, methane (CH₄), Nitrous Oxide (N₂O) and HAP emissions from the reformer furnace and the boiler appear to be inadequate to assure continuous compliance with the emission limits.

- a. Condition 2.2.7 of the Draft Permit requires the Permittee to conduct initial performance tests on the reformer furnace, within one year after initial startup of the reformer or 120 days after achieving the maximum production rate at which the reformer will be operated, for PM, PM₁₀, PM_{2.5}, VOM, hexane, CH₄, N₂O and HAP. Subsequent stack testing would be conducted within 90 days of a written request by the IEPA or such later date agreed to by the IEPA. Condition 2.2.7(a)(i) provides that specific requirements for periodic emission testing “may be established in the CAAPP permit for the facility.”⁷ Please add periodic testing requirements for PM, PM₁₀, PM_{2.5} (including condensable PM), VOM, hexane, CH₄, N₂O and HAP emissions from the reformer furnace or explain how the permit conditions will otherwise assure continuous compliance without periodic testing for these pollutants.
- b. Similarly, the Draft Permit requires initial performance testing for emissions of PM, filterable PM₁₀ and PM_{2.5}, condensable PM, VOM, formaldehyde, hexane, methane and N₂O from the boiler and provides that specific requirements for periodic emission testing “may be established in the CAAPP permit for the facility.” *See* Condition 2.3.7.⁸ However, subsequent periodic testing is not required for PM, filterable PM₁₀

⁷ NO_x, CO and CO₂ emissions from the reformer will be monitored by CEMS pursuant to Condition 2.2.8-1.

⁸ NO_x and CO emissions from the boiler will be monitored by CEMS pursuant to Condition 2.3.8-1.

and PM_{2.5}, condensable PM, VOM, formaldehyde, hexane, methane and N₂O. Please add periodic testing requirements for PM, filterable PM₁₀ and PM_{2.5}, condensable PM, VOM, formaldehyde, hexane, methane and N₂O emissions from the boiler or explain how the permit conditions will otherwise assure continuous compliance without periodic testing for these pollutants.

- c. As written, it appears that Condition 2.2.7(a)(ii) provides the Permittee with the choice to perform initial performance testing of the reformer furnace *either* within one year after initial startup *or* within 120 days after achieving the maximum production rate at which the unit will be operated. Please add “whichever occurs first” or similar language to this provision to ensure that the required initial performance tests occur within a reasonable time period.

7. The receptor grid spacing for the air quality analysis appears to be inadequate for demonstrating that the proposed source will not cause or contribute to violation of any national ambient air quality standard.

The air quality modeling documentation included in the permit record states that the applicant used a receptor resolution starting with a 100 meter spacing from the property boundary.⁹ It is unclear from the available documentation whether a tighter receptor grid was employed around the fenceline. The permit record shows that the modeled peak air quality impacts occurred very close to the facility’s fenceline. EPA requests the IEPA to confirm that a tighter receptor grid was used around the fenceline or require the applicant to conduct air quality modeling using a tighter receptor grid (e.g., 50 meters) to evaluate peak impacts near the source.

We provide these comments to help ensure that the PSD permit meets all federal requirements, and that the record provides adequate support for the permit decision. We look forward to working with you to address our comments. If you have any questions, please feel free to contact me at (312) 353-4761 or David Ogulei, of my staff, at (312) 353-0987.

Sincerely,



for Genevieve Damico
Chief
Air Permits Section

⁹ See Air Quality Modeling Report, Cronus Chemicals, LLC, Section 5.1.5 (April 2014).