UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1201 ELM STREET, SUITE 500
DALLAS, TEXAS 75270

April 11, 2023

Russell Wozniak
US Air Advocacy Leader & California Regulatory Affairs Leader
Dow Chemical Company, Texas Operations
2301 N. Brazosport Blvd.
Freeport, Texas 77541

Email: vnowak3@dow.com

Re: Alternative Monitoring Plan (AMP) – National Emission Standards for Hazardous Air Pollutants (NESHAP) for Miscellaneous Organic Chemical Manufacturing (MON), 40 Code of Federal Regulations (C.F.R.) Part 63 Subpart FFFF – Polyurethanes Production Facility, B-4400 Thermal Oxidizer - Dow Chemical Texas Operations, Freeport, Texas (Dow Freeport)

Dear Mr. Wozniak:

This letter is in response to your March 10, 2022, request for approval of an AMP with alternate monitoring parameters at the Dow Freeport Polyurethanes Production Facility B-4400 thermal oxidizer, in lieu of requirements under NESHAP Subpart FFFF. The AMP is needed to demonstrate compliance with new ethylene oxide provisions in the MON rule, §§ 63.2493(b)(5)(i)-(iii). Dow Freeport submitted the AMP request in accordance with the alternative monitoring provisions in §§ 63.8(f)(l)-(5). Upon review of all available information, the U.S. Environmental Protection Agency (EPA) conditionally approves your AMP, as delineated in the Enclosure to this letter.

On July 28, 2022, Dow Freeport requested a compliance extension to the August 12, 2022, compliance deadline under the MON rule. The extension request was needed to allow Dow Freeport to complete performance testing under additional operating scenarios requested by EPA. The additional testing was necessary for EPA to complete its technical evaluation of the AMP request. EPA approved the compliance extension on August 9, 2022. Dow Chemical furnished a copy of its proposed revised test plan to EPA and the Texas Commission on Environmental Quality (TCEQ) with its testing notification prior to August 12, 2022, in accordance with Part 63 Subpart A § 63.9(e).

EPA will furnish a copy of the AMP conditional approval response to TCEQ to attach to the facility's air permit for federal enforceability, and so that TCEQ may modify the facility's permit conditions to be consistent with the approved alternate monitoring parameters and operating condition representations for the AMP, in accordance with requirements of Part 63 Subpart FFFF and TCEQ's delegated air program.

If operations change from those represented in the Enclosure for the Polyurethanes Production Facility or the B-4400 Thermal Oxidizer, such that the alternate monitoring parameters and conditions are no longer representative, this approval may become void, and a new AMP request will be necessary. If you have questions or concerns about this conditional approval, please contact Justin Chen of my staff at (214) 665-2273 or chen.justin@epa.gov.

Sincerely,

STEVEN THOMPSON Digitally signed by STEVEN THOMPSON
Date: 2023.04.11 16:07:37 -05'00'

Steve Thompson
Manager
Air Enforcement Branch

Enclosure

cc: Michael De La Cruz, TCEQ, michael.delacruz@tceq.texas.gov

ENCLOSURE

ALTERNATIVE MONITORING PLAN (AMP)
Dow Chemical Freeport, Texas Operations
Polyurethanes Production Facility B-4400 Thermal Oxidizer

BACKGROUND INFORMATION

Dow Freeport has proposed an AMP with alternate monitoring parameters for the Polyurethanes Production Facility B-4400 Thermal Oxidizer at the facility located in Freeport, Texas. This Enclosure provides EPA's technical evaluation of the operating conditions and associated implementation of rule requirements for the B-4400 thermal oxidizer. Since the Dow Freeport facility must comply with recently added ethylene oxide emission standards under NESHAP Part 63 Subpart FFFF (the MON Rule), an AMP is necessary to evaluate equivalency and adequacy of the alternate monitoring parameters proposed, in lieu of rule-specified requirements for monitoring the maximum flue gas flow rate.

The Polyurethanes Production Facility is a batch process which uses propylene oxide and ethylene oxide to produce polyether polyols using various polyglycol- and amine-based initiators. The vent gas streams from the reactors and the finishing system are routed to the B-4400 thermal oxidizer unit. Process vents from the finishing system are regulated as continuous process vents under 40 CFR 63 Subpart FFFF. All of the vent gas streams are combined and routed through a single header line to the B-4400 thermal oxidizer. The contributing vent gas streams that flow through the header line to the thermal oxidizer inlet come from a combination of batch and continuous process vents. These conditions lead to variable flow rates in the header line and to the thermal oxidizer. Therefore, the combined volumetric flow rate and the differential pressure of the thermal oxidizer flue gas can vary significantly, and in many cases result in scenarios where the flue gas flow rate cannot be accurately measured. Due to these flue gas measurement challenges, Dow Freeport requests EPA's approval to use the combined flow rates of the inlet gas stream flow meters as an alternate parameter to meet the monitoring requirements §§ 63.2493(a)(2)(vii)(B) and (b)(5)(ii). Dow Freeport will monitor the inlet temperature to the B-4400 thermal oxidizer using existing process instrumentation. Dow proposes to use the sum of the monitored inlet gas volumetric flow rates to the thermal oxidizer to establish a maximum inlet gas flow rate, which will correspond to the maximum flue gas flow rate specified by §§ 63.2493(a)(2)(vii)(B) and (b)(5)(ii) .

TECHNICAL INFORMATION FOR AMP APPROVAL

From August 2 to August 4, 2022, a performance test was conducted on the B-4400 thermal oxidizer to demonstrate compliance with the ethylene oxide standards and requirements of the MON Rule. Dow Freeport submitted the results of this testing to EPA Region 6 on September 30, 2022. The maximum flue gas flow rate is a critical operating parameter specified by the MON rule that must be monitored to ensure proper thermal oxidizer performance. There is a +/- 5 percent accuracy

requirement specified in the rule for measuring the flow rate. However, the inconsistent flow rates and variable vent gas stream characteristics due to a mixture of continuous and batch processes pose a challenge for Dow Freeport to meet the flue gas monitoring requirement. Therefore, EPA requested that Dow Freeport conduct additional testing under low-load and average load conditions, as well as maximum load, to demonstrate that the combined vent gas stream to the B-4400 thermal oxidizer will meet the ethylene oxide emission standard under the expected range of operating conditions.

The final selection of the alternate operating parameters is entirely dependent upon ensuring that effective thermal oxidizer performance is maintained, and that the ethylene oxide emission standard will be continually met at the B-4400 thermal oxidizer. Through the performance testing conducted by Dow Freeport, the selected alternate operating parameters were established using minimum, average, and maximum values which were representative of the range of process operating conditions and operation of the B-4400 thermal oxidizer.

AMP CONDITIONAL APPROVAL PROVISIONS

Since a continuous emission monitoring system is not associated with Dow Freeport's AMP request, EPA's approval of alternate parameters is related to equivalency demonstration for meeting initial compliance with requirements of § 63.2493(a)(3)(ii)(C) - § 63.2493(a)(2)(vii) for establishing the alternate parameters and monitoring limits for the B-4400 thermal oxidizer, and associated continuing compliance requirements of § 63.2493(b)(5)(ii) for monitoring the alternate parameters in lieu of the exhaust stack flue gas flow rate on a one-hour basis.

During the August 2 – 4, 2022 performance tests, the following parameters were measured under low-load, average load, and maximum load to the B-4400 thermal oxidizer:

- Cumulative inlet gas flow rate;
- B-4400 exhaust stack flue gas flow rate;
- Ethylene oxide concentration in vent gas exiting the exhaust stack of the thermal oxidizer; and,
- Thermal oxidizer combustion chamber temperature.

The reported test values were monitored for 60-minute durations under three different representative operating conditions for a total of nine test runs:

- minimum combustion zone temperature and minimum inlet flow (low load);
- minimum combustion zone temperature and maximum flue gas flow rate (maximum load); and,
- average combustion zone temperature and average inlet flow (average load).

Dow provided a performance test report showing ethylene oxide emissions from the B-4400 thermal oxidizer in relation to the combined inlet flow rates, flue gas flow rates, and combustion chamber temperatures determined on a one-hour block average. Under all test conditions reported, ethylene oxide was measured at less than the NESHAP FFFF emission standard of 1 part per million dry volumes (ppmvd) corrected to 3 percent oxygen, including at the highest measured cumulative inlet flow rate.

Based upon the performance testing data under representative operating conditions provided by Dow Freeport, and the facility's post-testing correspondence dated December 8, 2022, EPA approves the following alternate monitoring parameters in lieu of measuring and monitoring exhaust stack flue gas flow rate to ensure that the B-4400 thermal oxidizer functions as intended, and that emissions from the Polyurethanes Production Facility will continuously meet the regulatory requirements of NESHAP FFFF for ethylene oxide:

- The sum of the monitored inlet gas volumetric flow rates to the thermal oxidizer to establish a maximum inlet gas flow rate;
- A combined maximum hourly inlet flow rate value of 23,695 pound per hour; and,
- A minimum thermal oxidizer combustion chamber temperature at or above 876 degrees Centigrade.

Compliance with the approved alternate monitoring parameters will be determined on an hourly rolling or other average basis, as required by NESHAP FFFF. Additionally, the following inlet gas flow meters will be used to monitor the incoming vent gas streams going to the inlet of the B-4400 thermal oxidizer:

- the combined vent gas flow to the thermal oxidizer;
- the fuel gas flow to the thermal oxidizer;
- the combustion air flow to the thermal oxidizer; and,
- the quench air flow to the thermal oxidizer.

If a flow meter or tag ID is replaced or updated in the future, then Dow will keep a record of any such change for comparison to the initial flow meter labels.

If Dow Freeport wishes to increase the combined inlet flow limit value from that determined for this conditional approval, another performance test will be required. Per the requirement of NESHAP FFFF § 63.2493(b)(3), Dow must conduct another performance test no later than 60 months after the testing conducted for this AMP conditional approval in order to establish a new alternate monitoring parameter limit value. Dow Freeport must also submit a request to EPA to revise the previously approved AMP, along with the supporting test results at representative operating conditions.

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