DEPARTMENT OF ENVIRONMENTAL QUALITY AIR QUALITY DIVISION ACTIVITY REPORT: On-site Inspection

B430900001					
FACILITY: BASF Corporation - Chemical Plants		SRN / ID: B4359			
LOCATION: 1609 BIDDLE AVE, WYANDOTTE		DISTRICT: Detroit			
CITY: WYANDOTTE		COUNTY: WAYNE			
CONTACT: Bryan Hughes, EHS Team Leader		ACTIVITY DATE: 08/01/2023			
STAFF: Samuel Liveson	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR			
SUBJECT: Scheduled inspection.					
RESOLVED COMPLAINTS:					

Introduction

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On August 1 and 2, 2023, I (AQD staff Sam Liveson) conducted an announced, scheduled inspection of BASF Corporation – Chemical Plants (BASF Chemicals), located at 1609 Biddle Avenue in Wyandotte, Michigan.

The purpose of this inspection was to determine the facility's compliance with the federal Clean Air Act; Part 55, Air Pollution Control, of the Michigan Natural Resources and Environmental Protection Act, 1994 PA 451, as amended; the Michigan Air Pollution Control Rules (Rules); and the conditions of Renewable Operating Permit (ROP) No. MI-ROP-B4359-2003b; the conditions of Permits to Install (PTI) 113-07B, 174-08A, 272-04, 84-07, 143-09, 80-11B, 145-17, 14-18, 115-18, 186-18, 67-20, 70-21, and 155-22; and Air Quality Consent Orders (ACO) AQD No. 2018-03 and AQD No. 2023-14.

Pre-Inspection Meeting and Facility Information

Arrival

The inspection was announced. I called Bryan Hughes, EHS Team Leader, on Wednesday July 26 about visiting the following week. I arrived at the facility at about 9:00 AM on Tuesday August 1. I parked at the small oval parking lot south of the Main Administration Building and walked to the building's front entrance off Biddle Avenue. At the Main Administration Building, I met with Bryan Hughes, EHS Team Leader; Tom Wharton, EHS Specialist; and Evan Rinke, EHS Specialist. I provided my state-issued identification and stated the purpose of my visit. We had a pre-inspection meeting prior to walking through the facility.

General Facility Overview

BASF in Wyandotte is comprised of three separate stationary sources. These are (1) chemical plants (State Registration Number B4359), (2) plastic production plants (SRN M4777), and (3) laboratory/research operations (SRN M4808). On August 1 and 2, 2023, I inspected the first stationary source, known as BASF Corporation – Chemical Plants. The chemical plants are comprised of five main areas: (1) the Steam Plant, (2) the Polyol Manufacturing Plant, (3) Chemical Engineering Research (CER), (4) Thermoplastic Urethane Synthesis Manufacturing (TPU), and (5) Wyandotte Dispersions and Resins (WYD&R).

Regarding source-wide federal New Source Performance Standard (NSPS) Part 60 Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984, BASF explained that two tanks at BASF Chemical Plants are subject at this time. Those are tank TK-524 in the Polyol Manufacturing Plant, and tank TK-0004 in WYD&R. NSPS Kb requirements are discussed in those sections of this report.

Compliance Background

BASF Chemicals has no outstanding violation notices, and two active consent orders.

Consent order AQD 2023-14 became effective on June 12, 2023. This consent order resolved violation notices issued November 28, 2022 and March 24, 2023 for exceeding the hourly and annual emission limits of toluene diisocyanate (TDI) from polyol storage tank TK-536 (MI-ROP-B4359-2003b, Section 2, EUPOLTKFARM).

Consent order AQD 2018-03 became effective May 7, 2018. This consent order resolved violation notices issued May 5, 2017, July 25, 2017, and December 15, 2017 for exceeding ethylene oxide emission limits from polyol manufacturing; failing to meet VOC destruction efficiency on the WYD&R RTO; installing the steam plant without obtaining a PTI; and not meeting stack requirements in WYD&R product filling and storage. Applicable consent order requirements are included in the discussion of each applicable emission unit in this report.

Facility Records

On August 10, 2023, I requested facility records, and they were received on October 17, 2023. BASF claims certain selected data within the submittal as "Confidential Business Information" (CBI). A portion of the CBI is monthly and 12-month rolling emissions calculations, which is not eligible for confidentiality, and another portion of the information discloses production information that is already reported within the annual emissions inventory for the source. Therefore, AQD does not necessarily agree with BASF's assertions. However, for the purpose of processing this report the information will be treated as confidential until a determination is reached on the confidentiality of this information.

Steam Facility – Walkthrough & Compliance Status

Discussed below are the facility steam plant, groundwater treatment system, and emergency engines on site.

Steam Plant (PTI No. 145-17, FG-BOILERS)

I visited the facility steam plant the morning of August 1, 2023. Along with Byran Hughes, Ed Kachadoorian, Site Utilities Manager, provided a walkthrough of the steam plant facility.

The steam plant houses four boilers (PTI 145-17, FGBOILERS). Each boiler has a heat input capacity of 49.9 million British thermal units (MMBtu) per hour and is permitted to burn natural gas. For control, boilers have low-NOx burners and flue gas recirculation. PTI 145-17 replaces the conditions listed in MI-ROP-B4359-2003b, Section 1, FGSTEFACILITY.

Boilers provide comfort heat and process steam such as steam heat for reactors and heat tracing. Reverse osmosis water is used in the boilers.

Boiler	1	2	3	4
Operating?	Yes	No	Yes	No
Flow meter?	Yes	Yes	Yes	Yes
Steam Flow (lb/hr)	15431		16125	
Gas flow rate (scfh)	21431		19500	
Flue Gas Recirculation	29.5%		33.4%	
Time observed	10:34 AM		10:18 AM	

During the inspection, I observed the following boiler parameters:

PTI 145-17, FG-BOILERS Special Conditions and Compliance Status

Below is a summary of each special condition from Flexible Group FG-BOILERS from PTI 145-17, and an explanation of the facility's compliance status.

SC I.1, I.2, I.4, I.6, V.1, and IX.1: Hourly NOx and CO emissions shall not exceed the following: 2.4 pounds per hour NOx; 0.048 lb/MMBTU NOx; 19.7 pounds per hour CO; and 0.39 lb/MMBTU CO. Testing to be conducted within 90 days after natural gas usage (12-month rolling time period) exceeds 1,100 million standard cubic feet (MMSCF).

COMPLIANCE. Boiler stack testing to demonstrate compliance with these NOx and CO limits is required upon natural gas usage exceeding 1,100 MMSCF over a 12-month rolling time period. At this time, the 12-month rolling natural gas usage has not exceeded 1,100 MMSCF, so the facility is not required to conduct stack testing. Natural gas usage records provided for July 2021 through July

2023 indicate that the maximum 12-month rolling natural gas usage occurred in the 12-month period ending September 2021, and was 562.03 MMSCF.

SC I.3, I.5, and VI.2: NOx emissions shall not exceed 36 tons per year (12-month rolling). CO emissions shall not exceed 86.4 tons per year (12-month rolling). COMPLIANCE. BASF provided NOx and CO emission calculations for July 2021 through July 2023. Maximum 12-month rolling NOx emissions were 14.05 tons NOx, and maximum 12-month rolling CO emissions were 23.61 tons CO. These NOx and CO 12-month rolling maximums both occurred in September 2021.

The facility calculates NOx and CO emissions using AP-42 Table 1.4-1 emission factors of 50 lb NOx/MMSCF and 84 lb CO/MMSCF. These emission factors appear appropriate for low-NOx boilers rated at less than 100 MMBtu/hr heat input. Condition VI.2 discusses calculating emissions by multiplying the monthly natural gas using the hourly emission limits in I.3 and I.8. This appears to be a typo because I.3 and I.8 are not the hourly emission limits for NOx and CO.

Additionally, converting from MMBTU to SCF by multiplying by 1020 MMBTU/1 MMCF, the hourly limit for CO in condition I.6 of 0.39 lb CO/MMBTU comes out to 398 lb CO/MMCF as an emission factor instead of 84 lb CO/MMSCF in AP-42. I plan to follow-up with the facility and permit staff to understand the basis of this emission factor. Regarding the hourly limit of NOx in condition I.2 of 0.048 lb NOx/MMBTU, this conversion is 49 lb NOx/MMCF, which is close to the 50 lb NOx/MMCF AP-42 emission factor the facility uses in their emissions calculations.

SC II.1, II.2, and VI.1: Natural gas usage shall not exceed 1,467 MMSCF on a 12-month rolling time period. Shall burn only pipeline quality natural gas. Keep satisfactory records.

COMPLIANCE. On site, Ed showed how there is no diesel pipework to the boilers. Diesel piping was removed during the 2016 recommissioning. Natural gas is provided by DTE. We visited the DTE flow meter outside the steam facility, which appeared to be operating.

BASF provided monthly and 12-month natural gas usage for July 2021 through July 2023. The maximum 12-month rolling natural gas was 562.03 MMSCF in September 2021.

SC III.1: Shall not operate boilers unless equipped with low NOx burners. Burners should be installed and maintained per manufacturer recommendations.

COMPLIANCE. Ed explained that boilers undergo annual State of Michigan physical inspections annually, as well as a CSD-1 boiler inspection. The State of Michigan inspection for boilers 2 and 4 took place on July 27, 2023, and the State of Michigan inspection for boilers 1 and 3 took place July 13, 2023. Boiler tuning occurs in late October or early November. During tuning, each flue gas recirculation damper is set, and boilers are tuned for maximum efficiency.

SC VI.1: Shall install, calibrate, maintain and operate in a satisfactory manner a device to monitor and record natural gas usage on a monthly basis.

COMPLIANCE. The facility explained that monthly and annual natural gas records are calculated using monthly bills from DTE. We visited the DTE flow meter outside the steam plant.

Flow meters are also in place on each boiler. Boiler 1 and 3 flow meters were replaced the week before the inspection. I observed new flow meters in place, and older flow meters disconnected at boilers 1 and 3. Boiler 2 and 4 flow meters are planned to be replaced Friday. Staff explained that flow meters are calibrated by the manufacturer prior to arriving at the steam plant. BASF provided flow meter calibration certificates for the four flow meters.

SC VIII.1: Exhaust gases from stack to be discharged unobstructed vertically upwards. A maximum exhaust diameter of 66 and a minimum height of 150 above ground surface are required.

COMPLIANCE. I observed that stacks appeared to have a similar height and diameter to those in PTI 145-17. Exhaust appeared to be unobstructed and to vent vertically to ambient air.

Northwest Groundwater Remediation (ROP MI-ROP-B4359-2003b, EUSTENWORKSGROUNDWATER; Rule 290)

BASF has a groundwater remediation system building on site. The remediation system uses carbon adsorption to treat organics in groundwater. I did not visit the remediation system during this inspection. I visited the system during the September 2021 inspection.

ROP MI-ROP-B4359-2003b, EUSTENWORKSGROUNDWATER - Rule 290 and Compliance Status

EUSTENWORKSGROUNDWATER is permitted under flexible group FGSTERULE290 in the MI-ROP-B4359-2003b. This flexible group is based on Michigan Air Pollution Control Rule 290. Below is a summary of requirements of the applicable parts of Rule 290 and an explanation of the facility's compliance status.

Rule 290(2)(a)(ii)(B): Emission limit of 20 pounds uncontrolled or 10 pounds controlled per month for toxic air contaminants with initial risk screening levels (IRSL) greater than or equal to 0.04 ug/m3.

COMPLIANCE. BASF provided monthly emissions for July 2021 through July 2023. Below are pollutants with an IRSL greater or equal to 0.04 ug/m3, and the maximum emissions from the facility's provided records, as well as the month(s) in which the maximum emissions occurred.

Contaminant	CAS No.	ITSL (ug/m3)	IRSL (ug/m3)	Max Monthly Emissions	Month of Occurrence
Methylene chloride	75092	2000	60	0.003 lbs	Oct 2021, Nov 2021, Dec 2021, Dec 2023
PDC (1,2- dichloropropane)	78875	4	0.2	0.035 lbs	Dec 2023
Chloroform	67663		0.4	0.035 lbs	Dec 2023
DCE (1,2- dichloroethane)	107062		0.04	0.004 lbs	Dec 2023

Rule 290(2)(a)(ii)(C): No emissions of toxic air contaminants with an initial threshold screening level or initial risk screening level less than 0.04 micrograms per cubic meter.

COMPLIANCE. BASF provided monthly emissions for July 2021 through July 2023. Below are pollutants with an IRSL less than 0.04 ug/m3. Records indicate 0.000 pounds were emitted.

Contaminant	CAS No.	ITSL (ug/m3)	IRSL (ug/m3)	Max Monthly Emissions	Month of Occurrence
BCEE (Bis (chloroethyl) ether)	111-44-4		0.003	0.000 lbs	

Rule 290(2)(c)-(e): Maintain a description of the emission unit, and records of material use and emissions for the most recent 2-year period.

COMPLIANCE. Records of monthly material use and emissions were provided for the most-recent 2 -year period of July 2021 through July 2023. I did not request a description of the emission unit.

Firewater Pond Pumps 1, 2, and 3 (40 CFR Part 63 Subpart ZZZZ and Rule 285(2)(g))

Firewater Pond Pumps 1, 2, and 3 were installed in February 2003, May 2003, and February 1991 respectively. The fire pump engines are compression ignition and use diesel fuel. The fire pumps appear to be exempt from PTI requirements under Rule 285(2)(g) for "...Internal combustion engines that have less than 10,000,000 Btu/hour maximum heat input." Each of these three firewater pond pumps has a maximum heat input of 4.6 MMBTU/hr.

Firewater Pond Pumps 1, 2, and 3 – 40 CFR Part 63 Subpart ZZZZ Requirements and Compliance Status

These firewater pond pumps appear to be subject 40 CFR Part 63 Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. I did not evaluate compliance with this subpart.

Polyol Fire Water Pump (40 CFR Part 60 Subpart IIII and Rule 285(2)(g))

The fourth firewater pond pump, the Polyol fire water pump, was installed on June 25, 2020. The engine is compression ignition and uses diesel fuel. The Polyol fire water pump appears to be exempt from PTI requirements under Rule 285(2)(g) for "...Internal combustion engines that have less than 10,000,000 Btu/hour maximum heat input." Its maximum heat input is 1.5 MMBTU/hr. I did not visit the Polyol fire water pump during the inspection.

Polyol Fire Water Pump – 40 CFR Part 60 Subpart IIII Requirements and Compliance Status

The Polyol fire water pump appears to be subject to 40 CFR Part 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Below is a summary of requirements of the applicable parts of 40 CFR Part 60 Subpart IIII and an explanation of the facility's compliance status.

§60.4205(c); 40 CFR Part 60 Subpart IIII Table 4; §60.4211(b)(1): The owner/operator must comply with emission standards specified in this subpart.

COMPLIANCE. The facility appears to have purchased a certified engine to comply with emissions standards. BASF provided a USEPA Certificate of Conformity for the Polyol fire water pump.

§60.4209(a): Install a non-resettable hour meter.

COMPLIANCE. The facility provided an image of the non-resettable hours meter.

§60.4211(a): Maintain the engine according to manufacturer's instructions. NOT EVALUATED. I did not request maintenance records for the Polyol fire water pump.

§60.4211(f): Limit maintenance checks and readiness testing to 100 hours per year. COMPLIANCE. The facility image of the non-resettable hours meter indicates the total operating hours on the Polyol fire water pump is 84.2 hours.

Five Natural Gas-Fired Emergency Engines (40 CFR Part 60 Subpart JJJJ and Rule 285(2)(g)) The facility operates five spark ignition, natural gas-fired emergency engines (ETPU Plant Back Up Generator, ETPU RTO Back Up Generator, IS Main Admin Generator, PBX Back Up Generator, and Steam Plant Backup Generator). We visited the ETPU Plant Back Up Generator and ETPU RTO Back Up Generator during the inspection.

The five natural gas-fired emergency engines appear to be exempt from PTI requirements under Rule 285(2)(g) for "...Internal combustion engines that have less than 10,000,000 Btu/hour maximum heat input." Maximum heat inputs are below.

Emergency Engine	Maximum heat input (MMBTU/hr)	Installation Date
ETPU Plant Back Up Generator	3.98	August 2018
ETPU RTO Back Up Generator	1.39	February 2019
IS Main Admin Generator	1.08	December 2016
PBX Back Up Generator	0.68	December 2018
Steam Plant Backup Generator	2.81	October 2016

Five Natural Gas-Fired Emergency Engines 40 CFR Part 60 Subpart JJJJ Requirements and Compliance Status

These emergency engines appear to be subject to 40 CFR Part 60 Subpart JJJJ—Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. Installation dates are above. Below is a summary of requirements of the applicable parts of 40 CFR Part 60 Subpart JJJJ and an explanation of the facility's compliance status.

§60.4233(d), §60.4233(e), 40 CFR Part 60 Subpart JJJJ Table 1: The owner/operator must comply with emission standards specified in this subpart.

COMPLIANCE. The facility appears to have purchased certified engines to comply with emissions standards. BASF provided a USEPA Certificate of Conformity for each of the five natural gas fired emergency engines.

§60.4234: Maintain the engine.

COMPLIANCE. Maintenance records were provided for ETPU RTO Back Up Generator, IS Main Admin Generator, PBX Back Up Generator, and Steam Plant Backup Generator.

§60.4237: Install a non-resettable hour meter.

COMPLIANCE. Records of the hour meter readings for ETPU RTO Back Up Generator, IS Main Admin Generator, PBX Back Up Generator, and Steam Plant Backup Generator were provided.

§60.4243(d): Limit maintenance checks and readiness testing to 100 hours per year. COMPLIANCE. Maintenance records indicate that less than 100 hours of operation occurred within the last year.

Polyol Manufacturing Plant – Walkthrough & Compliance Status

I visited the Polyol Manufacturing Plant the morning of August 2, 2023. Along with Bryan Hughes, Phil Langenkamp, Polyol Plant Technology Engineer, provided a walkthrough of the Polyol plant.

The Polyols Plant manufactures conventional and graft polyether poly alcohols (polyols). Conventional polyols are permitted as EUPOLCONV in the facility ROP, and graft polyols are permitted as EUPOLGRAFT in PTI 70-21. Polyols become graft when they are mixed with styrene and acrylonitrile, which provide resiliency. Polyols are liquids which can be reacted with diisocyanates such as methylene diphenyl diisocyanate (MDI) to form polyurethanes. BASF produces MDI at their Geismar, Louisiana facility. Examples of polyurethane products such as foam mattress pads are on display.

Conventional Polyol Storage Tanks and Reactor Trains 8 and 9 (MI-ROP-B4359-2003b, Section 2, Table C-2.1 EUPOLCONV)

Reactor trains 8 and 9 are used to produce conventional polyols. Raw materials include propylene oxide and ethylene oxide in storage tanks TK-101B, TK-101C, and TK-102. Each reactor train appears to include four main components: a pre-reactor, a reactor, a filter, and a flash (which pulls out residual water).

It appears that the portion of the train with oxides (the pre-reactor and reactor) is controlled by the caustic (potassium hydroxide) scrubber (PTI 70-21, FGPOLEMCON), and the portion of the reactor train with lower oxides (filter and flash) is controlled by the water scrubber. After going through either scrubber, emissions are then controlled by the thermal oxidizer (PTI 70-21, FGPOLEMCON). Particulate emissions from magnesol loading in trains 8 and 9 are controlled by fabric filters F-410C and F-531 respectively.

EUPOLCONV Special Conditions and Compliance Status (MI-ROP-B4359-2003b Section 2 Table C-2.1)

Below is a summary of each special condition from EUPOLCONV from the facility's ROP MI-ROP-B4359 -2003b, and an explanation of the facility's compliance status.

SC I.B.1-3: Minimum stack heights and maximum diameters for SVPOLSUGARFEED, SVPOLT-408, and SVPoIMagSil7

NOT EVALUATED. I did not observe these stacks during this inspection. SVPolMagSil7 is not used, because reactor 7 is mothballed.

SC II.A.1.1 and III.A.3.8: Magnesium silicate (magnesol) usage limited to 2,500 tons per year based on a 12-month rolling time period; keep magnesol records.

COMPLIANCE. BASF provided monthly and 12-month rolling magnesol usage records for July 2021 through December 2020. Each 12-month rolling usage total is less than 2,500 tons. BASF claims this data as "Confidential Business Information".

SC II.B.1.1-2, II.B.2, and III.A.3.5: Aggregate volatile organic compound (VOC) emissions from reactor trains 7, 8, 9 sugar feed shall not exceed 1.27 pounds per hour based on a daily average nor 2.24 tons per 12-month rolling time period; aggregate propylene oxide (PO) emissions from reactor trains 7, 8, 9 sugar feed shall not exceed 0.18 tons per 12-month rolling time period; records.

NOT APPLICABLE. BASF explained that emissions from sugar feed are no longer applicable, because sugar is no longer used as a polyol backbone.

SC II.B.3.1-2 and III.A.3.6: Particulate matter (PM) emissions from each solid raw material conveying system servicing reactor trains 7, 8, 9 shall not exceed 0.10 pounds per 1000 pounds of exhaust gases; aggregate PM emissions from all solid raw material conveying systems shall not exceed 1 ton per 12-month rolling time period. Keep records.

COMPLIANCE. Compliance with the pound-per-thousand-pound PM limit is to be determined through stack testing in GC 13, if requested. AQD has not requested that BASF stack test particulate emissions.

BASF provided monthly PM emissions from solid material conveying for July 2021 through July 2023. 12-month rolling emissions are below 1 ton. BASF claims this data as "Confidential Business Information".

SC II.B.4-6 and III.A.3.7: Emissions from reactor trains 7, 8, 9 equipment venting through the water scrubber shall not exceed 2.4 pounds per hour VOC based on a daily average; 0.13 tons propylene oxide (PO) per 12-month rolling time period; and 0.02 tons ethylene oxide (EO) per 12-month rolling time period. Keep records.

COMPLIANCE. Compliance with the VOC pounds per hour value is to be determined through stack testing in GC 13, if requested. AQD has not requested that BASF stack test VOC emissions.

As discussed in the 2013 inspection report (MACES Report B435923233), BASF tested for EO and PO was conducted March 18-20, 2009 per a United States Environmental Protection Agency (USEPA) administrative order. Oxide emissions were measured at less than 0.1 pounds per batch. It is likely VOC emissions are of a similar order of magnitude, because oxide emissions are the predominant VOC expected at the water scrubber emission point. Please see report B435907772.

BASF provided monthly and 12-month rolling emission calculations for VOC, PO, and EO for equipment vented to the water scrubber for July 2021 through July 2023. Monthly VOC emissions indicate compliance with the daily VOC limit, because monthly VOC emissions do not exceed 6.62 pounds. PO and EO emissions calculations do not exceed 0.03 tons PO and 0.003 tons EO per 12-month rolling time period.

SC III.A.3.1 and V.1-3: Polyol production rates for reactor trains 7, 8, 9 shall not exceed the following, each in units of pounds per 12-month rolling time period: 100,000,000 for reactor train 7; 72,000,000 for reactor train 8; 191,000,000 for reactor train 9. Keep records.

BASF provided monthly and 12-month rolling production records for each reactor for July 2021 through July 2023. Reactor 7 has not been in operation, so production for reactor 7 is zero pounds for the last two years. Records demonstrate compliance with the 72,000,000 pound production limit for reactor train 8, and the 191,000,000 pound production limit for reactor train 9. BASF claims this data as "Confidential Business Information".

On site, staff explained reactor train 7 is mothballed. Some tanks may have been repurposed. I visited the reactor for reactor train 8, and the pre-reactor/initiator, reactor, and flash for reactor train 9.

SC III.A.3.2 and V.6: TK-405B, TK-405C, and TK-505 pressure releases to add solid materials shall not exceed, in the aggregate, 24 times per day nor 800 times per 12-month rolling time period. Keep records.

NOT APPLICABLE. BASF explained that sugar is no longer used as a backbone, so reactors are no longer depressurized to open and add sugar.

SC V.4: Proper operation and installation of the thermal oxidizer including a minimum temperature of 1700 °F, a minimum residence time of 0.8 seconds, and maximum emission rates of 1.3 pounds per hour EO and 0.96 pounds per hour PO.

COMPLIANCE. The facility provided thermal oxidizer temperatures every 15 minutes for August 2, 2023. The lowest temperature is 1777 degrees, and temperature readings for August 2 are typically around 1820 °F. During the facility inspection, I observed two thermocouples, each at 1821 °F.

Stack testing conducted on December 6, 2010 through December 9, 2010 measured EO and PO beneath their respective detection limits of 0.006 pound per hour EO and 0.008 pounds per hour PO. Please see report B435915927. I did not request documentation of residence time.

SC V.5: Vacuum jets for the conventional processes shall not be operated unless they vent to the thermal oxidizer.

COMPLIANCE. The water scrubber procedure received following this inspection indicates that jets vent to the water scrubber. The scrubber then vents to the thermal oxidizer.

SC V.7: Equipment that may vent to the water scrubber are TK-410A; TK-408C except during filling and transfer operations; TK-534 after unreacted materials have been removed; the filter press; and TK-532.

COMPLIANCE. Based on the test conducted March 18- 20, 2009, each of these vents to the water scrubber; please see report B435907772.

SC V.8: For ethylene oxide storage tank TK-101B and propylene oxide storage tanks TK-101C and TK-102, install, maintain, and operate a vapor balance system, or vent filling emissions to the thermal oxidizer, including a nitrogen purge of the liquid transfer line and vapor-tight collection line.

COMPLIANCE. Ethylene oxide and propylene oxide are raw materials used at the start of the polyol production process. I visited above-ground ethylene oxide storage tank TK-101B. Staff explained that filling emissions are piped to the potassium hydroxide scrubber where they are converted to glycols, which go out with the facility wastewater. From the scrubber, vapors exhaust to the polyol thermal oxidizer (PTI 70-21, FGPOLEMCON). Staff explained all tanks are under a nitrogen pad, and showed me the white nitrogen tank near TK-101B.

SC III.A.2.1, III.A.3.3, and V.9: Install, maintain, and operate the water scrubber and device to monitor scrubber flow rate. Maintaining the water flow rate specified in operating procedures, which are kept on site and made available upon request. Record the scrubber liquid flow rate.

COMPLIANCE. The water scrubber overview document received following this inspection indicates the minimum flow is 25 gallons per minute (gpm). If flow drops to 35 gpm, an alarm is triggered, and at 30 gpm, the vent valves shut down. Water scrubber flow rates were provided at 15 minute intervals for the entire 24 hours of August 2, 2023. Flow rate ranges from 35 gpm to 38 gpm. On site I observed a flow rate of 38.1 gallons per minute.

SC III.A.2.2-3, III.A.3.4, V.10, and Appendix 2-3.1 through 3: Install, calibrate, and maintain a device to monitor the pressure drop across fabric filters. Conduct regular baghouse inspections as specified in Appendix 2-3. Keep records of the pressure drop. Install, maintain, and operate the fabric filter.

COMPLIANCE. Provided operating procedures for reactor trains 8 and 9 indicate dust collector F-410C services reactor train 8, and dust collector F-531 services reactor train 9. BASF provided pressure drop readings for F-410C and F-531 recorded every 15 minutes for August 2, 2023. Also provided were F-410C and F-531 dust collector inspection procedures indicating that the last inspection for F-410C appears to have occurred 9/15/22, and the last inspection for F-531 appears to have occurred on May 16, 2023.

SC VI.1: Comply with applicable requirements of 40 CFR 63, Subpart PPP-National Emission Standards for Hazardous Air Pollutant Emissions for Polyether Polyol Production. Though not stated explicitly in the condition, as the emission unit EUPOLCONV covers the non-fugitive aspects of conventional polyols production, this condition covers compliance with those aspects of MACT PPP addressing process vents, wastewater provisions, etc. and not those aspects of the MACT PPP that relate to leak detection and repair, which are covered under a similar condition within the flexible group FGPOLFUG.

COMPLIANCE. As of the date of this inspection, BASF appears to be in compliance with 40 CFR Part 63, Subpart PPP. Since the end of the last FCE period (September 9, 2021), pursuant to 63.1439(e)(6), MACT PPP semiannual reports have been received on September 9, 2021, March 2, 2022, September 6, 2022, and March 15, 2023.

Graft Polyol Tanks and Reactor Train 11 (PTI 70-21, EUPOLGRAFT; PTI 155-22, EUPOLGRAFTINDEXFILTER)

Reactor train 11 is used to produce graft polyols. This includes storage tanks for raw materials acrylonitrile, alcohol, and styrene. PTI 70-21 was issued September 29, 2021 for the graft reactor train number 11. Phil let me know that the ribbon cutting for the new graft reactor train line occurred in November of 2022. Additionally, new dedicated mix and feed tanks for the new reactor, TK-1109, and TK-1110, have been installed. From talking with staff and per the description of FGPOLEMCON in PTI 70-21, graft reactor train 11 exhausts directly to the thermal oxidizer (FGPOLEMCON) without going to a scrubber.

For some product being fine filtered, that graft polyol is filtered prior to railcar loading. This filter process is permitted via PTI 155-22, EUPOLGRAFTINDEXFILTER. I abserved the filter F-610 and product receiving tank. Staff explained that there is some off gassing of acrylonitrile and styrene through this process. Emissions can be calculated based upon the filtered amounts of product.

EUPOLGRAFT Special Conditions and Compliance Status (PTI 70-21)

Below is a summary of each special condition from EUPOLGRAFT from the facility's PTI 70-21, and an explanation of the facility's compliance status.

SC I.1, I.2, VI.1, and VI.3: Styrene emission limits of 22.7 pounds per day and 1.185 tons per year (tpy) from the TK-500 styrene storage tank. Keep monthly and 12-month rolling emissions records.

COMPLIANCE. The facility provided calculations of monthly and 12-month rolling styrene emissions for July 2021 through July 2023. PTI 70-21 was issued September 29, 2021. Monthly records indicate that the daily limit has not been exceeded, because monthly emissions do not exceed 40 pounds. 12-month rolling styrene emissions have not exceeded 1.185 tons. BASF claims this data as "Confidential Business Information".

SC II.1 and VI.1: Styrene charged to TK-500 shall not exceed 60,300,000 pounds per 12 -month rolling time period. Keep records.

COMPLIANCE. BASF provided calculations of monthly and 12-month rolling styrene charged for July 2021 through July 2023. 12-month rolling styrene charged totals have not exceeded 60,300,0000 pounds. BASF claims this data as "Confidential Business Information".

SC II.2 and VI.2: Graft polyol production in reactor train 11 shall not exceed 150,000,000 pounds per year. Keep records.

COMPLIANCE. BASF provided calculations of monthly and 12-month rolling graft polyol production in reactor train 10 from July 2021 through September 2022, and reactor train 11 for October 2022

through July 2023. 12-month rolling graft polyol production has not exceeded 150,000,000 pounds in either reactor 10 or 11. Prior to PTI 70-21, BASF had the same graft polyol production limit but for reactor train 10 (MI-ROP-B4359-2003b, EUPOLGRAFT, V.5), so the facility is in compliance with this production limit for the entire time period from July 2021 through July 2023. BASF claims this data as "Confidential Business Information".

SC III.1: Unloading system includes closing hatches and openings during a transfer, and a device or procedure to minimize liquid drainage from the liquid transfer line when it is disconnected and not in use. Develop written procedures.

COMPLIANCE. I visited the styrene storage tank TK-500 on site. The tank does not (and has no requirement to) vent to the thermal oxidizer. The facility provided the procedure for unloading a railcar into the styrene tank. I did not observe a styrene transfer during the inspection.

SC III.2, IV.1, VI.5: Vapor balance system on the acrylonitrile storage tank, or filling emissions should vent to the thermal oxidizer. Develop written procedures. Equip the acrylonitrile tank with a closed vent system and thermal oxidizer control. Maintain documentation of the VOC capture efficiency of the vapor balance system, and develop a plan and conduct ppm instrument readings as determined in 40 CFR 60.485 (b).

COMPLIANCE. I visited the acrylonitrile storage tank. It is a horizontal tank. Phil explained the tank exhausts to the thermal oxidizer, and there are also two pressure safety valves on the tank in case pressure builds up. BASF provided the procedure for unloading a railcar into the acrylonitrile tank. I did not observe an acrylonitrile transfer during the inspection. BASF explained that TK-524 is part of the LDAR monitoring program.

VI.4: Maintain a record showing the dimensions and capacity of the acrylonitrile storage tank (TK-524).

COMPLIANCE. BASE explained the diameter is 13 feet 6 inches; length is 40 feet; and capacity is 43,000 gallons.

VI.6: Retain information to document the determination that reactor train 11 is not a PMPU per 40 CFR 63.1423.

COMPLIANCE. BASF explained that the EUPOLGRAFT process does not polymerize ethylene oxide, propylene oxide, or other cyclic ethers and thus is not a PMPU. As such, Subpart PPP does not apply to EUPOLGRAFT for both not meeting the definition of a PMPU and not being located at a major source of HAPs.

SC VII.1: Within 30 days after commencement of trial operations of the phase II vacuum stripping system upgrade, notify AQD in writing.

COMPLIANCE. It appears the phase II vacuum stripping system upgrade has not occurred as of this inspection.

SC VII.2: Notify AQD in case of land use change.

COMPLIANCE. It appears land use hasn't changed.

SC VIII.1: Stack SVPOL115 dimensions.

NOT EVALUATED. SVPOL115 appears to be the vent located on TK-500 (styrene tank). I did not evaluate the stack dimensions.

SC IX.1: Comply with 40 CFR Part 60 Subpart Kb, the Standards of Performance for Volatile Organic Liquid Storage Vessels for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984, as they apply to the acrylonitrile storage tank TK-524 per 40 CFR 60.110b(a)

COMPLIANCE. BASF explained that tank TK-524 complies with 40 CFR Part 60 Subpart Kb by using a closed vent system and Polyol thermal oxidizer.

EUPOLGRAFTINDEXFILTER Special Conditions and Compliance Status (PTI 155-22)

Below is a summary of each special condition from EUPOLGRAFTINDEXFILTER from the facility's PTI 155-22, and an explanation of the facility's compliance status.

SC I.1, VI.1, and VI.2: Acrylonitrile emission limit of 0.030 tons (60 pounds) per year. Calculate acrylonitrile emissions.

COMPLIANCE. BASF provided monthly and 12-month acrylonitrile emissions for December 1, 2022 (when PTI 155-22 was issued) through July 2023. The highest 12-month rolling acrylonitrile emissions were 13.5 pounds in May of 2023.

SC II.1 and VI.3: Polyol throughput limit of 150,000,000 pounds per 12-month rolling time period. Keep monthly and 12-month rolling records.

COMPLIANCE. BASF provided monthly and 12-month records of the pounds of polyol filtered for December 1, 2022 (when PTI 155-22 was issued) through July 2023. Records indicate the highest amount of polyol filtered over 12 months was 33,869,047 pounds in May 2023.

Thermal Oxidizer and Caustic Scrubber (PTI 70-21, FGPOLEMCON, and ACO AQD No. 2018-03) I observed the thermal oxidizer during the inspection.

FGPOLEMCON Special Conditions and Compliance Status (PTI 70-21, FGPOLEMCON) Below is a summary of each special condition from FGPOLEMCON from the facility's PTI 70-21, and an explanation of the facility's compliance status.

SC I.1, I.3, I.4, I.5, I.6, I.7, VI.1, VI.2, and VI.3: Emissions shall not exceed the following on a 12-month rolling time period basis: 15.3 tons NOx; 16 tons VOC; 0.89 tons EO; 2.2 tons PO; 2.4 tons ACN; 0.927 tons styrene. Calculate monthly and 12-month rolling emissions and keep records.

COMPLIANCE. BASF provided 12-month rolling emissions for July 2021 through July 2023. The maximum 12-month rolling emissions and the last month in which that 12-month total occurred are below. Each 12-month total is less than the annual emissions limitation.

Special Condition	Pollutant	Emission Limit	Maximum 12-Month Rolling Facility Emissions	Last Month of 12- Month Rolling Facility Maximum
l.1	NOx	15.3 tpy	4.093	September 2021
1.3	VOC	16 tpy	0.54	September 2021
1.4	Ethylene oxide	0.89 tpy	0.0001	Multiple time periods
1.5	Propylene oxide	2.2 tpy	0.008	Multiple time periods
1.6	Acrylonitrile	2.4 tpy	0.14	September 2021
1.7	Styrene	0.927 tpy	0.13	July 2021

SC I.2, V.2: VOC emission limit of 6.4 pounds per hour on a daily average; stack test upon request.

COMPLIANCE. Testing conducted December 4-7, 2001 measured an emission rate of 1.71 pounds per hour VOC. Testing conducted December 6-9, 2010 over an 8-hour test period, during which time BASF organized process operations to maximize VOC loading to the thermal oxidizer, measured an emission rate less than 0.03 pounds per hour VOC. Although not a 24-hour test, AQD concludes the 2010 test indicated compliance with the facility emission limit. Please see report B435915927.

SC I.8, I.9, V.1: Acrylonitrile emission limit of 15.4 pounds per day; styrene emission limit of 5.1 pounds per day; stack test within 180 days of trial operation of the Phase II Vacuum Stripping System Upgrade. COMPLIANCE. PTI 70-21 was issued for a project involving an upgrade of Polyol's vacuum stripping system. The upgrade has not yet occurred, so stack testing to determine compliance with emission limits I.8 and I.9 also hasn't occurred.

SC I.10: Total epoxide emission limit of 20 ppmv per stack test methodology at 40 CFR 63.1426(c).

COMPLIANCE. BASF tested for total epoxides on December 6-9, 2010 per 40 CFR 63.1426(c). The results indicated 0.8 ppmv ethylene oxide and 0.8 ppmv propylene oxide, for 1.6 ppmv total epoxides. Please see report B435915927 for stack test information. This appears to be a one-time stack test requirement in MACT PPP.

SC III.1.a & b; IV.1; VI.4: Maintain a daily average firebox temperature at or above 1820 °F and a minimum residence time of 0.8 seconds. Install, calibrate, maintain, and operate a temperature monitor & recorder. Record data at least every 15 minutes.

COMPLIANCE. From the control panel, I observed an operating temperature of 1821 °F, and a second operating temperature also of 1821 °F. Staff explained the setpoint is 1820 °F. Temperature records were provided for every 15 minutes for August 2, 2024. Temperatures of both thermocouples are generally within a few degrees above or below 1820 °F. I did not request retention time or calibration information during this inspection.

SC III.3, IV.2, IV.3, IV.4: Operate the caustic scrubber and vacuum jet system when operating EUPOLCONV. Install, calibrate, maintain, and operate devices to monitor waste gas inlet control valves of the thermal oxidizer, scrubber liquid flowrate, and scrubber effluent pH. Record this information every 15 minutes.

COMPLIANCE. pH and flow records were pro vided for every 15 minutes for August 2, 2024. BASF explained waste gas valves are in the open position. pH and flow appear to be above 12.0 and 50 gallons per minute at all times on August 2.

The facility established parametric monitoring in accordance with 40 CFR 63.1438(d) for pH and flow per their PPP Periodic Compliance report received by AQD on 8/31/11. The pH has been set at 12.0 standard units, and the combined flow of the scrubbers has been set at a minimum 50 gallons per minute. A USEPA Finding of Violation signed 9/18/23 indicates EPA is reviewing whether these established values are appropriate.

SC VI.8: Regular inspection of thermal oxidizer not less frequently than every 12 months.

FURTHER EVALUATION NEEDED. BASF provided the thermal oxidizer preventative maintenance (PM) inspection procedure and record that the most-recent thermal oxidizer PM inspection occurred on September 29, 2022. This PM inspection frequency appears to occur biennially instead of every 12 months. AQD plans to follow up with the facility whether other regular thermal oxidizer inspections occur so that regular inspections are annually, or if the facility needs to increase the PM inspection frequency to occur every 12 months.

SC VII.1-2: Report excursions and complete test reports during semiannual reporting periods.

COMPLIANCE. BASF's PPP semi-annual report was received March 15, 2023.

SC VIII.1: Stack dimensions.

COMPLIANCE. I observed that the stack was unobstructed and exhausted vertically. From a visual observation, the thermal oxidizer stack dimensions appeared similar to permitted dimensions.

SC IX.1-4: Comply with 40 CFR Part 63 Subpart PPP.

COMPLIANCE. As of the date of this inspection, BASF appears to be in compliance with 40 CFR Part 63, Subpart PPP. Since the end of the last FCE period (September 9, 2021), pursuant to 63.1439(e)(6), MACT PPP semiannual reports have been received on September 9, 2021, March 2, 2022, September 6, 2022, and March 15, 2023.

ACO AQD 2018-03 Paragraphs and Compliance Status

Below is a summary of each paragraph related to FGPOLEMCON in consent order AQD 2018-03 (effective 5/7/18) in the Compliance Program and Implementation Schedule section, and an explanation of the facility's compliance status.

Paragraph 10.A: Comply with the VOC pounds per hour limit, which is based on a daily average, for FGPOLEMCON in Polyol.

COMPLIANCE. Testing conducted December 4-7, 2001 measured an emission rate of 1.71 pounds per hour VOC. Testing conducted December 6-9, 2010 over an 8-hour test period, during which time BASF organized process operations to maximize VOC loading to the thermal oxidizer, measured an emission rate less than 0.03 pounds per hour VOC. Although not a 24-hour test, AQD concludes the 2010 test indicated compliance with the facility emission limit. Please see report B435915927. The facility appears to be meeting this requirement. Since the end of the last FCE period (September 9, 2021), there have been no reported emissions bypassing the thermal oxidizer.

Toluene Diisocyanate Storage Tank TK-536 (MI-ROP-B4359-2003b, Section 2, EUPOLTKFARM and ACO AQD 2023-14)

I visited the toluene diisocyanate storage tank at about 10:30 AM on August 2, 2023.

On September 20, 2022, AQD received BASF Chemicals' ROP semi-annual deviation report for the reporting period of January to June 2022. The report explained that BASF had observed a pressure safety valve lift related to TDI tank TK-536. While investigating the valve lift, other instances were discovered. The facility determined that the PSV lifted 42 times from January 8 to May 1, 2022 for a total of 1.16 pounds TDI emissions, and the PSV lifted 67 times from 2017 through 2021 for a total of 2.028 pounds TDI emissions during that time. Four additional lifts occurred in January 2023 which exceeded the hourly TDI emission limit. AQD provided violation notices November 28, 2022 and March 24, 2023 for these emission limit exceedances.

Regarding corrective actions, the facility replaced a valve solenoid and regulator to ensure nitrogen is properly regulated, and added interlocks to valve XV2513 to prevent tank overpressure from railcar unloading into TK-536, and to valve XV2607 to prevent overpressure from tanker truck loading from TK-536. Interlocks were also added to valves XV2512, XV2603, XV2604, and XV2701 to reduce the possibility of PSV lifts. Interlocks act to close the valves before the pressure exceeds 10 inches of water column. Additionally, if a PSV on the TDI storage tank lifts, alarms are audible and visual (red) in the control room, and emails are sent. Additional training to personnel was also provided. Consent order AQD 2023-14 became effective on June 12, 2023. This consent order resolved the November 28, 2022 and March 24, 2023 violation notices.

During my visit to the tank on 8/2/23, active unloading of a railcar into the TDI storage tank was occurring. I observed the railcar with placard 2078. From a nearby control panel monitor, I observed information about the unloading. At 10:40 AM, I observed that pressure appeared to be 0.15 inches water. Phil showed me loading and unloading parameters on the monitor. There appears to be pressures measured by pressure transducers PT2513 and PT2523. My understanding is one pressure transducer is for monitoring pressure during the unloading of a railcar into the TDI tank, and the other is for monitoring pressure during the loading from the TDI tank into a tank truck. When Phil selected each pressure transducer on the monitor, a window indicated ">6", so that it appears an action takes place if pressure exceeds 6 inches water.

EUPOLTKFARM Special Conditions and Compliance Status (MI-ROP-B4359-2003b, Section 2)

Below is a summary of each special condition from EUPOLTKFARM from the facility's ROP MI-ROP-B4359-2003b, and an explanation of the facility's compliance status.

SC I.B.1: Exhaust gases from the carbon canister on TK-536 shall discharge unobstructed vertically upwards with maximum diameter of 3 inches and height of not less than 35 feet above ground.

COMPLIANCE. During the inspection, compliance was determined based on visual observation of the carbon canister. Measurements were not collected.

SC II.A.1 and III.A.3.3: TDI throughput in TK-536 shall not exceed 5,000,000 gallons per 12-month rolling time period; keep records.

COMPLIANCE. BASF provided calculations of monthly and 12-month rolling TDI throughput from July 2021 through July 2023. Each 12-month total is less than the 5,000,000 gallon limit. BASF claims this data as "Confidential Business Information".

SC II.B.1.1 and 2, III.B.1-3: TDI emissions from TK-536 shall not exceed 0.0031 pounds per hour nor 0.18 pounds per year; TDI test to be performed on TK-536 upon request. COMPLIANCE. Exceedances of hourly emission limits from 2017 through 2022 and hourly emissions limits from 2017 through January of 2023 were resolved via AQD Consent Order 2023-14. BASF provided TDI tank pressures for January 2023 through July 2023. The one pressure safety valve release not part of AQD No. 2023-14 was 60 seconds of release on April 29, 2023, in which 0.00309 pounds of TDI were released. AQD will follow up with the facility regarding whether total emissions during this hour resulted in an exceedance of the hourly emission limit of 0.0031 pounds TDI. At this time, because controls and pressure safety valves are generally operating properly, compliance with these emissions limits is presumed.

SC III.A.3.1, V.1, 6, and 7: TK-536 shall not be operated unless the carbon canister is installed and operating properly; TDI shall not be transferred to delivery vessels unless emissions from the delivery vessels are controlled by installed carbon adsorption canisters operating properly; TK-536 carbon canisters shall be replaced every five years; a written record shall be maintained of the replacements.

COMPLIANCE. I observed the activated carbon canister on top of TK-536. Staff explained there is no color indicator used with this carbon canister to indicate when to it. The carbon canister is replaced on an annual frequency. BASF provided a record of the carbon drum replacement procedure and dates for TK-536. The record indicates the last carbon drum changeout occurred during May 12, 2023.

SC III.A.3.2, V.5, and VI.1: Records shall be maintained of the dimensions and capacity of the storage tank TK-536, per NSPS Kb; no more than 50,000 gallons stored in TK-536 at any given time.

COMPLIANCE. Please see submittal of September 27, 2007, where the tank capacity is listed at 50,000 gallons, the diameter at 20.2 feet, and the height at 22 feet.

SC V.2: TDI storage and transfer facilities shall incorporate a dry air or nitrogen gas pad for moisture control.

COMPLIANCE. During the active railcar loading of TK-536, it appeared that nitrogen was being piped into the railcar and out of the railcar via an insulated line. I did not observe the nitrogen pressure during the inspection.

SC V.3 and 4: Residual or spilled materials shall be stored in closed containers preventing TDI release to the ambient air; spilled material shall be immediately contained, neutralized and stored.

COMPLIANCE. During the inspection, a spill or stored spill materials were not observed.

ACO AQD 2023-14 Paragraphs and Compliance Status

Below is a summary of each paragraph in consent order AQD 2023-14 (effective 6/12/23) in the Compliance Program and Implementation Schedule section, and an explanation of the facility's compliance status.

Paragraph 9.A: Comply with TDI emission limits from the TDI storage tank.

COMPLIANCE. Compliance with the hourly and annual limit is determined by the throughput limit and the control maintenance requirement. As the annual throughput limit is in compliance and the control system appears in compliance, the facility is presumed in compliance with the hourly and annual emission limits as well.

Paragraph 9.B: Maintain monitoring and recording equipment for the TDI storage tank to measure pressure in units of inches of water.

COMPLIANCE. From observing parameters on a monitor on site, there appears to be pressures measured by pressure transducers PT2513 and PT2523. One transducer measures pressure for loading events, and the other measures pressure for unloading events. Staff provided a record of the pressures measured and recorded from the August 2, 2023 railcar loading event. Additionally, BASF provided a graph of TDI tank pressures from January 2023 through July 2023.

Paragraph 9.C: Maintain storage tank interlocks that will close so that during loading or unloading, the pressure stays below the point at which any pressure safety valve (PSV) on the TDI storage tank would open.

COMPLIANCE. In the facility's semi-annual deviation report for the first half of 2022, BASF discussed that the facility added an interlock to railcar unload line valve XV2513 to have the valve close based on TDI tank pressure. In a March 16, 2023 letter, BASF discussed that an interlock was additionally placed on valve XV2604 to close before the pressure can exceed 10 inches of water column while loading trucks from the TDI tank. During the inspection on a monitor displaying TDI tank information, I observed valves XV2513 (valve from railcar to TDI tank) and XV2607 (valve from TDI tank to truck)) related to pressure monitor PT2523. Viewing PT2523 on the monitor, pressure of 6 inches water was indicated as a level at which to take further action. Bryan explained that interlocks were added to those two valves, as well as to XV2512, XV2603, and XV2701 to reduce the possibility of PSV lifts (in addition to XV2604 discussed in the March 16, 2023 letter).

Paragraph 9.D: Monitor whether any PSV opens. If a PSV on the TDI storage tank opens, notify AQD in writing within 5 business days. In a notification, include an explanation, duration, TDI emission amount, and corrective actions.

COMPLIANCE. It appears TDI tank TK-536 has two pressure safety valves numbered PSV-2507 and PSV-2509. Bryan explained that if either PSV lifts, there is a visual and audible alarm in the control room, and automatic emails are sent that the PSV lifted. AQD has not received notifications of PSV openings since ACO 2023-14 went into effect on June 12, 2023. Bryan confirmed that no notifications have been received because there have not been events of the PSVs lifting since 6/12/23.

Polyols Cold Cleaner (MI-ROP-B4359-2003b, Section 2, FGPOLCOLDCLEANERS)

BASF operates a cold cleaner in the machining/maintenance area. I did not observe the cold cleaner during the inspection.

FGPOLCOLDCLEANERS Special Conditions and Compliance Status

Below is a summary of each special condition from FGPOLCOLDCLEANERS from the facility's ROP MI-ROP-B4359-2003b, and an explanation of the facility's compliance status.

SC II.A.1.1: Less than 5% of any combination of methylene chloride, perchloroethylene, trichloroethylene, 1,1,1-trichloroethane, carbon tetrachloride, and chloroform.

COMPLIANCE. Bryan confirmed the facility is still using solvent "Extreme Simple Green Aircraft Precision Cleaner". The SDS for this cleaner was provided in the facility's record submittal related to the 2021 facility inspection. The cleaner is water based (>78% water) and does not contain any of the indicated compounds. VOC content appears to be greater than 5%, so that the cold cleaner is not considered an aqueous-based parts washer.

SC I.C.1 through 3, III.A.3.1 through 5, V.1 through 5, VI.1: Cold cleaner operational requirements, including draining parts, closing cover when not in use, posting operating procedures near the cleaner, and storing waste solvents in closed containers; cold cleaner operational requirements are based on the type of cleaner and the vapor pressure of the solvent; information on each cold cleaner to be maintained on file.

COMPLIANCE. I did not observe whether the lid was closed, or evaluate whether operating instructions were posted. Instructions were confirmed posted at the 2016 facility inspection. The vapor pressure of the solvent is reported at 20.7 mmHg (0.40 psia). The cold cleaner air/vapor

interface to be less than 10 square feet. The solvent in the Polyols cold cleaner is agitated and its lid motorized.

Fugitive Emissions from Polyol (PTI 143-09, FGPOLFUG)

This flexible group contains fugitive emissions requirements for the conventional and graft polyol systems.

FGPOLFUG Special Conditions and Compliance Status

Below is a summary of FGPOLFUG special conditions from PTI 143-09, and an explanation of the facility's compliance status.

III.A.2.1 and 2, III.A.3.1 and 3, V.1 and 2: Leak detection and repair (LDAR) shall be performed on reactor trains 7, 8, 9 as per MACT PPP; LDAR program shall be instituted for reactor train 10 equivalent to the program in Rule 628 with noted exceptions; records maintained.

COMPLIANCE. Reactor train 10 has been replaced with reactor train 11, permitted under PTI 70-21. It appears appropriate to update reactor train 10 to 11 in PTI 143-09 via a Permit to Install application, or directly through the ROP renewal process. Since the end of the last FCE period (September 9, 2021), pursuant to 63.1439(e)(6), MACT PPP semiannual reports have been received on September 9, 2021, March 2, 2022, September 6, 2022, and March 13, 2023. These reports include summaries of MACT PPP LDAR activities. Rule 628 LDAR semiannual reports for FGPOLFUG have been received on September 9, 2021, March 2, 2022, and March 15, 2022, and March 15, 2023.

III.A.3.2 and 4: Keep records of emissions of EO, PO, CAN, and styrene. NOT APPLICABLE. PTI 143-09 does not have emission limits for EO, PO, ACN, and styrene. These

NOT APPLICABLE. PTI 143-09 does not have emission limits for EO, PO, ACN, and styrene. These were removed since MI-ROP-B4359-2003b.

Polyol Site-Wide Conditions (PTI 143-09, FGPOLFACILITY)

This flexible group aggregates permitted, exempt, and grandfathered equipment at the polyol plant and total emissions limitations.

FGPOLFACILITY Special Conditions and Compliance Status

Below is a summary of each special condition from FGPOLFACILITY from the facility's PTI 143-09, and an explanation of the facility's compliance status.

SC III.A.3.1: Keep monthly and 12-month rolling HAP emissions records.

COMPLIANCE. HAP emissions are tracked and reported on the Wyandotte Site HAPs Summary. See discussion of SOURCE-WIDE conditions SC II.B.1.1 and 2.2, III.A.3.2 and 3.

SC III.A.3.2, IV. 4, and V.1: Comply with 40 CFR Part 63 Subpart PPP.

COMPLIANCE. Please see discussion of Subpart PPP in EUPOLCONV and FGPOLFUG sections.

SC V.2: Comply with 40 CFR Part 60 Subpart YYYY.

NOT APPLICABLE. This subpart was proposed as Standards of Performance for VOC emissions from the synthetic organic chemical manufacturing industry (SOCMI) wastewater. To be located beginning at 40 CFR 60.770, the regulation has yet to pass beyond the proposal stage.

SC V.3: Comply with 40 CFR Part 60 Subpart Kb.

COMPLIANCE. BASF explained that tank TK-524 complies with 40 CFR Part 60 Subpart Kb by using a closed vent system and Polyol thermal oxidizer.

Tanks Subject to 40 CFR Part 60 Subpart Kb (MI-ROP-B4359-2003b, FGPOLNSPSKBTANKS) Per BSAF, currently the one tank subject to 40 CFR Part 60 Subpart Kb in the Polyol Manufacturing Plant is ACN storage tank TK-524.

FGPOLNSPSKBTANKS Special Conditions and Compliance Status

Below is a summary of each special condition from FGPOLNSPSKBTANKS from the facility's ROP MI-ROP-B4359-2003b, and an explanation of the facility's compliance status.

SC III.A.3.1: Records shall be maintained of the dimensions and capacity of the storage tank.

NOT EVALUATED. I did not request dimensions of ACN storage tank TK-524 during the facility inspection.

SC V.1: Comply with 40 CFR Part 60 Subpart Kb, the Standards of Performance for Volatile Organic Liquid Storage Vessels for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984.

COMPLIANCE. BASF explained that tank TK-524 complies with 40 CFR Part 60 Subpart Kb by using a closed vent system and Polyol thermal oxidizer.

Rule 290 Equipment in Polyol (MI-ROP-B4359-2003b, FGPOLRULE290)

BASF provided an inventory of emission units which use Rule 290 in Polyol, as well as the contaminants emitted; whether emissions are controlled or uncontrolled; and emissions records from July 2021 through July 2023 sufficient to indicate compliance with Rule 290 emission limits.

Equipment under rule 290 are: polyol storage tanks identified as "EUPOLTK" concatenated with the tank number; methylene diphenyl diisocyanate (MDI) storage tank EUPOLTK122; as well as equipment for transferring sugar bins (EUPOLSUGARPENT).

Polyol storage tanks have uncontrolled VOC emissions. VOC emissions over the entire 24-month period of July 2021 through July 2023 are below 300 pounds for each storage tank. This demonstrates compliance with the Rule 290 monthly uncontrolled VOC emission limit of 1000 pounds.

EUPOLTK122 emits VOCs and is controlled with a carbon adsorption canister. VOC emissions over the entire 24-month period of July 2021 through July 2023 are below 1 pound. This demonstrates compliance with the Rule 290 monthly VOC emission limit of 500 pounds.

EUPOLSUGARPENT is out of service. This appears to be because sugar is no longer used as a polyol backbone.

Chemical Engineering Research – Walkthrough & Compliance Status

I visited Chemical Engineering Research (CER) in the afternoon on August 2, 2023. Along with Bryan Hughes, Mark Waldrop, Senior Scientist, provided a walkthrough of CER.

The CER plant (formerly ACCE) mixes pilot-scale research activities with small-scale chemical manufacturing operations. Polyols are a commercial product from this plant. The research and development activities are covered under SRN M4808 and manufacturing activities are covered under SRN B4359. Many activities appear to be located in buildings 53 and 55. The facility has several smaller size reactors ranging from 10 to 160 gallons that are used for pure research (SRN M4808). Additionally, CER contains reactors utilized for either polyol production or research. Smaller reactors such as the 60 gallon R-20 and 250 gallon R-100 reactors are more often utilized for research and development while the larger 2,000 gallon R-30 reactor is more often utilized for commercial manufacture. A wet scrubber and vacuum jet condenser controls are applied for emissions control for both R&D and production processes.

Poly-THF Production (MI-ROP-B4359-2003b, Section 3, EUCHEPOLYTHF)

This emission unit covers production of poly-THF in reactors R-30, R-62, and R-63. BASF confirmed Poly-THF has not been produced since early 2003. The emission unit is in compliance with all emissions, throughput, and process specifications for the fact that the process has not been in operation. AQD did not visit these processes during the facility inspection.

Conventional Polyol Reactors (PTI 272-04, EUCHEPOLYOL)

This emission unit covers production of conventional polyether polyols in reactors R-20, R-30, and R-100, as well as oxide storage tanks TK-73 and TK-78 or tank cars. Staff explained reactor R-20 has not

been used since 2016. I visited reactor R-30 and R-100. Mark explained reactors today are being used for a butylene oxide research batch rather than for production. The research batch is being controlled.

EUCHEPOLYOL Special Conditions and Compliance Status

Below is a summary of each special condition from EUCHEPOLYOL from the facility's PTI 272-04, and an explanation of the facility's compliance status.

SC I.B.1-8: Maximum diameters and minimum heights for eight stacks SVCHE054, SVCHE057, SVCHE525, SVCHE526, SVCHE527, SVCHE528, SVCHET-110, and SVCHEWJET.

COMPLIANCE. I observed stack SVCHEWJET during the inspection. From observations, it appeared to have a diameter less than 3.1 inches, and a height more than 52 feet. The stack appeared to exhaust unobstructed vertically to ambient air; I did not observe a rain cap. SVCHET-110 was observed to have similar dimensions to permit requirements during the 2021 facility inspection.

SC II.B.1 through 4, III.B.1 through 3, Appendix 3-4 2j through 2m: Emissions from the polyether polyol process shall not exceed the following on a 12-month rolling time period basis: 7.22 tons VOC; 0.8 tons EO; 3.5 tons PO; 0.89 tons butylene oxide (BO). VOC, EO, PO, and BO monthly/12-month calculations kept for five years.

COMPLIANCE. Monthly records were provided for July 2021 through July 2023. Combined emissions of EU, PO, and VOC were 228.46 pounds from July 2021-June 2022, and 155.58 pounds from July 2022-June 2023. These combined emissions are less than each individual emission limit. It is assumed that the BO was not used in production (zero emissions).

SC V.1 and 2, Appendix 3-4 2a and b: Polyether polyol production shall not exceed 220 batches per 12-month rolling time period nor 3,300,000 pounds per 12-month rolling time period; records.

COMPLIANCE. Monthly records were provided for July 2021 through July 2023. For the 12-month period July 2022 through June 2023, BASF produced 28 batches and 413,947.6 pounds of polyol.

SC III.A.2.5, V.3 and 4, Appendix 3-4 2g and h: Install and operate north or south condenser system properly with a condenser exhaust gas temperature of 113°F or less; install and operate east or west condenser system properly and with a condenser exhaust gas temperature of 140°F or less; temperature records.

During the inspection, condenser systems were operating. I observed that building 55R N/S condensers, building 53Z E/W condensers, and wet scrubber T-110 were operating. I observed the following parameters.

Control	Parameter	Value	Time
55R N/S Condenser	Exhaust gas temperature	27.2 °C (81 °F)	2:20 PM
53Z E/W Condenser	Exhaust gas temperature	31.5 °C (88.7 °F)	2:04 PM

South and west vacuum jet temperatures were provided for August 2, 2023 via a graph. South vacuum jet temperature continually registered less than 30 °C (86 °F), below the limit of 113 °F. West vacuum jet temperatures continually registered less than 100°F, below the limit of 140°F.

SC III.A.2.1 and 3 through 4 and 6, V.5, Appendix 3-4.2d through f and i: Install and operate T-110 wet scrubber properly including: (a) pH of 3.0 or less; (b) pump outlet pressure of 2.0 bar gauge or less; (c) water concentration of 60 percent by weight or more. The scrubber solution shall be verified at the beginning of each month and whenever the scrubber solution is replaced. Maintain records. The T-110 wet scrubber pump shall be maintained with a flow alarm. Records of alarm conditions and steps taken in response shall be kept.

During the inspection, the wet scrubber T-110 was operating. Staff explained the scrubber starts with fresh water and phosphoric acid. The scrubber fills as EO and PO become ethylene glycol and propylene glycol. I observed the following pressure.

1

Control	Parameter	Value	Time
T-110 Wet Scrubber	Pump outlet pressure	0.94 bar	2:21 PM

Scrubber pressure was provided for August 2, 2023 via a graph. The graph indicates pressure was consistently less than half of the permit limit of 2.0 bar gauge.

BASF provided the scrubber operation log for July 2023. A commercial batch was produced on 7/31/23. Previous inspections discussed that an alarm sounds at 2 bar. Staff explained that pH is sampled monthly. From talking with BASF staff, a water sample is brought to the QA lab down the hall for pH monthly and water concentration via Karl Fischer titration. The log indicates that pH and water percentage were sampled on July 10, 2023, and were 1.9 and 94.0% respectively. BASF explained there were no alarm conditions during July 2023, the month for which I requested records.

SC III.A.2.2, Appendix 3-4 2c: Perform a visual inspection of all equipment in EO, PO, and BO service at the beginning of every month to ensure that there are no leaks; repair or replace any leaking equipment prior to the start of any subsequent batch. Keep records.

NOT EVALUATED. I did not request monthly inspection records during this inspection. As part of the facility inspection during January 24 and 25, 2019, LDAR activities were provided on the monthly production sheets for January 2019.

SC V.6, Appendix 3-4 2n: Magnesium silicate use limited to 77,000 pounds per 12month rolling time period. Keep records.

BASF provided monthly magnesium silicate usage from July 2021 through July 2023. For the 12month period of July 2022 through June 2023, total magnesium silicate usage was 900 pounds.

SC VI.1: Comply with NSPS Subparts A and Kb as they apply to storage tanks at EUCHEPOLYOL.

NOT APPLICABLE. Per BASF, tanks in EUCHEPOLYOL are excluded from NSPS Kb by date of construction, modification, or reconstruction; tank volume; and/or vapor pressure of the stored materials.

Graft Polyols (PTU 84-07, EU-CheGraft and EU-CheGraftFug)

Emission units EU-CheGraft and EU-CheGraftFug cover the production of grafted polyether polyols in reactor R-3. The emission unit is also used for research and development; the permit to install enables the unit to be utilized for both purposes. From the information submittal provided, no graft polyol was produced for commercial production. The emission units are in compliance with all emissions, throughput, and process specifications for the fact that the equipment has not been used for commercial production. BASF plans to void PTI 84-07. I did not visit R-3 during the inspection.

Production of Organic Activator (PTI 80-11B, EUCHEORGACT)

Emission unit EUCHEORGACT covers production of organic activator in reactor R-803. The emission unit is also used for research and development. BASF explained that EUCHEORGACT has not operated for since 2012 and that the unit is run under the EUCHEX5400 operating scenario (evaluated below).

Production of X-5400 Catalyst (PTI 80-11B, EUCHEX5400)

During the inspection, I observed product storage tanks TK-98 and TK-99. Staff explained the process was not running. I did not observe reactor R803 or condenser E802.

Emissions are controlled by a condenser system. During the inspection, the chiller was not running since the X-5400 catalyst production was not operating.

EUCHEX5400 Special Conditions and Compliance Status

Below is a summary of each special condition from EUCHEX5400 from the facility's PTI 80-11B, and an explanation of the facility's compliance status.

SC I.1, VI.1, an VI.5: VOC emissions shall be less than 1.0 tpy on a 12-month rolling time period. Keep monthly and 12-month records in an acceptable format.

COMPLIANCE. VOC emissions records were provided for July 2021 through July 2023. The highest 12-month rolling emissions were 770 pounds (0.385 tons) in June 2023.

SC II.1, VI.3: Maximum 183 batches of X-5400 catalyst in EUCHEX5400 per 12-month rolling time period. Keep records.

COMPLIANCE. The maximum number of batches produced over 12 months was 70 batches in June 2023.

SC III.1 and 2, VI.2: Install, maintain, and operate the condenser system in a satisfactory manner, with inlet chilled liquid solution is maintained at 57 °F or less. Install, maintain, operate, and calibrate yearly a device to monitor and record, on a continuous basis, the inlet chilled liquid solution temperature.

COMPLIANCE. BASF provided the inlet chilled solution temperature for July 27, 2023, which was the most-recent day that the process operated. The temperature graph indicates that the temperature did not exceed 3 °C (37.4 °F). I did not request calibration records.

SC V.1: Upon the request from the AQD, verify VOC emission rates from EUCHEX5400.

COMPLIANCE. At this time, AQD has not requested stack testing.

SC VI.4: Maintain a current list of materials used in EUCHEX5400 that are determined to be exempt from health-based screening level requirement of Rule 225. The list shall include the compound name and CAS number and a calculation demonstrating the emission rate of each material.

The facility provided that there are no materials emitted requiring a Rule 225 evaluation.

SC VIII.1-4: Stack parameters for stacks EF-1, EF-2, TK-98, and TK-99. NOT EVALUATED. I did not observe these stacks during this facility inspection.

SC IX.1: Comply with 40 CFR Part 63 Subpart A and VVVVVV.

COMPLIANCE. The AQD has accepted delegation of Subpart VVVVVV per Rule 960 (adopted by reference in Rule 902). In the June 10, 2019 submittal, BASF states "X-5400 is covered because of the use of a Table 1 Metal HAP – Nickel, found in the Nickel Chloride Solution, but it is not handled in a dry form and has no vapor pressure and therefore there are no Nickel emissions and requires only batch recordkeeping under 40 CFR 63.11496 (f)(2) to comply with the rule." Batch records are maintained per SC II.1 and SC VI.3.

On July 19, 2019, the facility submitted a Notice of Compliance Status (NOCS) for EUCHEX5400, which updates the NOCS received May 28, 2013. According to the July 19, 2019 submittal, "X5400 (EUCHEX5400) uses a Nickel salt in solution as a raw material and remains in solution throughout the entire manufacturing process. There are no emissions of particulate HAP in this process, hence the bulk of the metal HAP requirements are not applicable, except to maintain records."

Production of Rain Coat (PTI 14-18, EURAINCOAT)

I observed reactor R-62 and condenser E-6. These were not being used for rain coat production. Staff on site explained rain coat production has not occurred since before the COVID-19 pandemic, and confirmed in their provided records that EURAINCOAT has not operated since July 2019.

EURAINCOAT Special Conditions and Compliance Status

Below is a summary of each special condition from EURAINCOAT in PTI 14-18, and an explanation of the facility's compliance status.

SC I.1, VI.3, VI.4: VOC emissions less than 1.3 tpy on a 12-month rolling time period; keep monthly and 12-month records.

COMPLIANCE. Records provided from July 2021 through July 2023 indicate 0 pounds of VOC emissions.

SC II.1, VI.2: Material limit of 400 batches of Raincoat in EURAINCOAT per 12-month rolling time period; keep monthly and 12-month records.

COMPLIANCE. Records provided from July 2021 through July 2023 indicate 0 batches produced.

SC III.1 and 2, IV.1, IV.2, VI.1: Don't operate EURAINCOAT unless the outlet gas temperature from the hot well is 115 °F or less. Install, maintain, and operate the condenser system and a device to monitor and continuously record the outlet gas temperature from the hot well.

COMPLIANCE. Although rain coat was not being produced, I did observe the hot well for west steam jets. It was operating and temperature was being monitored. At 2:06 PM, I observed that the temperature of the outlet gas was 31.5 °C (88.5 °F), and the temperature of the west jet was the same at 31.5 °C. From my understanding of discussing the hot well with staff, it appears steam and process vapor are collected under vacuum, condensed so that liquids collect into the hot well on the first floor, and air exhausts to ambient air.

Because rain coat has not been produced in 2 years, I did not observe recent continuous temperature monitoring records from the last 2 years.

SC VIII.1: Stack SVCHEWJET shall have a maximum diameter of 3.1 inches and a minimum height of 52 feet above ground.

COMPLIANCE. I observed stack SVCHEWJET during the inspection. It appeared to have a diameter less than 3.1 inches, and a height more than 52 feet. The stack appeared to exhaust unobstructed vertically to ambient air; I did not observe a rain cap.

Production of Blocked Acid Catalyst (PTI 115-18, EUBACATALYST)

Blocked acid catalyst production utilizes existing equipment in Building 53Z: R63 reactor train, multiple steam vacuum jets with an inter-condenser discharging to a hotwell and vented to an exhaust stack (SVCHEWJET). I observed reactor train 63 during the inspection.

EUBACATALYST Special Conditions and Compliance Status

Below is a summary of each special condition from EUBACATALYST in PTI 115-18, and an explanation of the facility's compliance status.

SC I.1, VI.1, and VI.3: VOC emissions shall be less than 0.123 tpy on a 12-month rolling time period; keep records.

COMPLIANCE. Monthly records provided from July 2021 through July 2023 indicate the highest 12month rolling emissions are 5.4 pounds (0.0027 tons). Staff previously explained that emissions are based on emission factors.

SC II.1, VI.2: Material limit of 30 batches of blocked acid catalyst in EUBACATALYST per 12-month rolling time period; keep records.

COMPLIANCE. Monthly production records from July 2021 through July 2023 indicate a maximum of 2 batches were produced over any 12-month rolling time period.

SC VIII.1: Stack SVCHEWJET shall have a maximum diameter of 3.1 inches and a minimum height of 52 feet above ground.

COMPLIANCE. I observed stack SVCHEWJET during the inspection. It appeared to have a diameter less than 3.1 inches, and a height more than 52 feet. The stack appeared to exhaust unobstructed vertically to ambient air; I did not observe a rain cap.

Production of Rawmat 3334 (PTI 186-18, EURAWMAT3334)

Staff explained that production of Rawmat 3334 has been removed. In the follow-up records provided, BASF explained the emission unit has not operated since 2019 and there are no plans to operate in the future. The emission unit is in compliance with the emissions limit and material limit in PTI 186-18 because the process has not been in operation. BASF plans to submit a request to void PTI 186-18.

Resin Solution Replacement Process (PTI 67-20, EURESINRESOLV)

This is a resin solution replacement process for "Resin A" and "Resin B" using reactor R-63 and tank TK-65 in building 53Z. I visited reactor R-63 and tank TK-65 upstairs. Staff explained this tank receives solvent.

EURESINRESOLV Special Conditions and Compliance Status

Below is a summary of each special condition from EURESINRESOLV in PTI 67-20, and an explanation of the facility's compliance status.

SC I.1, III.1-2, VI.1-4: VOC emissions limit of 100 pounds on a 12-month rolling time period; process less than 20 batches each of resin A and resin B on a 12-month rolling time period; keep records.

COMPLIANCE. Records provided for July 2021 through July 2023 indicate 0 batches and 0 pounds of VOC emissions occurred during this time period.

SC III.3: While conducting the solvent stripping step of the process, close reactor R-63 to the atmosphere.

NOT EVALUATED. I did not observe if the reactor was closed to atmosphere, and this solvent stripping process did not appear to be occurring during the inspection.

SC VIII.1-2: Stack parameters for SVCHEWJET and SVCHE057.

COMPLIANCE. I observed stack SVCHEWJET during the inspection. It appeared to have a diameter less than 3.1 inches, and a height more than 52 feet. The stack appeared to exhaust unobstructed vertically to ambient air; I did not observe a rain cap. I did not observe stack SVCHE057.

Hardlen Mixing/Blending Operation (Rule 290, EUCHEHARDLEN, and 40 CFR Part 63 Subpart VVVVV)

EUCHEHARDLEN appears to involve the use of resin Hardlen F-2P which contains less than 1.5% chloroform is by weight according to its safety datasheet. During the inspection, staff explained EUCHEHARDLEN uses reactor 62, which I visited. It is a 2,000 gallon reactor. It appears to also be used for NMP distilling (EUCHENMP), another Rule 290-exempt process. According to staff, it appears the E6 condenser and tanks 64 and 65 are used for EUCHEHARDLEN, and that these are connected to the steam jets.

On May 28, 2013, the AQD received an Initial Notice of Compliance Status report for Chemical Manufacturing Area Source MACT at 40 CFR 63 Subpart VVVVVV from BASF Corporation. Please see B435923198. According to BASF, MACT VVVVV applies to certain equipment at the CER plant associated with EUCHEHARDLEN. The AQD accepted delegation of Subpart VVVVVV through R 336.1902 and R 336.1960.

According to the Subpart VVVVV May 2013 submittal, all batch chemical manufacturing process unit (CMPU) equipment consists of enclosed piping and vessels and complies with §63.11495. The May 2013 submittal also indicates that HAP usage is significantly less than 10,000 lb/yr and process vent requirements under §63.11496 are not applicable. The May 2013 submittal indicates HAP usage for EUCHEHARDLEN at 3 lbs/year chloroform for 10 batches made in 2012.

As part of the January 2019 facility inspection, EUCHEHARDLEN records demonstrating compliance with 40 CFR §63.11496(a)(4) were requested. §63.11496(a)(4) requires that organic HAP usage is less than 10,000 pounds per year and that monthly organic HAP usage records are maintained. On June 12, 2019 BASF provided HAP usage on a yearly basis for 2017 and 2018. The facility estimates chloroform usage based SDS for Hardlen F-2P Resin used. According to the SDS provided chloroform is less than 1.5% by weight. BASF reports that chloroform used is 27.6 pounds in 2017 and 17 pounds in 2018 (see attached correspondence). Based on the small quantities used, the AQD is not pursuing monthly records at this time. As part of this inspection EUCHEHARDLEN was not evaluated for full compliance with Subpart VVVVVV. Please see the discussion of FGCHERULE290 for Rule 290 equipment in CER.

Rule 290 Equipment in CER (MI-ROP-B4359-2003b, FGCHERULE290)

BASF explained that there are processes using existing reactors R-30, R-62, R-400, and R-20 that are exempt from obtaining a PTI per Rule 290. BASF provided an inventory of emission units which use Rule 290. The five emission units operating under Rule 290 in CER are EUCHEBLENDS, EUCHEHARDLEN, EUCHENMP, EUCHEGRAFTEDPOLYOL, and EUCHEMARS7. Of these, all emit VOCs, and EUCHEMARS7 also emits particulate matter. BASF also provided their monthly emissions from June 2021 through July 2023. BASF claims the provided emissions data as "Confidential Business Information". These records indicate that the combination of monthly VOC and PM emissions are less than 500 pounds per month. EUCHEMARS7 emitted 0 pounds of VOC and particulate matter.

EUCHEGRAFTEDPOLYOL appears to be the production of CS-10, which was permitted under PTI 22-22, issued March 1, 2022. On 10/6/23, BASF informed me they discussed PTI 22-22 with AQD permit staff, and PTI 22-22 for EUCHECS10 is void because production of the first batch of CS-10 did not occur within 18 months of the permit issuance date. Limited, periodic production of CS-10 will continue to occur (as has occurred historically) under the Rule 290 exemption as EUCHEGRAFTEDPOLYOL.

Other Rule 290 equipment in the facility's annual emissions report is EUCHEGRAFTINDEX, EUCheHalfEster, EUCheMacromer, and EUCheEpilmine. According to the annual emissions report, it appears these processes have operated since before 2020.

Thermoplastic Urethane Synthesis Manufacturing Unit – Walkthrough & Compliance Status Following CER, I visited the thermal plastic polyurethane manufacturing process, also on the afternoon of August 2, 2023. Along with Bryan Hughes, Evan Rinke provided a walkthrough of the facility.

The thermoplastic polyurethane (TPU) manufacturing process produces a TPU elastomer from diols, MDI, and solid materials. Raw materials are mixed together and conveyed by belt through an oven. Upon release from the oven, cooling water appears to solidify the product, and it is then diced in a rotary cutter. Staff explained there is no exhaust associated with dicing. The dice appear to be classified to silos; transferred to a hopper; extruded; stored in heated storage silos; and then packed out (packaged). Regarding controls, VOCs are controlled by carbon adsorbers and water scrubbers, and dust collectors are used for particulate emissions control.

BASF considers these TPU operations to be exempt from obtaining a Permit to Install per Rule 290 for emission units with limited emissions.

MDI Storage Tanks (MI-ROP-B4359-2003b, EUTPURULE290)

I visited two methylene diphenyl diisocyanate (MDI) storage tanks 1104 and 1105. Vapors from the tanks vent through an activate carbon drum, before exhausting to ambient air. Transparent color indicator sleeves are installed on each carbon drum which are initially purple in length. As the length of purple decreases and brown increases, this is an indication to change the activated carbon. Staff explained that the indicator is checked once a month, and the activated carbon is changed every 3 months. I observed that each MDI storage tank 1104 and 1105 had a date of 7/28/23. Additionally, each color indicator appeared to have several inches of purple color. Staff also explained that tanks 1104 and 1105 have a nitrogen pad, meaning that the vapor space contains nitrogen.

Two TPU Conveyor Lines (MI-ROP-B4359-2003b, EUTPUSYNTHESIS)

I observed the two TPU conveyor lines at 3:14 PM. Lines were not operating during the inspection. Raw materials in the TPU process are MDI, 1-3 butanediol, and elastoslab, which is a stabilizer and BASF product. These raw materials are dosed, mixed together, and conveyed by conveyor belt through a heated oven area and then a cooling area.

I observed baghouses at the belt lines to control particulate emissions. These appeared to be labeled F1170, F1177, and F4720. Staff explained that filter F1170 doesn't exhaust to ambient air. Staff explained the baghouses pulse into a container below on wheels. It sounds like filter bags themselves are replaced approximately every 2 years.

I observed water scrubbers, which control MDI emissions from the heated (oven) portion of the belt lines. The heated portion is referred to in records as the reaction belt hot zone. Although belts were not operating, I observed that scrubbers were operating. At 3:23 PM, I observed the following flows in gallons per minute:

Conveyor Line 1		Conveyor Line 2	
Stage 1 water scrubber flow rate	45 gpm	Stage 1 water scrubber flow rate	194 gpm
Stage 2 water scrubber flow rate	48 gpm	(\$4050)	

Three Extrusion Lines (MI-ROP-B4359-2003b, EUTPUSYNTHESIS)

Dice from the belt line and dicer are then extruded. There are three extrusion lines. I observed that extrusion lines 1 and 2 were operating; line 3 was not in operation. I did not observe visible emissions or odors from the lines. Extruders use electric heat. I observed a Nederman arm exhaust collection system. It doesn't appear that the extruding process exhausts to ambient air.

Rule 286(2)(a) excludes from the requirement to obtain a Permit to Install "[p]lastic extrusion . . . and associated plastic resin handling, storage, and drying equipment." This exemption applies to the TPU extruding lines and plastic storage silos. This equipment is still required to comply with Rules 301 for opacity; 331 for particulate matter emissions; 901 for unreasonably interfering with the comfortable enjoyment of life and property; and 910 for installing, maintaining, and operating air-cleaning devices. The facility appeared to be in compliance with these rules. I did not observe odors or opacity from the extruding operations.

Burnoff Oven (MI-ROP-B4359-2003b, EUTPUSYNTHESIS)

Metal parts are burned clean in a Rule 290 natural gas-fired burnoff oven located to the northeast of the TPU plant. I visited the burnoff oven at 4:08 PM. I observed that the oven has a primary burner and an afterburner. The oven and afterburner are fueled by natural gas. The oven stack is unobstructed and exhausts to ambient air.

EUTPUFURNACE Rule 290 Compliance Status

From the facility's air emissions report for 2022, NOx, VOCs, SOx, particulates, and CO emissions appear to be below Rule 290 thresholds.

FGTPURULE290 Special Conditions and Compliance Status

Flexible group FGTPURULE290 in MI-ROP-B4359-2003b is comprised of EUTPURULE290, EUTPUSYNTHESIS, and EUTPUFURNACE. Below is a summary of special conditions from FGTPURULE290, and an explanation of the facility's compliance status.

Rule 290(2)(a)(ii): For air contaminants with an ITSL above 2 micrograms per meter cubed (ug/m3) and no IRSL, emit less than 500/1000 pounds controlled/uncontrolled monthly.

COMPLIANCE. BASF provided monthly VOC and PM emissions from TPU Line 1 and Line 2 for July 2021 through July 2023. Additionally, the facility's air emissions report for 2022 provides monthly emissions of each VOC air contaminant. Of these contaminants, 1,4 butanediol (BD) (CAS 110634) has a screening level of 79 ug/m3 so that its controlled emissions are limited to 500 pounds monthly. Additionally, particulate matter is emitted. Each month of 2022, monthly combined VOC BD and PM emissions did not exceed 500 pounds.

Rule 290(2)(a)(ii)(A): With an ITSL between 0.4 and 2 ug/m3, emit less than 10/20 pounds controlled/uncontrolled monthly.

COMPLIANCE. MDI has an ITSL of 0.6 ug/m3. It appears to be emitted at a rate less than 10 pounds per month. BASF provided detailed monthly MDI emissions records in their 2022 emissions report. Monthly MDI emissions did not exceed 10 pounds.

In addition to BD and MDI, it appears that polytetrahydrofuran and several other VOCs are emitted at less than 10 pounds per month. AQD does not have ITSL or IRSL values for these contaminants.

SC III.A.2.1-2: Install, calibrate, maintain, and operate a device to monitor water scrubber liquid flow rate on a continuous basis; record liquid flowrate at least once per month.

COMPLIANCE. BASF provided monthly records of scrubber flow rates for July 2021 through July 2023. The lowest scrubber flowrate for pumps 1154A and B was 37 gallons per minute. Scrubber flowrate for pump 4050 did not fall below 172 gallons per minute.

SC III.A.2.3-5: Inspect water scrubber at least every 12 months; keep records of malfunctions, repairs, and corrective actions.

COMPLIANCE. BASF provided monthly scrubber inspections for July 2021 through July 2023, and dates and descriptions of maintenance conducted.

SC V.2, III.A.2.6: Equip and maintain an interlock to prevent the synthesis belt line from operating if the scrubber flow rate is less than the required minimum flow rate; record each interlock shutdown.

COMPLIANCE. Staff explained scrubber flow rate is interlocked with the conveyor line operation via a programmable logic control. If the flow is less than the minimum flow rate, the lines automatically shut down. Records indicate the minimum flowrate for each scrubber is 10 gallons per minute. Records of maintenance indicate there were not any interlock shutdowns from July 2021 through July 2023.

Wyandotte Dispersions and Resins – Walkthrough & Compliance Status

I visited Wyandotte Dispersions and Resins (WYD&R) on the afternoon of August 1, 2023. Along with Byran Hughes, David Whipple and Tom Wharton, EHS Specialist, provided a tour of the facility. WYD&R was not operating during the inspection due to maintenance and repair activities.

WYD&R manufactures polymers and resins for inks, varnishes, and industrial coatings utilized in the printing and packaging industries. Raw material monomers, surfactants, initiators, and water from the tank farm (PTI 113-07B, FG-RAWMATLS) are reacted to form solid and liquid grade organic (SGO) resins (PTI 113-07B, FG-SGO) and emulsion polymers (PTI 113-07B, FG-EMULSIONS). Resin cutting (PTI 113-07B, FG-RESINCUT), product drumming and storage (PTI 113-07B, FG-DRUMMING and FG-PRODUCTS), and a product warehouse (PTI 174-08A, EUJONBAGGING) are sited at the plant. This facility is designed such that the majority of emissions points throughout the plant are ducted to a regenerative thermal oxidizer (PTI 113-07B, FG-RTO) for the control of VOC emissions. A fabric filter (PTI 113-07B, F-1091) controls particulates from other ancillary emissions points not exhausting through the RTO.

Outdoor Raw Material Storage Tanks (PTI 113-07B, FG-RAWMATLS)

I visited the outdoor raw material storage tanks. Staff explained that monomer storage tanks are vented to the D-0031 knockout tank to allow for thermal expansion, and then to the WYD&R RTO. Pressure safety valves are present on tanks for safety purposes.

FG-RAWMATLS Special Conditions and Compliance Status

Below is a summary of each special condition from FG-RAWMATLS in PTI 113-07B, and an explanation of the facility's compliance status.

SC II.1, VI.1, and VI.2: Ethyl acrylate throughput limited to 379,000 gallons per 12month rolling time period. Keep monthly and 12-month rolling records. COMPLIANCE. Records provided for July 2021 through July 2023 indicate 12-month rolling throughput is less than 379,000 gallons. BASF claims this data as CBI.

SC III.1 and VI.3: Comply with NSPS Kb as applicable to storage tanks EUJONTK-0001, 2, 3, 4, 5, 6, 7, and 8.

COMPLIANCE. With the 10/15/2003 revision to the standard, BASF explained that tank EUJONTK-0004 is the only tank in WYD&R currently subject to NSPS Kb. From Appendix F of the permit application for PTI 113-07, it has a capacity of 80,000 gallons and stores a liquid with vapor pressure of 5.8 kilopascals. Other tanks store liquids with vapor pressures less than 1.1 kilopascals. BASF explained the facility complies with 60.112b(a) by operating EUJONTK-0004 with a closed vent system that exhausts to the RTO per 60.112b(a)(3). I did not request tank dimensions during this inspection.

SC IV.1: EUJONTK-0004 leak detection requirements per 40 CFR 60.485(b).

COMPLIANCE. BASF has an outside company conducts leak detection throughout the tank farm. BASF maintenance staff repair leaks upon their detection. EUJONTK-0004 appears to be part of the FG-JONFACILITY leak detection and repair (LDAR) program equivalent to Rule 628.

Emulsion Polymer Production (PTI 113-07B, FG-EMULSIONS)

I visited the emulsions production area of WYD&R, where four reactor trains produce emulsions. The trains were not operating during the visit. Each emulsion train appears to be a series of tanks located vertically through four floors, which staff explained are fed by gravity. It appears that these tanks vent to the regenerative thermal oxidizer, with the hold tank venting to the emulsion reactor. Finished emulsion product appears to go in the hold tank and to be filtered before being packaged as a final product.

FG-EMULSIONS Special Conditions and Compliance Status

Below is a summary of each special condition from FG-EMULSIONS in PTI 113-07B, and an explanation of the facility's compliance status.

SC II.1, VI.1 and VI.2: Production of emulsion polymer limited to 241,000,000 pounds per 12-month rolling time period; records.

COMPLIANCE. Monthly and 12-month rolling production records were provided for July 2021 through July 2023. The highest 12-month rolling value does not exceed 241,000,000 pounds. BASF claims this data as "Confidential Business Information".

Solid/Liquid Grade Resin Production (PTI 113-07B, FG-SGO)

I visited the bottom floor of the SGO production area of WYD&R. Here there are four reactor trains that produce solid/liquid grade organic resins (SGO) through a series of gravity-fed tanks located vertically through four floors. The production trains were not operating during the inspection.

I visited polymer cooling belt line 1200, one of three cooling belt lines (EUSGOCOOLBELT) that are part of FG-SGO. Two of the reactor trains share one cooling belt. Cooling belts were not operating during the inspection. It appears that the molten portion of the cooling belts is exhausted to the RTO.

I also visited an SGO dicer. It was not operating during the inspection. These cut the solid polymer into small pieces and appear to be controlled by fabric filter F-1091.

I visited fabric filter F-1091 on site. It was operating. Staff explained it controls SGO dicing. Ventilation to the dust collector is labeled. From observing ventilation, it appears that the fabric filter controls the bucket elevator, hopper room vent space, bagging line hopper cartridge, and chopper. I observed waste particulate was below the fabric filter in a sealed blue container which appeared to be in good condition. Staff explained the container can't be reused. The waste is type D, meaning that it doesn't need grounding.

FG-SGO Special Conditions and Compliance Status

Below is a summary of each special condition from FG-SGO in PTI 113-07B, and an explanation of the facility's compliance status.

SC I.1, IV.1, IV.2, and VI.3: Particulate emissions from the grinder not to exceed 0.10 pounds per thousand pounds of exhaust gases; fabric filter F-1091 installed and operating properly, including the operation of the filter within the proper pressure drop operating range; pressure drop measured and recorded on a daily basis. COMPLIANCE. The dust collector F-1091 appeared to be operating properly and was in good condition. I observed the collector pressure differential to be 3.3 pounds per square inch (PSI). It

appears that between 1 – 7 PSI is considered safe. I observed the purge system pressure drop of 0.27 PSI. It appears that between 0.15 and 0.35 PSI is considered safe.

BASF provided daily pressure drop records for the month of July 2023, which included the time and pressure reading in PSI in electronic format. The record notes that the value should be within 1 and 7 psi. The daily pressure drop value ranges from 3 to 6 psi.

SC V.1: Stack test upon request of AQD.

NOT EVALUATED. AQD has not requested stack testing.

SC II.1, VI.1, and VI. 2: Production of solid/liquid grade resin limited to 142,000,000 pounds per 12-month rolling time period; records.

COMPLIANCE. Monthly and 12-month rolling production records for the period of July 2021 through July 2023 indicate that 12-month rolling production has not exceeded 142,000,000 pounds. BASF claims this data as "Confidential Business Information".

Solvent cutting and water blending of resin (PTI 113-07B, FG-RESINCUT)

FG-RESINCUT is for SGO dissolving from a solid to a liquid, like sugar to water. It appears to involve hot ammonia and hot water. I observed the two cutting/blending vessels which are D-0901 and D-0902. D-0902 is approximately 2/3 the size of D-0901.

FG-RESINCUT Special Conditions and Compliance Status

Below is a summary of each special condition from FG- RESINCUT in PTI 113-07B, and an explanation of the facility's compliance status.

SC II.1, VI.1, and VI.2: Production of cut resin limited to 143,000,000 pounds per 12month rolling time period; records.

COMPLIANCE. Monthly and 12-month rolling production records from July 2021 through July 2023 indicate that 12-month rolling production has not exceeded 143,000,000 pounds. BASF claims this data as "Confidential Business Information".

Product storage in about 60 tanks (PTI 113-07B, FG-PRODUCTS, and ACO AQD No. 2018-03) I walked through the facility area with about 60 product storage tanks. Several of the tanks are controlled by the RTO as described in PTI 113-07B. Staff showed how piping carousels direct the product to the storage tank.

FG-PRODUCTS Special Conditions and Compliance Status

Below is a summary of each special condition from FG- PRODUCTS in PTI 113-07B, and an explanation of the facility's compliance status.

SC I.1, VI.1, and VI.3: Ethyl acrylate from FG-PRODUCTS equipment not vented to the RTO limited to 0.0144 pounds per hour; throughput records and other records maintained as necessary to determine compliance with limit, which may be prorated from monthly records to an hourly rate.

COMPLIANCE. BASF provided prorated pound per hour ethyl acrylate emissions data from tanks for each month from July 2021 through July 2023. Each monthly pound per hour ethyl acrylate emission rate is less than 0.0144. BASF claims this data as "Confidential Business Information".

SC I.2, IV.1, IV.2, and VI.2: Particulate emissions from FG-PRODSILOS not to exceed 0.10 pounds per thousand pounds of exhaust gases; fabric filter F-1091 installed and operating properly, including the operation of the filter within the proper pressure drop operating range; pressure drop measured and recorded on a daily basis.

COMPLIANCE. The dust collector F-1091 appeared to be operating properly and was in good condition. I observed the collector pressure differential to be 3.3 pounds per square inch (PSI). It appears that between 1 – 7 PSI is considered safe. I observed the purge system pressure drop of 0.27 PSI. It appears that between 0.15 and 0.35 PSI is considered safe.

BASF provided daily pressure drop records for the month of July 2023, which included the time and pressure reading in PSI in electronic format. The record notes that the value should be within 1 and 7 psi. The daily pressure drop value ranges from 3 to 6 psi.

SC V.1 and V.2: Stack test to verify ethyl acrylate and PM emission rates upon request.

NOT EVALUATED. AQD has not requested stack testing.

SC VIII.1 and VIII.2: Stack dimensions for two stacks associated with FG-PRODUCTS. Stacks are not required to discharge unobstructed vertically.

These stacks are two room vents for the finished product storage area. In the PTI 113-07B application, BASF modeled these room vents, and the PTI was approved and issued. I did not observe these stack vents during this inspection.

ACO AQD 2018-03 Paragraphs and Compliance Status

Below is a summary of each paragraph related to FG-PRODUCTS in consent order AQD 2018-03 (effective 5/7/18) in the Compliance Program and Implementation Schedule section, and an explanation of the facility's compliance status.

Paragraph 9.C: Modify the stack associated with FG-PRODUCTS to bring it into compliance with PTI 113-07A, as amended.

COMPLIANCE. PTI 113-07A has been amended to PTI 113-07B. As described in the 2019 facility inspection report, when applying for PTI 113-07B, BASF included new modeling using the installed stack(s) SV-PROD1 and SV-PROD2, which are the room vents for the finished products storage area (emulsions and resin). Per PTI 113-07B, these stacks are not required to discharge unobstructed vertically. I did not observe these stacks during the inspection.

Product Filling (PTI 113-07B, FG-DRUMMING, and ACO AQD 2018-03)

I observed the emulsion product filling area with two emulsion drumlines (EUJONEMULDRUMLINE1 and EUJONEMULDRUMLINE2). These were not operating during the inspection. Staff explained emulsions travel to the totes and drums via pipe. The north side of the emulsion drumming appears to have a dust collector to control ammonia vapors from resin cuts. I did not observe the separate SGO drum line EUJONRESINDRUMLINE.

FG-DRUMMING Special Conditions and Compliance Status

Below is a summary of each special condition from FG-DRUMMING in PTI 113-07B, and an explanation of the facility's compliance status.

SC I.1, VI.1, and VI.2: Ethyl acrylate from FG-DRUMMING equipment not vented to the RTO limited to 0.0144 pounds per hour; throughput records and other records maintained as necessary to determine compliance with limit, which may be prorated from monthly records to an hourly rate.

COMPLIANCE. BASF provided prorated pound per hour ethyl acrylate emissions data from drumming for each month from July 2021 through July 2023. Each monthly pound per hour ethyl acrylate emission rate is less than 0.0144. BASF claims this data as "Confidential Business Information".

SC V.1: Stack test to verify ethyl acrylate emission rate upon request. NOT EVALUATED. AQD has not requested stack testing.

SC II.1 and VI.3: Material limit of 5,000,000 gallons of organic compound loading with a vapor pressure greater than 1.5 psia per 12-month rolling time period; records. COMPLIANCE. BASF provided monthly and 12-month rolling liquid resin production records. 12-month rolling production has not exceeded 5,000,000 gallons. BASF claims this data as "Confidential Business Information".

SC VIII.1: Stack minimum height and maximum diameter for SV-DRUM. NOT EVALUATED. I did not observe stack SV-DRUM during this inspection.

ACO AQD 2018-03 Paragraphs and Compliance Status

Below is a summary of each paragraph related to FG-DRUMMING in consent order AQD 2018-03 (effective 5/7/18) in the Compliance Program and Implementation Schedule section, and an explanation of the facility's compliance status.

Paragraph 9.B: Modify the stack associated with FG-DRUMMING to bring it into compliance with PTI 113-07A, as amended.

COMPLIANCE. PTI 113-07A has been amended to PTI 113-07B. As described in the 2019 facility inspection report, the stack has been extended approximately 15 feet and is now equipped with a rain sleeve (discharging vertically upwards). The stack is in compliance with SV-DRUM in PTI 113-07B. I did not observe the stack during this inspection.

WYD&R Regenerative Thermal Oxidizer (PTI 113-07B, FG-RTO, and ACO AQD No. 2018-03) I visited the WYD&R RTO. Although the WYD&R facility was not operating, the RTO was operating to control storage tank vapor space exhaust. The RTO operates all the time except planned outages.

The RTO has 12 chambers which rotate every 15 seconds for a total cycle time of 3 minutes. There are 5 inlet chambers; 5 outlet; one flush; and one dead zone.

FG-RTO Special Conditions and Compliance Status

Below is a summary of each special condition from FG-RTO in PTI 113-07B, and an explanation of the facility's compliance status.

SC I.1, V.1, and V.2: Ethyl acrylate emissions limited to 0.21 pounds per hour; test required every 5 years for TOC and ethyl acetate. For VOC destruction efficiency (DE), stack test no later than December 31, 2019, and every 2 years thereafter. After 2 consecutive events demonstrating compliance with the minimum VOC destruction efficiency limits for FG-RTO, the permittee may return to the testing schedule in V.1.

FURTHER EVALUATION NEEDED. Performance testing conducted on December 6, 2016 indicated an ethyl acrylate emission rate of 0.09 pound per hour, which is below the emission limit of 0.21 pounds ethyl acetate per hour. Testing for VOC DE was conducted on November 26, 2019; May 13, 2020; and April 26, 2022. AQD will follow up with the facility regarding more recent ethyl acrylate testing.

SC III.1, VI.2, VI.4, and VI.5: Submit an operating plan pursuant to 60.113b(c)(1); monitor the closed vent system and RTO in accordance with the plan; maintain a copy of plan and records of monitoring conducted for compliance with the operating plan; keep records of parameter measured values in accordance with the operating plan.

COMPLIANCE. AQD received the NSPS Kb Operating Plan revised July 12, 2022. BASF confirmed this is the most-recent plan version. BASF explained that thermal oxidizer temperature is the parameter monitored to ensure proper operation of the RTO.

BASF provided the 3-hour average temperatures for August 1, 2023. On August 1, 2023, the firebox temperature ranged from 1549.5 °F to 1550.5 °F. This is greater than the 50 °F below the average temperature during stack testing, so this is satisfactory operation.

SC IV.1, V.1, and VI.6: Equipment vented to the RTO shall not be operated unless the RTO is installed, maintained, and operated in a satisfactory manner, including maintaining a 3-hour average temperature not less than 50°F less than the average during a performance test where a TOC (minus methane and ethane) destruction efficiency of 98% is demonstrated; TOC destruction efficiency performance test required and reported to AQD.

The average RTO firebox temperature during the most recent stack test was 1549 °F in testing on April 26, 2022, during which a TOC destruction efficiency of 98% was demonstrated.

During the inspection, at 3:19 PM, I observed a chamber temperature of 1556 °F.

SC IV.2, VI.3, VI.7: Continuously monitor and record firebox temperature; record time periods when the 3-hour average is below the minimum; regular inspections to be performed to determine operating status of RTO and process emissions to oxidizer to be discontinued within one hour in the event of an RTO malfunction; temperature monitor to be calibrated.

COMPLIANCE. In the provided records, BASF explained they purchase pre-calibrated thermocouples (RTD units). Staff explained Durr comes out for RTO inspections. BASF provided the most-recent RTO service report from when Durr visited on March 21, 2023.

BASF provided the 3-hour average temperatures for August 1, 2023. On August 1, 2023, the firebox temperature ranged from 1549.5 °F to 1550.5 °F. This is greater than the 50 °F below the average temperature during stack testing, so this is satisfactory operation.

SC IV.3, IV.4, and VI.8: Shall not install bypass valves that could divert a vent stream from the RTO except as allowed by SC IV.4. During periods of shutdown of the RTO system for maintenance or offline inspections, the facility may vent storage tanks and process tanks breathing losses to atmosphere by way of the RTO emergency vent. During RTO shutdowns, the facility shall minimize uncontrolled emissions. Keep records of RTO shutdowns.

COMPLIANCE. The facility reports any bypass of the RTO through semiannual or annual reporting. Since the end of the last FCE period (September 9, 2021), the facility appeared to exhaust through the bypass stack for 27.5 hours from 1/1/21 through 6/30/21; for 8.6 hours from 7/1/21 through 12/31/21; for 5 hours from 1/1/22 through 6/30/22; and half an hour for 7/1/22 through 12/31/22. The deviations appear to be malfunctions as defined in 40 CFR Part 60, Subpart A, §60.2. I did not request additional records of RTO shutdown periods.

On May 6, 2022, Bryan explained how, during periods of exhaust through the bypass stack, BASF shuts down processes so that emissions are only from breathing losses from storage and process tanks. The time to safely shut down depends on the point in a process. The facility will finish processes that have already begun. For example, if an emulsion line is the middle of a run, they will finish that run. But the facility won't start new processes. This allows the facility to safely discontinue the sources of emissions to the thermal oxidizer besides tank breathing losses.

SC VIII.1-2: RTO stack and bypass stack parameters. Both stacks shall discharge unobstructed vertically.

COMPLIANCE. From a visual observation, stacks appear to have similar dimensions to these conditions. The RTO stack is unobstructed. There is a rain cap on the RTO bypass stack, so that it appears to be obstructed. A review of the permit file indicates that the bypass stack did not appear to require modeling. In June of 2022, AQD discussed with the facility to resolve this discrepancy by applying for a PTI to modify the stack requirements in PTI 113-07B, a PTI application has not been received. AQD will request that the facility modify PTI 113-07B to accurately reflect that the bypass stack is obstructed.

ACO AQD 2018-03 Paragraphs and Compliance Status

Below is a summary of each paragraph related to FG-RTO in consent order AQD 2018-03 (effective 5/7/18) in the Compliance Program and Implementation Schedule section, and an explanation of the facility's compliance status.

Paragraph 9.A: On WYD&R FG-RTO in PTI 113-07A, as amended, keep online and offline checks performed by Durr, and all checks to verify proper function of the rotary valve and thrust bearing assembly performed by Durr on the RTO.

COMPLIANCE. PTI 113-07A has been amended to PTI 113-07B. BASF provided the most-recent RTO service report from when Durr visited on March 21, 2023.

Paragraph 10.B: Comply with the minimum VOC destruction efficiency limits for FG-RAWMATLS and FG-RTO in PTI 113-07A, as amended.

PTI 113-07A has been amended to PTI 113-07B. PTI 113-07B, FG-RTO, SC IV. 1 requires a 98% TOC (minus methane and ethane) destruction efficiency. NSPS Kb requires a 95% VOC destruction

efficiency (40 CFR 60.112b(a)(3)(ii) and stipulates a test to demonstrate compliance if the oxidizer's minimum residence time is less than 0.75 seconds or its minimum temperature is less than 1500°F (40 CFR 60.113b(c)(1)(i)).

Testing conducted on May 13, 2020 indicated an average TOC destruction efficiency of 98.0% demonstrating compliance. Testing conducted on April 26, 2022, demonstrated a TOC destruction efficiency of 98%.

Paragraph 10.C-G: No later than December 31, 2019 and continuing every two years thereafter, submit test plan for FG-RTO to determine the VOC destruction efficiency. Within thirty days after AQD approval of test plan, conduct stack testing. Within sixty days after test completion, submit test report with test data and results. Shall notify not less than 7 days prior to testing. After two consecutive testing events demonstrating compliance with the minimum VOC destruction efficiency the company may return to the testing schedule in PTI 113-07A, as amended.

COMPLIANCE. PTI 113-07A has been amended to PTI 113-07B. Because two consecutive tests appear to demonstrate compliance with the minimum VOC destruction efficiency (May 13, 2020 and April 26, 2022), it appears the facility may return to the testing schedule of every 5 years per PTI 113 -07B, FG-RTO, SC V.1.

WYD&R Site-Wide Conditions (PTI 113-07B, FG-JONFACILITY)

FG-JONFACILITY includes conditions that encompass the entire WYD&R facility including equipment exempt from obtaining a PTI.

FG-JONFACILITY Special Conditions and Compliance Status Below is a summary of each special condition from FG-JONFACILITY in PTI 113-07B, and an explanation of the facility's compliance status.

SC I.1, VI.1, and VI.2: VOC emissions from WYR not to exceed 36 tons per 12-month rolling time period; records maintained.

COMPLIANCE. BASF provided monthly and 12-month rolling VOC emissions from WYD&R for July 2021 through July 2023. Emissions have not exceeded 36 tons per 12-month time period. BASF claims this data as "Confidential Business Information".

SC III.1, VI.3: Implement and maintain a leak detection and repair (LDAR) program equivalent to Rule 628 with some alterations, including the submittal of semiannual (instead of quarterly) reports; records required.

COMPLIANCE. The WYR plant is not subject to Rule 628, however, an LDAR program is necessary to provide a mechanism to quantify fugitive emissions; otherwise, a 12-month total for the plant cannot be obtained as needed to determine compliance with the 12-month rolling VOC limit. AQD and BASF agreed to model an LDAR program after an existing program (Rule 628) with some minor alterations. Talking with staff, it appears that Alliance Emissions Monitoring conducts the LDAR monitoring. Since the end of the last FCE period (September 9, 2021), Rule 628 LDAR semiannual reports for FG-JONFACILITY have been received on September 9, 2021, March 2, 2022, September 6, 2022, and March 15, 2023. The facility provided an inventory of all components subject to the LDAR requirements.

SGO Bagging Line and Warehouse (PTI 174-08A, EUJONBAGGING)

I visited the SOG bagging line and warehouse on the morning of August 2, 2023. The bagging line and baghouse were operating. Observing the Donaldson baghouse outside next to the bagging line, the baghouse appears to be in good condition. I did not observe any resins around the baghouse. Staff on site explained that they look at the baghouse daily and don't see any dust. I heard a pulse every several seconds. A sealed container was located underneath the baghouse to collect particulate. Staff explained the container is checked and changed as needed. The baghouse is opened to observe bags as needed. Filters are changed as needed based upon the pressure drop.

The container underneath the baghouse is the same supersack used for production SGO bagging on the line. Replacement baghouse filters appear to be on site. Bryan showed me the Central Stores on site where maintenance equipment is stored to be used as needed. I observed backup filters ready to be used as needed, including for WYD&R fabric filter F-1091. Staff explained that filters are ordered ahead of time based upon historical usage, and that maintenance staff replace the filters.

EUJONBAGGING Special Conditions and Compliance Status

Below is a summary of each special condition from FG-JONFACILITY in PTI 174-08A, and an explanation of the facility's compliance status.

SC I.1, IV.1, IV.2, V.1: Particulate emissions from the bagging line not to exceed 0.10 pounds per thousand pounds of exhaust gases; test upon request of AQD; baghouse installed and operating properly, including the operation of the baghouse within the proper pressure drop operating range.

COMPLIANCE. A gauge measuring the pressure drop is installed, and the display of pressure is inside the building. At 9:00 AM on August 2, 2023, I observed a pressure drop of 2.5 inches water. Staff showed me the on-site daily log of pressure drop for August 2023. The log indicates that maintenance should be called if the pressure drop is outside the range of 1.5 to 3.0 inches water. Pressures for 8/1/23 and 8/2/23 were in the 2.5 to 2.6 inches water range. AQD has not requested stack testing.

SC VI.1: Pressure drop measured and recorded on a daily basis.

COMPLIANCE. I observed the on-site daily log of pressure drop for 8/1/23 and 8/2/23, and BASF provided a copy of the July 2023 pressure drop record. Values are recorded twice daily, at the beginning and end of the shift. Records indicate pressure is within the proper pressure drop operating range of 1.5 to 3.0 inches water.

SC VIII.1: Baghouse stack dimensions; stack should discharge unobstructed vertically.

COMPLIANCE. The stack appears to be about 18 inches or less in diameter, and 20 feet or greater in height.

ROP Source-Wide Conditions and Compliance Status

Below is a discussion of general conditions and source-wide special conditions listed in each ROP section.

MI-ROP-B4359-2003b General Conditions and Compliance Status

Below is a summary of applicable general conditions from MI-ROP-B4359-2003b, and an explanation of the facility's compliance status.

GC 9, 10: Collected air contaminants shall be removed to maintain controls at required collection efficiency; air cleaning devices installed and operated in a satisfactory manner.

COMPLIANCE. Controls appeared to be installed and operating as directed by the ROP during the inspection.

GC 11: Visible emissions limited to 20% over a six-minute average, with the exception of one 27% opacity per hour unless otherwise specified in the ROP or in a federal new source performance standard. This limit applies to point source (non-fugitive) emission units at the plant.

COMPLIANCE. I did not observe visible emissions during the inspection.

GC 12: Nuisance emissions prohibited.

COMPLIANCE. Since the last facility inspection on September 9, 2021, AQD's Detroit Office has received four complaints for BASF Wyandotte operations. For each complaint, AQD visited downwind of the facility either the same day or the following day and no odors were observed.

GC 19-23, 25 (and under individual EU/FG tables at SC III.B.IV.1 through 3): Certification of reports and prompt reporting of deviations.

COMPLIANCE. Annual certifications and semiannual deviation reports were received or postmarked September 15, 2021, March 15, 2022, September 20, 2022, and March 15, 2023.

GC 24: Annual submission to the emissions inventory.

COMPLIANCE. The AQD received the facility's 2021 and 2022 air emissions report March 24, 2022 and March 15, 2023.

MI-ROP-B4359-2003b Special Conditions and Compliance Status

Below is a summary of source-wide conditions in each section of MI-ROP-B4359-2003b, and an explanation of the facility's compliance status.

SC II.B.1.1 and 2.2, III.A.3.2 and 3: Hazardous Air Pollutant (HAP) emissions limited to less than 9.0 tons per 12-month rolling time period for each individual HAP and 22.5 tons per 12-month time period for combined HAPs; records; these requirements apply to the three stationary sources B4359, M4777, and M4808 combined.

COMPLIANCE. BASF provided site-wide HAP emissions totals for the period July 2021 through July 2023. The highest individual HAP emissions for a 12-month rolling period were 2.621 tons of acrylic acid in July 2023. The highest 12-month rolling total HAPs were 14.1204 tons aggregate HAPs in September 2021.

SC III.A.3.1, IV.4, VI.1 and 2: Compliance with certain requirements within 40 CFR 61, Subparts A, M: National Emission Standard for Asbestos, and FF: National Emission Standard for Benzene Waste Operations.

During the 2015 inspection, a conversation was held with Mr. Jordan Thompson regarding the Subpart FF requirements. Mr. Thompson did not believe that BASF was subject to Subpart FF, and could not think of any operations subject to the requirements. Records were not reviewed for these standards during the inspection or records request.

Conclusion

Based on the AQD inspection and records review, it appears that BASF Chemicals is in compliance with the federal Clean Air Act; Part 55, Air Pollution Control, of the Michigan Natural Resources and Environmental Protection Act, 1994 PA 451, as amended; the Michigan Air Pollution Control Rules; the conditions of ROP No. MI-ROP-B4359-2003b; the conditions of PTIs 113-07B, 174-08A, 272-04, 84-07, 143-09, 80-11B, 145-17, 14-18, 115-18, 186-18, 67-20, 70-21, and 155-22; and ACOs AQD No. 2018-03 and AQD No. 2023-14. AQD plans to follow up with BASF Chemicals regarding stack testing for ethyl acrylate in FG-RTO; the rain cap on the FG-RTO bypass stack; the hourly NOx emission limit basis for FG-BOILERS in PTI 145-17; updating reactor train 10 to 11 on PTI 143-09 or in the ROP renewal; and FGPOLEMCON regular inspection frequency.

NAME SAR DATE 6/14/24 SUPERVISOR JK