

B4359

MANILA

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

B435959925

FACILITY: BASF CORP		SRN / ID: B4359
LOCATION: 1609 BIDDLE AVE, WYANDOTTE		DISTRICT: Detroit
CITY: WYANDOTTE		COUNTY: WAYNE
CONTACT: Bryan Hughes , EHS Team Leader		ACTIVITY DATE: 09/09/2021
STAFF: Samuel Liveson	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Scheduled inspection.		
RESOLVED COMPLAINTS:		

On September 9, 14, and 15, 2021, AQD staff (Sam Liveson and Jeff Korniski) conducted an inspection of BASF Corporation - Chemical Plants (BASF) located at 1609 Biddle Avenue, Wyandotte, Michigan. The purpose of the 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; the conditions of Renewable Operating Permit (ROP) No. MI-ROP-B4359-2003b; the conditions of Permits to Install (PTI) 67-20, 186-18, 115-18, 14-18, 145-17, 80-11B, 143-09, 174-08A, 113-07B, 84-07, and 272-04; and Consent Order ACO AQD No. 2018-03.

## Pre-Inspection Meeting and Facility Overview

### 1. Scheduling, Arrival, and Safety Overview

Due to the ongoing COVID pandemic, to minimize exposure and ensure that safety protocols were followed, the inspection was announced. AQD called BASF staff beginning on August 20, 2021 to schedule the inspection. Mr. Bryan Hughes provided pre-registration information on September 3. AQD virtually viewed a safety video and completed pre-registration before visiting the facility.

Each day of the inspection, AQD met with Mr. Bryan Hughes, EHS Team Leader, at the Main Administration Building (east off of Biddle Avenue). AQD parked at the small oval parking lot south of the Main Administration Building and walked to the building's front entrance off of Biddle Avenue. From there, Mr. Bryan Hughes, EHS Team Leader, Mr. Jordan Thompson, Senior EHS Specialist, and Mr. Tom Wharton, EHS Specialist, provided information and a tour of facility operations relating to air quality permits. Additional BASF personnel at each plant at the facility provided information and tours of their respective plant.

Facility records were provided via email to AQD staff Todd Zynda during the week of March 8, 2021. Additional follow-up records were provided as requested. BASF claims certain selected data within the submittal as "Confidential Business Information". This requires further follow-up as a portion of the information discloses pollutant emissions, 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 final determination is reached.

Personal protection equipment to have on site includes long sleeves, safety shoes, a hard hat, safety glasses, a safety vest, and hearing protection (available at all plants if needed).

### 2. 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 September 9, 14, and 15, 2021, AQD inspected the first stationary source, known as BASF Corporation – Chemical Plants. The chemical plants are comprised of five main areas: (1) Wyandotte Dispersions and Resins, (2) the Steam Plant, (3) Thermoplastics Urethanes (TPU), (4) Polyols, and (5) Chemical Engineering Research (CER).

AQD received company comments regarding the working draft ROP on August 26, 2021. This inspection was conducted using MI-ROP-B4359-2003b and subsequently issued permits to install (PTIs).

### 3. Compliance Background

As a result of the inspection on December 6 and 7, 2016 and January 17, 2017, and review of semi-annual deviation report for the reporting period January 1, 2016 through June 30, 2016, the ROP annual deviation report for the reporting period January 1, 2016 through December 31, 2016, and the emission test report for the WYR RTO, it was determined that BASF was in violation of the following listed items.

- Polyols Plant - violation of MI-ROP-B4359-2003b, Section 2, Table D-2.3 FGPOLEMCON, Special Condition (SC) II. B.1.1 and R 336.1702(a).
- Chemical Engineering Research - violation of PTI 80-11, FGCHEORGACT, SC III.1, SC IV.1, and SC VI.1 and R 336.1910.
- Wyandotte Resins Plant - violation of PTI 113-07A, FG-PRODUCTS, SC VIII.1; FG-DRUMMING, SC VIII.1; FG-RAWMATLS, SC III.1 and 40 CFR 60.112b(a)(3)(ii); and FG-RTO, SC IV.1 and R 336.1910.
- Steam Facility (FGSTEFACILITY) – violation of R 336.1201(1).

A violation notice was issued on May 5, 2017. On August 10, 2017 BASF was referred to the AQD Enforcement Unit regarding the above violations (see facility file for enforcement referral and associated documents). On May 7, 2018 Administrative Consent Order (ACO) AQD No. 2018-03 became effective, resolving the above listed violations. ACO AQD No. 2018-03 is evaluated below.

Testing of FG-RTO conducted on November 26, 2019 indicated an average TOC destruction efficiency of 95%. This was not in compliance with PTI 113-07A, FG-RTO, IV.1 (see below) and Consent Order AQD No. 2018-03. A violation notice was issued on February 25, 2020 regarding this issue. Testing conducted on May 13, 2020 indicated an average TOC destruction efficiency of 98.0%, demonstrating compliance.

### 4. Outstanding Violations

None.

### **Facility Walkthrough: Process Overview and Compliance Status**

On September 9, 2021, AQD visited Wyandotte Dispersions and Resins. On September 14, 2021, AQD visited the BASF Steam Plant, NW Groundwater, and Thermoplastic Urethanes. On September 15, 2021, AQD visited BASF Polyols and BASF Chemical Engineering Research.

#### 1. Wyandotte Dispersions and Resins (WYD&R) – PTI No. 113-07B & 174-08A

AQD visited WYD&R on September 9, 2021 from about 9:00 AM to 12:38 PM. Weather was mostly sunny and the temperature was in the high 60s. Wind speed was about 12 miles per hour coming from the northwest (heading southeast) according to the Detroit Metropolitan Airport weather station. Mr. Cata Oaha of SGO & Resins provided a walkthrough of WYD&R. PTI 113-07B was issued on February 28, 2019.

##### 1.1. WYD&R Overview

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 (PTI 113-07B, FG-RAWMATLS) are reacted to form solid and liquid grade (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.

1.2. Outdoor Raw Material Storage Tanks - FG-RAWMATLS – PTI 113-07B

AQD visited the outdoor raw material storage tanks. From the site visit and discussions with staff, it appears that all tanks in FG-RAWMATLS vent to the RTO system (as discussed in the descriptions of the tanks in PTI 113-07B). Staff demonstrated how piping from tanks leads to knockout drums to allow thermal expansion, and then to the RTO. SGO reactors appeared to vent to knockout tank D1056 and then to the RTO. Emulsion reactors appeared to vent to tank 881 and then to the RTO. The raw material tanks appeared to vent to knockout tank 3101 and then to the RTO.

AQD visited tank EUJONTK-0004, which stores methyl methacrylate monomer (MMR), which is subject to federal standard 40 CFR Part 60 Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels. Piping appears to vent to the RTO.

1.2.1. FG-RAWMATLS Special Conditions and Compliance Status

SC(s)	Brief Condition Summary	Determination	Explanation
II.1, VI.1, and VI.2	Ethyl acrylate throughput limited to 379,000 gallons per 12-month rolling time period; records	Compliance	Monthly and 12-month rolling total ethyl acrylate throughput records are provided for the period January 2019 through December 2020 in the March 9, 2021 submittal. Each 12-month total is less than 379,000 gallons. BASF claims this data as "Confidential Business Information".
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	Tank EUJONTK-0004 is subject to NSPS Kb. <sup>1</sup> As verified during the inspection, BASF complies with 60.112b(a) by operating EUJONTK-0004 with a closed vent system that exhausts through the RTO per 60.112b(a)(3). AQD did not request tank dimensions during this inspection.
IV.1	EUJONTK-0004 leak detection requirements per 40 CFR 60.485(b)	Compliance	During the inspection, BASF explained that an outside company conducts leak detection throughout the tank farm. BASF maintenance has a method to repair leaks as soon as they are detected. This appears to be part of the FG-JONFACILITY leak detection and repair (LDAR) program equivalent to Rule 628.

<sup>1</sup> At 40 CFR 60.110b(b), the following volatile organic liquid storage tanks constructed after July 23, 1984 are subject to NSPS Kb: (i) those with capacity of 151 cubic meters or greater (about 40,000 gallons) storing a liquid with a vapor pressure of 3.5 kilopascals or greater, or; (ii) those with capacity of 75 cubic meters or greater (about 20,000 gallons) storing a liquid with a vapor pressure of 15.0 kilopascals or greater. From Appendix F of the permit application for PTI 113-07, only EUJONTK-0004 meets the criteria (e.g. it has a capacity of 80,000 gallons and stores a liquid with vapor pressure of 5.8 kilopascals). Under 60.110b(a), (b), and (c) of the pre-10/15/2003 requirements of NSPS Kb, tanks greater than 40 cubic meters (about 10,500 gallons) that were not subject to control standards were still subject to the recordkeeping standards at 60.116b(b) and (c). With the 10/15/2003 revision to the standard the formerly "recordkeeping only" subject tanks are no longer subject to the standard at all. Excepting EUJONTK-0004, all of the tanks are reported to store liquids with vapor pressures less than 1.1 kilopascals. Although SC III. 1 infers that these tanks are subject to the recordkeeping provisions of NSPS Kb the known information about these tanks determine otherwise.

1.3. Solid/Liquid Grade Organic Resin Production Trains – FG-SGO – PTI 113-07B

SGO resin production occurs on resin production "trains" that are a series of gravity-fed tanks located vertically through four floors. AQD visited SGO resin production. There appear to be four trains as permitted under FG-SGO.

AQD visited one of the three cooling belt lines (EUSGOCOOLBELT) that are part of FG-SGO. (Two trains share a belt line.) Vapors from these lines are collected and vent through the knockout tank D1056 and then to the RTO.

AQD visited one of the three dicers (labeled 1300) (EUSGOGRINDER). These cut solid polymers into small pieces and appear to be controlled by fabric filter F-1091.

**1.3.1. FG-SGO Special Conditions and Compliance Status**

SC(s)	Brief Condition Summary	Determination	Explanation
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; test upon request of AQD; 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	This particulate limit would be determined from a stack test. On site, AQD observed a collector differential pressure of 3.4 inches water for F-1091. The daily pressure drop records for December 2020 are provided in the March 9, 2021 submittal. The fabric filter operating procedures were previously provided in the September 25, 2013 information submittal and indicate a pressure drop range of 1 to 7 psi. The pressure drop measurements in December 2020 range from 4 psi to 7 psi.
V.1	Stack testing requirements upon request.	Not evaluated	AQD did not request 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 total production records of solid/liquid grade resin are provided for the period January 2020 through December 2020 in the March 9, 2021 submittal. Each 12-month total is less than 142,000,000 pounds. BASF claims this data as "Confidential Business Information". In the 2020 MAERS, BASF reports 36,383 tons (72,766,000 pounds) of product through RGJonResins.

**1.4. Emulsion Polymer Trains - FG-EMULSIONS – PTI 113-07B**

Similarly to SGO, emulsion polymer production occurs on "trains" that are a series of gravity-fed tanks located vertically through four floors. AQD visited the emulsion trains. There appear to be four trains as permitted under FG-EMULSIONS. Emulsion reactors appear to vent to knockout tank 881 and then to the RTO. AQD visited one reactor that appeared to vent to tank 883 and then to tank 881 to the RTO.

**1.4.1. FG-EMULSIONS Special Conditions and Compliance Status**

SC(s)	Brief Condition Summary	Determination	Explanation
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 total production records of emulsion polymer are provided for the period January 2019 through December 2020 in the March 9, 2021 submittal. Each 12-month total is less than 241,000,000 pounds. BASF claims this data as "Confidential Business Information". In the 2020 MAERS, BASF reports 69,156 tons (138,312,000 pounds) of product through RGJonEmulsions.

**1.5. Solvent Cutting with Two Water Scrubbers – FG-RESINCUT – PTI 113-07B**

Solvent cutting involves going from a solid to a liquid, like sugar to water. AQD observed the two cutting/blending vessels, which appeared to be labeled 901 and 902. Tanks appear to be vented to tank 883, which vents to the RTO. Water scrubbers are located on top of the resin cutting vessels. AQD was not able to observe the water in the scrubbers, and pressure drop is not monitored. The scrubbers were running during the facility inspection.

**1.5.1. FG-RESINCUT Special Conditions and Compliance Status**

SC(s)	Brief Condition Summary	Determination	Explanation
II.1, VI.1, and VI.2	Production of cut resin limited to 143,000,000 pounds per 12-month rolling time period; records	Compliance	Monthly and 12-month rolling total production records of cut resin are provided for the period January 2019 through December 2020 in the March 9, 2021 submittal. Each 12-month total is less than 143,000,000 pounds. BASF claims this data as "Confidential Business Information". In the 2020 MAERS, BASF reports 43,552 tons (87,104,000 pounds) of product through RGJonResinCut.

### 1.6. Product Storage Tanks – FGPRODUCTS – PTI 113-07B

This flexible group comprises product storage tanks located in SGO.

#### 1.6.1. FGPRODUCTS Special Conditions and Compliance Status

SC(s)	Brief Condition Summary	Determination	Explanation
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	Prorated pound per hour ethyl acrylate emissions data is provided in the March 9, 2021 submittal for each month in the period January 2019 through December 2020. Each monthly pound per hour ethyl acrylate emission rate is less than 0.0144. BASF claims this data as "Confidential Business Information".
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; test upon request of AQD; 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	Please see discussion for fabric filter F-1091 under FG-SGO.
V.1 and V.2	Stack testing to verify ethyl acetate and PM emission rates upon request	Not evaluated	AQD did not request stack testing.
VIII.1 and VIII.2	Stack dimensions for two stacks associated with FG-PRODUCTS. Stacks are not required to discharge unobstructed vertically.	Not evaluated	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. AQD did not observe these stack vents during this inspection.

### 1.7. Product Filling – FG-DRUMMING – PTI No. 113-07B

AQD observed the product filling area. Talking with staff on site, a hood on the resin drumline appears to be controlled by the RTO, as described in the facility permit. There also appeared to be two emulsion drumlines.

#### 1.7.1. FG-DRUMMING Special Conditions and Compliance Status

SC(s)	Brief Condition Summary	Determination	Explanation
I.1, V.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	Compliance	A stack test has not been requested by AQD. Prorated pound per hour ethyl acrylate emissions data is provided in the March 9, 2021 submittal for each month in

	records and other records maintained as necessary to determine compliance with limit, which may be prorated from monthly records to an hourly rate		the period January 2019 through December 2020. Each monthly pound per hour ethyl acrylate emission rate is less than 0.0144. BASF claims this data as "Confidential Business Information".
II.1 and VI.3	Loading of organic compounds with a vapor pressure greater than 1.5 psia limited to 5,000,000 gallons per 12-month rolling time period; records	Compliance	Monthly and 12-month rolling total loading records are provided for the period January 2019 through December 2020 in the March 9, 2021 submittal. Each 12-month total is less than 5,000,000 gallons. BASF claims this data as "Confidential Business Information". During the inspection, staff explained that all loading is tracked regardless of the vapor pressure.
VIII.1	Stack dimensions	Compliance	From a visual observation during this inspection, the stack dimensions appeared to be correct, and the stack appeared to exhaust unobstructed vertically. <sup>1</sup>
<p><sup>1</sup> During the inspection on December 6, 2016, the drumming stack (SV-DRUM) did not appear to meet PTI 113-07A requirements. The stack did not discharge unobstructed vertically upwards (rain cap installed) and was approximately 8 inches in diameter and 35 feet above ground surface. The stack has been modified and is now in compliance with SV-DRUM. The stack was extended approximately 15 feet and is now equipped with a rain sleeve (discharging vertically upwards). BASF included new modeling using the installed stack in the PTI application for 113-07B. The new stack conditions were approved in PTI 113-07B issued February 28, 2019.</p>			

**1.8. Regenerative Thermal Oxidizer – FG-RTO – PTI 113-07B**

AQD visited the RTO used to control VOC emissions from multiple emission units as described above. The RTO was operating during the facility inspection. From an RTO control panel, AQD observed that the RTO has 12 sections; at any time, 5 are used for inlet, 5 are used for outlet, and 2 are spare sections. Sections are rotated every 15 seconds, for a total cycle time of 3 minutes.

**1.8.1. RTO Recent Stack Testing Issues and Resolution**

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)).

On February 9, 2017, the AQD received BASF's test report via email. BASF reported the average non-methane VOC destruction efficiency was 73.99%. This was a violation of 40 CFR 60.112b(a)(3)(ii) and SC III.1 and was documented through a violation notice dated May 5, 2017. On May 7, 2018 ACO AQD No. 2018-03 became effective, resolving the above violation. On September 21, 2017 BASF retested for the TOC destruction efficiency (see MACES report B435941693). Testing conducted on September 21, 2017 indicates an average TOC destruction efficiency of 99.41% demonstrating compliance. Testing conducted on November 26, 2019 indicates an average TOC destruction efficiency of 95%. This was not in compliance with PTI 113-07A, FG-RTO, IV.1 (see below) and Consent Order AQD No. 2018-03. A violation notice was issued on February 25, 2020 regarding this issue. Testing conducted on May 13, 2020 indicated an average TOC destruction efficiency of 98.0% demonstrating compliance.

**1.8.2. FG-RTO Special Conditions and Compliance Status.**

SC(s)	Brief Condition Summary	Determination	Explanation
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),	Compliance	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

	stack test no later than December 31, 2019, and every 2 years thereafter.		November 26, 2019 and subsequently on May 13, 2020.
III.1, VI.2, and VI.4	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.	Compliance	AQD received the operating plan from BASF on July 26, 2007. The operating plan is required under NSPS Kb for the affected storage tank EUJONTK-0004. Please see report B435901112. AQD did not request the operating plan during this inspection. <sup>1</sup>
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.	Compliance	<p>Within the March 9, 2021 submittal, BASF provided the 3-hour average temperatures for December 14, 2020. The temperatures demonstrate compliance stack test determined temperature requirement.</p> <p>The TOC destruction efficiency retest was conducted on May 13, 2020. Stack testing indicated the average total hydrocarbon (minus methane and ethane) destruction efficiency at 98.0%, and therefore in compliance with the SC IV.1 destruction efficiency standard of 98%. AQD and BASF agree the firebox temperature averaged 1547°F across the test and therefore the 3-hour minimum average is 1497°F.</p> <p>During the inspection the RTO combustion chamber temperature was recorded as 1554 °F (10:51 AM). A bypass stack is installed prior to the RTO and its exhaust stack.</p>
IV.2, VI.3, VI.5, 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	<p>In the March 9, 2021 submittal, BASF supplied the 3-hour averages, calculated each hour, for December 14, 2020. The lowest 3-hour average recorded is 1549°F. During the inspection, the RTO was observed to be operating at 1554 °F.</p> <p>According to the facility, BASF purchases pre-calibrated temperature monitors (RTD units).</p> <p>BASF reports the RTO temperature has remained above the minimum during process operations except during RTO malfunctions, when interlocks are activated to shut down the process within an hour (in accordance with SC VI.3.c).</p> <p>It appears the RTO was last inspected on March 28, 2018 (online) and September 18, 2020 (offline) by the manufacturer (Durr Environmental).<sup>2</sup></p>
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	Compliance	The facility has had deviations related to bypassing the RTO (please see MACES reports B435948310 and B435946885). The incidents appear to be malfunctions as defined in 40 CFR Part 60, Subpart A, §60.2. It has not been

	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.		verified if the facility is meeting the requirements of SC IV.4 during periods of shutdown. Records specified in SC VI.8 were not requested but the facility has reported any bypass of the RTO during shutdown or malfunction through semiannual and annual reporting.
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VIII.1 and 2	RTO stack and bypass stack parameters. Both stacks shall discharge unobstructed vertically.	Further evaluation needed.	From a visual observation, stacks appear to have similar dimensions to these conditions. The RTO stack is unobstructed. AQD observed a rain cap on the RTO bypass stack, so that it appears to be obstructed. AQD will review this issue further.
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<sup>1</sup> Pursuant to 60.113b(c)(1)(i), flow and VOC constituent loading rates are provided and manufacturer’s design specifications are given. The operating plan is to document the control device will meet the minimum destruction efficiency of 95% required under 60.112b(a)(3)(ii). Meeting a minimum residence time of 0.75 seconds and a minimum temperature of 816°C (1500°F) presumes compliance with the destruction efficiency without the necessity of a compliance test.

According to BASF, the RTO manufacturer specifies an average residence time of 0.93 seconds, a minimum combustion temperature of 790°C (1454°F), a maximum combustion temperature of 980°C (1796°F), and a destruction efficiency of 99%. The manufacturer’s average residence time exceeds the minimum required, although a manufacturer’s minimum is not provided. The manufacturer’s minimum temperature does not meet the required presumptive minimum in the NSPS. At the time the operating plan was reviewed (B43590112), the specifications in the operating plan were accepted because of the performance test to be conducted (for the permit) to verify the destruction efficiency, which would provide superior documentation to the presumptive compliance method allowed by the regulation.

Pursuant to 60.113b(c)(1)(ii) BASF indicates the RTO system will be equipped with inlet, outlet, and combustion chamber temperatures monitors, airflow monitors, and burner flame management monitors. These monitors were to be observed during the performance test to determine appropriate parametric monitoring ranges for continued compliance.

The performance test conducted on May 13, 2020 demonstrated a destruction efficiency of 98.0%. The firebox temperature averaged 1547°F across the test. SC IV.1 sets the minimum 3-hour average firebox temperature to 50°F less than the average exhibited during a compliant performance test: the 3-hour minimum average is therefore 1497°F.

<sup>2</sup> BASF provided the offline inspection report from the offline inspection on September 18, 2020. The conclusion states that overall, the RTO “is in good operating condition.” The report notes “rotary valve not being greased.” The report discusses how aspects related to the thrust bearing assembly look good. Regarding checking that the air spring is clean and centered below thrust bearing carrier, this “looks good.” Regarding verifying the rotor shaft alignment in the thrust bearing housing plate, this is “good”. Regarding the setscrew for the thrust bearing carrier being tight and clean, this “looks good.”

1.9. WYD&R Site-Wide Conditions – FG-JONFACILITY – PTI 113-07B

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

1.9.1. FG-JONFACILITY Special Conditions and Compliance Status

SC(s)	Brief Condition Summary	Determination	Explanation
I.1, VI.1, VI. 2	VOC emissions from WYR not to exceed 36 tons per	Compliance	Monthly and 12-month rolling total VOC emissions for the plant are reported in the April 9, 2019 submittal for each month in the period



	12-month rolling time period; records maintained		January 2019 through December 2020. Each 12-month rolling total is less than 36 tons of VOC. BASF claims this data as "Confidential Business Information". In the 2020 MAERS, BASF reports 4,765.7 pounds (2.38 tons) of VOC were emitted from the various WYR Plant processes in calendar year 2020.
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. Rule 628 LDAR semiannual reports have been received on March 19, 2021 and September 25, 2020. Please see reports B435957341 and B435955413.

1.10. Resin Bagging Line and Warehouse – EUJONBAGGING – PTI 174-08A

AQD visited the resin bagging line in the bagging warehouse. The line was not in operation. Staff explained that resin bagging operations generate dust. A vacuum is hooked up to the hoppers and emissions are vented out a stack controlled by the pulse jet baghouse.

1.10.1. EUJONBAGGING Special Conditions and Compliance Status

SC(s)	Brief Condition Summary	Determination	Explanation
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	The bagging line was not in operation during the inspection; however the baghouse was operating. During the inspection, AQD observed a baghouse pressure drop of 2.7 inches water at 12:16 PM. Staff explained the proper pressure drop operating range is 1.5 to 3.0 inches water. The baghouse and stack appeared to be well maintained. Stack testing has not been requested by AQD.
VI.1	Pressure drop measured and recorded on a daily basis	Compliance	AQD observed the on-site daily record log. Additionally, pressure drop records were provided for December of 2020. Pressure drop is recorded twice each day of operation, and was 2.6 inches water this morning. Records indicate pressure is within the proper pressure drop operating range of 1.5 to 3.0 inches water.
VIII.1	Stack dimensions; stack should discharge unobstructed vertically	Compliance	Stack dimensions appeared similar to those in the facility permit. The stack was unobstructed.

2. Steam Plant and Ancillary Operations - PTI 145-17

AQD visited the steam plant and groundwater remediation operation on September 14, 2021. Ed Kachadoorian, Site Utilities Manager, provided a walkthrough of the steam plant facility.

2.1. Steam Plant and Ancillary Operations Overview

The steam plant houses four boilers (PTI 145-17, FGBOILERS). Each boiler has a heat input capacity of approximately 49.9 million British thermal units (MMBtu) per hour and is permitted to burn natural gas. Also discussed here as an ancillary operation is a groundwater treatment system. The last ancillary

operations are the facility's four diesel-fired firewater pumps (ESTEFIREPUMP1, ESTEFIREPUMP2, ESTEFIREPUMP3, and ESTEFIREPUMP4) and five natural gas-fired emergency generators (EUPBXGEN, EUISBACKUPGEN, EUSTEAMGEN, EUETPUBACKUPGEN, and EUETPURTOGEN). The steam facility, groundwater treatment operations, and generators/fire pumps are all associated with the general administration of the site and therefore under the umbrella of the B4359 stationary source because the Chemical Plants are the dominant SIC footprint at the Wyandotte operations.

2.2. Steam Plant – FGBOILERS – PTI 145-17

These boilers were installed in 1981. The boilers were shut down on March 15, 2006, and steam at the plant was provided by the City of Wyandotte’s municipal power plant. The boiler burners were then upgraded with low-NOx burners. (The steam facility no longer has the capability to combust #6 fuel oil. The fuel oil lines have been removed or capped, and there is no fuel oil tank.) This burner upgrade was permitted in PTI 145-17 following the issuance of ACO AQD No. 2018-03. PTI 145-17 replaces the conditions listed in MI-ROP-B4359-2003b, Section 1, FGSTEFACILITY.

During the inspection, AQD observed the following boiler parameters:

Boiler	1	2	3	4
Operating?	No	Yes	No	Yes
Steam Flow (lb/hr)	--	16503	--	11329
Gas flow rate (scfh)	--	19148	--	19429
Time observed	--	10:27 AM	--	10:49 AM

2.2.1. FGBOILERS Special Conditions and Compliance Status

SC(s)	Brief Condition Summary	Determination	Explanation
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 MMSCF.	Compliance	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 demonstrating compliance with the hourly CO and NOx emission limits. The maximum 12-month rolling natural gas usage occurred at the end of January 2020 at 604.05 MMSCF.
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	The highest 12-month rolling NOx emissions (15.10 tons) occurred at the end of January 2020. The highest 12-month rolling CO emissions (25.37 tons) occurred at the end of January 2020.
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.	Compliance	The facility maintains monthly and 12-month rolling records of natural gas usage. The maximum 12-month rolling natural gas usage occurred at the end of January 2020 at 604.05 MMSCF. From talking with staff, natural gas fuel usage appears to come from a DTE billing meter.
III.1	Shall not operate boilers unless equipped with low NOx burners (installed and maintained per manufacturer requirements).	Compliance	The facility appears to be meeting this requirement.
IV.1	Shall install, calibrate, maintain and operate in a	Compliance	The facility uses a billing meter from DTE to track monthly natural gas usage. Meters also

	satisfactory manner a device to monitor and record natural gas usage on a monthly basis.		appear to be in place on each boiler to track natural gas usage. Staff explained that boiler maintenance is conducted annually, and that flow meters are calibrated annually before boiler tuning. AQD visited DTE incoming gas line. A flow meter appears to be in place for natural gas leading to the steam plant.
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	AQD observed the boiler stack during the inspection. From a visual observation, dimensions appeared similar to the required dimensions.

2.3. NW Groundwater Remediation - EUSTENWORKSGROUNDWATER – MI-ROP-B4359-2003b - Rule 290

BASF has a groundwater remediation system building on site. AQD visited the building and talked with Mr. Dave Higdon of Utilities about the treatment system. The remediation system uses carbon adsorption to treat organics in groundwater. There are two 20,000 pound carbon adsorption beds (tanks) that act as primary and secondary treatment. About eleven groundwater wells are located throughout the site where it appears that water is collected for treatment.

Weekly in-house water sampling appears to occur off the primary tank. AQD observed the nozzles where sampling takes place. If breakthrough occurs, then both the primary and secondary carbon tanks are changed at that time.

The treatment system does not appear to have an associated stack. According to Mr. Higdon, exhaust from the carbon treatment system is vented back into the ground. Treated water appears to travel to the sewer.

The facility provided monthly emissions in 2019 and 2020 per Rule 290. Emissions appear to be below thresholds in Rule 290 for contaminants with known initial threshold screening levels (ITSL) and initial risk screening levels (IRSL).

2.3.1. Emitted contaminants from groundwater remediation compared to Rule 290 thresholds

Contaminant	CAS No.	ITSL (ug/m3)	IRSL (ug/m3)	Applicable 290 Part	Max Allowable Monthly Emissions	Maximum Monthly Emissions (month of occurrence)	Pass Rule 290?
Methylene chloride	75092	2000	60	290(2)(a)(ii)(B)	20/10 lbs	0.004 lbs (June 2019)	Yes
PDC (1,2-dichloropropane)	78875	4	0.2	290(2)(a)(ii)(B)	20/10 lbs	0.037 lbs (June 2019)	Yes
Chloroform	67663	--	0.4	290(2)(a)(ii)(B)	20/10 lbs	0.037 lbs (June 2019)	Yes
DCE (1,2-dichloroethane)	107062	--	0.04	290(2)(a)(ii)(B)	20/10 lbs	0.004 lbs (June 2019)	Yes
BCEE (Bis (chloroethyl) ether)	111-44-4	--	0.003	290(2)(a)(ii)(C)	0 lbs	0.000 lbs	Yes

2.4. Firewater Pumps 1, 2, and 3 – 40 CFR Part 63, Subpart ZZZZ - Rule 285(2)(g)

Three of the facility's firewater pumps (EUSTEFIREPUMP1, EUSTEFIREPUMP2, and EUSTEFIREPUMP3) are subject to the Area Source MACT for Stationary Reciprocating Internal

Combustion Engines, published at 40 CFR 63, Subparts A and ZZZZ.[1] These were installed in February of 2003, May of 2003, and February of 1991 respectively. The AQD did not evaluate compliance with applicable conditions of Subpart ZZZZ during this inspection. The fire pumps each have stationary compression ignition engines and operate using diesel fuel. The fire pumps are 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." [2]

#### 2.5. Firewater Pump 4 - 40 CFR Part 60, Subpart IIII – Rule 285(2)(g)

According to the facility's ROP comments, EUSTEFIREPUMP4 was installed on June 25, 2020. The fire pump has a stationary compression ignition engine and operates using diesel fuel. EUSTEFIREPUMP4 is 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." [2]

The NSPS for Stationary Compression Ignition Internal Combustion Engines is published at 40 CFR 60, Subparts A and IIII. Engines that commenced construction after July 11, 2005 are subject to this regulation. Engine EUSTEFIREPUMP4 appears to be subject to 40 CFR Part 60 Subpart IIII because it was installed on June 25, 2020.

AQD visited fire pump EUSTEFIREPUMP4.

#### 2.5.1. 40 CFR Part 60 Subpart IIII Sections and Compliance Status

Subpart Section	Brief Section Summary	Determination	Explanation
§60.4205(c); 40 CFR Part 60, Subpart IIII, Table 4; §60.4211(b) (1)	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 EUSTEFIREPUMP4.
§60.4209(a)	Install a non-resettable hour meter.	Not evaluated	Due to the display being off, AQD was not able to view the hours of operation on the display of emergency engine EUSTEFIREPUMP4 during the facility inspection.
§60.4211(f)	Limit maintenance checks and readiness testing to 100 hours per year.	Not evaluated	At the time records were requested during the week of March 8, 2021, it does not appear the engine had operated for a full year since it was installed on June 25, 2020.

#### 2.6. Natural Gas- Fired Emergency Engines – 40 CFR Part 60, Subpart JJJJ – Rule 285(2)(g)

The facility operates five emergency generators (EUPBXGEN, EUISBACKUPGEN, EUSTEAMGEN, EUETPUBACKUPGEN, and EUETPURTOGEN). The five emergency generators are each of spark ignition design and operate using natural gas. The emergency generators are 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." [2]

AQD visited the steam plant generator EUSTEAMGEN. The generator appears to be natural gas fired off the same line as the steam plant.

The NSPS for Stationary Spark Ignition Internal Combustion Engines is published at 40 CFR 60, Subparts A and JJJJ. Engines that commenced construction after June 12, 2006 are subject to the regulation. EUPBXGEN at the facility appears to have been installed December 1, 2018 and is subject to this regulation. EUISBACKUPGEN appears to have been installed on December 1, 2016 and is subject to this regulation. EUSTEAMGEN was installed in October 2016 so is also subject to this regulation. The other two generators (ETPUBACKUPGEN and ETPURTOGEN) were not evaluated as part of this inspection.

**2.6.1. 40 CFR Part 60 Subpart JJJJ Sections and Compliance Status**

Subpart Section	Brief Section Summary	Determination	Explanation
§60.4233(d), §60.4233(e), 40 CFR Part 60, Subpart JJJJ, Table 1	Owner/operator must comply with emission standards specified in this subpart.	Compliance	The facility has provided a USEPA Certificate of Conformity for EUISBACKUPGEN and EUSTEAMGEN. AQD did not request a certificate for EUPBXGEN.
§60.4237(b)	Install a non-resettable hour meter.	Compliance	During the previous inspection, the verification of a non-resettable hour meter was verified on EUISBACKUPGEN and EUSTEAMGEN. AQD was not able to view the hours of operation on the display of emergency engine EUSTEAMGEN during the facility inspection.
§60.4243(d)	Limit maintenance checks and readiness testing to 100 hours per year.	Compliance	The facility appears to be meeting this requirement based on the generator records provided.

**3. TPU Synthesis Plant – MI-ROP-B4359-2003b – Rule 290**

AQD visited the TPU Synthesis Plant on the afternoon of Tuesday September 14, 2021.

**3.1. TPU Synthesis Plant Overview**

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 the solid product is diced in a rotary cutter; the dice appear to be stored via silo; transferred to a hopper; extruded; stored in heated storage silos; and then packed out (packaged). Carbon adsorbers and water scrubbers are employed for VOC emissions control; dust collectors are used for particulate emissions control.

**3.2. MDI Storage Tanks – EUTPURULE290 – MI-ROP-B4359-2003b**

AQD visited the two methylene diphenyl diisocyanate (MDI) storage tanks 1104 and 1105. To allow for vapor space, the tanks vent through a carbon drum which controls emissions, which then appear to vent to the roof. Transparent carbon-filled sleeves are installed on each adsorption unit as a color gauge. The carbon is initially purple in color and turns brown as the carbon in the drum is exhausted. It appears that adsorption drums were installed on July 22, 2021. AQD observed that the transparent sleeves were primarily purple with an inch of brown coloring.

**3.3. Two TPU Belt Lines – EUTPUSYNTHESIS - MI-ROP-B4359-2003b – Rule 290**

AQD visited the two TPU belt lines at 1:15 PM. Lines were not operating during the inspection. It appears that raw materials from an MDI dosing vessel, 1,4-butanediol dosing vessel, and elastoslab dosing vessel are mixed together and conveyed by belt through an oven.

For the heated (oven) portion of the lines (referred to in records as the reaction belt hot zone), water scrubbers control MDI emissions. AQD did not observe scrubber flow rates due to the facility not being in operation. Line 1 has a two-stage scrubber. AQD observed the first stage is labeled S1154. Line 2 has a one-stage scrubber. AQD observed that stage 1 is labeled S4050.

A baghouse appears to control particulate emissions for both lines. AQD did not observe baghouse pressure due to the facility not being in operation.

**3.3.1. EUTPUSYNTHESIS Rule 290 Conditions and Compliance Status**

Rule	Brief Rule Summary	Determination	Explanation
290(2)(a)(ii)	For air contaminants with an ITSL above 2 micrograms per meter	Compliance	1,4 butanediol (BD) appears to emit less than 500 pounds per month. BASF provided detailed monthly BD

	cubed (ug/m3) and no IRSL, emit less than 500/1000 pounds controlled/uncontrolled monthly.		emissions records in MAERS that did not exceed this threshold. BASF claims this record is "Confidential".
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 MAERS that did not exceed this threshold. BASF claims this record is "Confidential".
290(2)(a)(iii)	For particulate with an ITSL greater than 2.0 ug/m3, emit less than 500/1000 pounds controlled/uncontrolled monthly.	Undetermined	AQD does not have an ITSL for the solid product particulate emitted. Monthly emissions are under the 500 pound monthly threshold.

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

#### 3.4. Three Extrusion Lines – EUTPU EXTRUSION – MI-ROP-B4359-2003b – Rule 286(2)(a)

Dice from the belt line and dicer are then extruded. There are three extrusion lines. AQD observed line 1 at 1:32 PM. Extrusion lines were not in operation during the inspection.

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. AQD did not evaluate compliance with these rules because the extrusion lines were not in operation.

#### 3.5. Burnoff Oven – EUTPU FURNACE – MI-ROP-B4359 – 2003b – Rule 290

Metal parts are burned clean in a Rule 290 natural gas-fired burnoff oven located to the northeast of the TPU plan. AQD visited the burnoff oven at 1:45 PM. It was not operating during the inspection. AQD 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. From talking with facility staff, it appears typically the burnoff oven may be operated about every other day for a few hours.

##### 3.5.1. EUTPU FURNACE Rule 290 Compliance Status

The facility provided annual emissions of NOx, VOCs, SOx, particulates, and CO based upon hours of operation. Emissions appear to be below Rule 290 thresholds.

#### 4. Polyols Plant - MI-ROP-B4359-2003b

AQD visited the Polyols Plant on the morning of Thursday September 15, 2021. Mr. Phillip Langenkamp, Polyol Plant Technology Engineer, provided a walkthrough of the facility and explained equipment and operations.

##### 4.1. Polyols Plant Overview

The Polyols Plant manufactures conventional and graft polyether poly alcohols (polyols). Polyols react with diisocyanates to form polyurethanes. Examples of products such as foam mattress pads were on display.

The polyols plant includes three reactor trains 8, 9, and 10. Reactor trains No. 8 and No. 9 (MI-ROP-B4359-2003b, EUPOLCONV) are used to produce conventional polyols through a batch process. Reactor train No. 10 (MI-ROP-B4359-2003b, EUPOLGRAFT) is used to produce graft polyols. The

Polyols Plant encompasses storage tanks and emissions control equipment, including a water scrubber, thermal oxidizer (MI-ROP-B4359-2003b, FGPOLEMCON), and dust collectors. AQD also visited a cold cleaner on site (MI-ROP-B4359-2003b, EUPOLCOLDCLEANERS).

4.2. Conventional Reactor Storage Tanks – EUPOLCONV – MI-ROP-B4359-2003b

AQD visited the oxide tank farm which contains tanks TK-101B, TK-101C, and TK-102 for the storage of propylene oxide (PO) and ethylene oxide (EO). If a tank needs to vent, it appears to vent to a scrubber and then to the thermal oxidizer. A vapor balance system also appears to be in place from an equalization line back to the tank.

4.3. Conventional Reactor Trains 8 and 9 – EUPOLCONV – MI-ROP-B4359-2003b

AQD visited reactor trains 8 (EU) and 9 (PO). Each appears to have four associated tanks. From talking with staff on site, it appears that each train has 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, and the portion of the 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 (FGPOLEMCON).

Periodically, magnesol solids are added to reactor trains 8 or 9. During this time, dust collectors F-410C and F-531 control magnesol dust from reactors 8 and 9 respectively. These dust collectors appear to be independent of the thermal oxidizer control system.

BASF staff explained that reactor train 7 is no longer in operation. The reactor train used to use sugar. From talking with staff on site and observing the reactor train, it is mothballed and converted to storage tanks.

4.3.1. EUPOLCONV Special Conditions and Compliance Status

SC(s)	Brief Condition Summary	Determination	Explanation
I.B.1,2, and 3	Maximum stack height and diameters for SVPOL SUGARFEED (24 inches and 32 feet), SVPOL T-408 (3 inches and 55 feet), and SVPolMagSil7 (9.75 inches by 11.5 inches and 30 feet)	Not evaluated	AQD staff did not evaluate these stack dimensions. SVPolMagSil7 is not used as reactor 7 has not been in use since the mid-2000's.
II.A.1.1 and III.A.3.8	Magnesium silicate (magnesol) use limited to 2,500 tons per 12-month rolling time period; records	Compliance	BASF reports monthly and 12-month rolling totals for the period January 2019 through December 2020; each 12-month rolling total is less than 2,500 tons (April 9, 2019 submittal). BASF claims this data as "Confidential Business Information". In the 2020 MAERS, BASF reports 217 tons of "magnesium silicate (solid)" was processed in the EUPOLConv bulk material conveyors during the 2020 calendar year.
II.B.1.1 and 2, II.B.2, 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	Compliance	According to the March 9, 2021 submittal, sugar is no longer used. Therefore, these conditions are not applicable. According to Mr. Thompson, when sugar was used, reactor 7 was the primary reactor for sugar additions. Reactor 7 is currently not in operation as it has been de-rated. At this time, there is no plan for future use of reactor 7. VOC and PO emissions for operations not using sugar are captured in

	tons per 12-month rolling time period; records.		SC II.B.4 through 6 and SC III.A.3.7 as described below.
II.B.3.1 and 2, 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; records.	Compliance	Compliance with the pound per thousand pound limit is to be determined through stack testing in GC 13, if requested; BASF has not been requested to perform a stack test on particulate emissions. BASF reports monthly and 12-month rolling totals of PM emissions for the period January 2019 through December 2020; each 12-month rolling total for PM is less than 1.0 ton (March 9, 2021 email submittal). BASF claims this data as "Confidential Business Information". In the 2020 MAERS, BASF reports aggregate PM emissions from EUPolConv at 869 pounds (0.43 tons).
II.B.4 through 6, and III.A.3.7	Aggregate VOC emissions from reactor trains 7, 8, 9 equipment venting to the water scrubber shall not exceed 2.4 pounds per hour based on a daily average; aggregate emissions from reactor trains 7, 8, 9 equipment venting to the water scrubber shall not exceed 0.13 tons (260 pounds) PO per 12-month rolling time period and 0.02 tons (40 pounds) EO per 12-month rolling time period; records.	Compliance	Compliance with the VOC pounds per hour value is to be determined through stack testing in GC 13, if requested. <sup>1</sup>  BASF reports monthly and 12-month rolling totals of EO, PO and VOC for the period January 2019 through December 2020; monthly VOC emissions indicate compliance with the daily VOC limit. VOC emissions are reported monthly, with the majority of monthly VOC emissions being less than 5.95 pounds. The 12-month rolling total for EO and PO is less than 0.13 tons and 0.02 tons, respectively (March 9, 2021 submittal).
III.A.3.1, and V.1 through 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; records.	Compliance	BASF reports monthly and 12-month rolling throughputs in each reactor the period January 2019 through December 2020. Reactor 7 has not been in operation. Therefore, the monthly production for reactor 7 is zero for the last two years. The March 9, 2021 submittal for each 12-month rolling total show compliance with the 100,000,000 pounds limit for reactor train 7, the 72,000,000 pound limit for reactor train 8, and the 191,000,000 pound limit for reactor train 9. BASF claims this data as "Confidential Business Information". In the 2020 MAERS, BASF reports 24,785 tons (49,570,000 pounds) of product through EUPOLConv and 24,785 tons (49,570,000 pounds) of product through EUPOLFugConv.
V.4	Conventional equipment to be vented to the thermal oxidizer shall not be operated unless the oxidizer is installed and operating properly, including achieving a minimum temperature of 1700°F, a	Compliance	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. Continuous thermal oxidizer temperatures for January 24, 2019



	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; exceptions are given in SC V.6 through 8.		are provided in the March 9, 2021 submittal; the temperature measures fluctuate within a range from about 1815°F to about 1828°F. During the facility inspection, AQD observed two thermocouples at 1820 °F and 1830 °F.
V.5	Vacuum jets for the conventional processes shall not be operated unless they vent to the thermal oxidizer	Compliance	AQD observed the vacuum jets system. From talking with facility staff and observing the process flow scheme on computer consoles, it appears that jets vent to the caustic scrubber, which vents to the thermal oxidizer.
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; records.	Compliance	Within the March 9, 2021 submittal, BASF states that sugar is no longer used as a polyol backbone hence there is no longer a need to depressurize the reactor to open and add it.
V.7	The following may vent to the water scrubber: TK-410A, TK-408C except during filling and transfer operations, TK-534 after unreacted materials have been removed, the filter press, TK-532.	Compliance	Based on the test conducted March 18, 2009 through March 20, 2009, each of these vents to the water scrubber; please see report B435907772.
V.8	EO (TK-101B) and PO storage tanks (TK-101C, TK-102) shall be filled with satisfactory vapor balance in place or venting to thermal oxidizer. Satisfactory vapor balance includes: vapor-tight collection line before transfer, nitrogen purge of vapor line after transfer, hatches and openings closed, nitrogen purge of liquid line after transfer, device to minimize liquid drainage. Procedures shall be developed incorporating the listed requirements.	Compliance	Non-confidential procedures for EO and PO transfers were received in the March 9, 2021 submittal. Based on December 7, 2016 observations of the process flow scheme on the computer consoles at the Polyol plant, this equipment is connected to the thermal oxidizer; the equipment is also equipped with a vapor balance during transfers. AQD did not observe a transfer during the facility inspection.
III.A.1, III.A.3.3, and V.9	Conventional process equipment venting to the water scrubber shall not do so unless the scrubber is operating properly; satisfactory operation includes maintaining the water scrubber flowrate specified in the water scrubber operating procedures; the liquid flowrate shall be monitored daily with an acceptable device; records.	Compliance	Continuous water scrubber flowrates for December 14, 2020 are provided in the March 9, 2021 submittal; the flowrate measures within the range of about 155 to 159 gallons per minute. Water scrubber procedures were provided in the March 9, 2021 submittal. From the procedures, the water scrubber is designed to operate down to 25 gallons per minute; an alarm is triggered should the flowrate drop to 35 gallons per minute and the vent lines are shut down should the flowrate drop to 30 gallons per minute.

<p>III.A.2.2 and 3, III.A.3.4, V.10, Appendix 2-3.1 through 3</p>	<p>Solid raw material conveying systems shall not be operated unless the fabric filter is installed and operating properly; satisfactory operation includes maintaining the pressure drop specified in the fabric filter operating procedures; the pressure drop across each fabric filter shall be monitored with an acceptable device; periodic inspections of the baghouses to be conducted; records.</p>	<p>Compliance</p>	<p>Based on previous maintenance records provided, it appears that dust collector F-531 services reactor #9 and dust collector F-410C services reactor #8. From talking with BASF staff, pressure drop appears to be monitored and recorded every 15 minutes. BASF provided 15-minute pressure readings (in inches H<sub>2</sub>O) for F-410C on December 14, 2020. A record of the inspection procedures for F-410C indicate preventative maintenance (PM) occurred on October 3, 2020. Records of inspection procedures for F-531 indicate PM occurred on March 24, 2020.</p>
<p>VI.1</p>	<p>Permittee shall comply with applicable requirements of MACT A and PPP – 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.</p>	<p>Compliance</p>	<p>Based on information obtained during an inspection from March 17 through 20, 2008 and from subsequent 114(a) requests, USEPA Region 5 found BASF in violation of MACT PPP as detailed in a Finding of Violation (FOV) issued September 29, 2008 and an FOV issued September 25, 2009. On June 15, 2012, USEPA and BASF entered into an Administrative Consent Order (ACO), and on June 19, 2012, a Consent Agreement and Final Order (CAFO) between USEPA and BASF was filed which resolved the MACT PPP violations.</p> <p>Since the end of the last FCE period (January 24, 2019), pursuant to 63.1439(e) (6), MACT PPP semiannual reports have been received on March 14, 2019, September 13, 2019, March 3, 2020, September 1, 2020, and March 4, 2021. Please see reports CA_B435948318, CA_B435950469, CA_B435952787, CA_B435955414, and CA_B435957342.</p>
<p><sup>1</sup> As discussed in the 2013 inspection report (MACES Report B435923233), BASF has not been requested to perform a VOC stack test on the water scrubber, however, testing for EO and PO was conducted March 18, 2009 through March 20, 2009 pursuant to a United States Environmental Protection Agency (USEPA) administrative order. Oxide emissions were measured at less than 0.1 pounds per batch and 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.</p>			

**4.4. Graft Reactor Train 10 – EUPOLGRAFT – MI-ROP-B4359-2003b**

This emission unit covers the graft polyol manufacturing process (reactor train 10). AQD visited reactor train 10. This includes storage tanks containing acrylonitrile (ACN), butanal, and styrene. From discussions on site, it appears a future project will be replacing R-500 with R-1100, which will be a high-pressure reactor.

**4.4.1. EUPOLGRAFT Special Conditions and Compliance Status**

SC(s)	Brief Condition Summary	Determination	Explanation
I.B.1		Not evaluated	

	Stack dimensions for SVPOL115; exhaust gases discharged unobstructed vertically upwards.		Based on the inspection of January 24, 2019, SVPOL115 appears to be the vent located on TK-500 (styrene tank). AQD did not evaluate the stack dimensions.
II.A.1, II.B.1.1 and 2, III.A.3.2 and 3	Styrene emissions from storage tank TK-500 shall not exceed 9.8 pounds per hour based on a daily average nor 0.24 tons (480 pounds) per year on a 12-month rolling time period; the styrene charge to TK-500 shall not exceed 60,300,000 pounds per 12-month rolling time period; styrene monthly/12-month emissions calculations and production records kept for five years.	Compliance	BASF reports the monthly and 12-month rolling total styrene throughput for the period January 2019 through December 2020 (March 9, 2021 submittal and revised May 4, 2021 submittal); each of the 12-month totals is less than the 60,300,000 pound limit. BASF claims this data as "Confidential Business Information". In the 2020 MAERS, BASF reports the annual throughput of styrene at 1,877,000 gallons. At a density of about 7.56 pounds per gallon, this equates to an annual throughput of 14,190,000 pounds styrene. Within the 2020 MAERS submittal the facility uses "tank model" to report emissions. Based on the records provided, the facility is determined to be in "compliance" with the emission limits. However, further evaluation of this emission unit and reported emissions needs to be completed. <sup>1</sup>
III.A.3.1 and V.5	Polyol production rates for reactor trains 10 shall not exceed 150,000,000 pounds per 12-month rolling time period; records	Compliance	BASF reports monthly and 12-month rolling throughputs for reactor No. 10 in the period January 2019 through December 2021; each 12-month rolling total shows compliance with the 150,000,000 pound limit (March 9, 2021 submittal). BASF claims this data as "Confidential Business Information". In the 2020 MAERS, BASF reports 23,850 (47,700,000 pounds) of product through EUGRAFTINDEX and 23,962 tons (47,924,000 pounds) of product through EUPOLFugGraft.
V.1	Graft equipment to be vented to the thermal oxidizer shall not be operated unless the oxidizer is installed and operating properly, including achieving a minimum temperature of 1700°F, a minimum residence time of 0.8 seconds, and maximum emission rates of 0.88 pounds per hour acrylonitrile (ACN) and 0.74 pounds per hour styrene; exceptions are given in V.3 and 4.	Compliance	Testing conducted on December 6, 2010 through December 9, 2010 measured ACN and styrene beneath their respective detection limits. Measured emission rates during the testing were 0.004 pound per hour ACN and 0.023 pounds per hour styrene. Please see report B435915927. Continuous thermal oxidizer temperatures for December 14, 2020 are provided in the March 9, 2021 submittal; the temperature measures fluctuate within a range from about 1815°F to about 1828°F. During the facility inspection, AQD observed two thermocouples at 1820 °F and 1830 °F.
V.2	The vacuum system for the graft process shall not be operated unless it vents to the thermal oxidizer.	Compliance	During the inspection, the process flow scheme on the computer consoles at the Polyol plant appeared to indicate that the vacuum jets vent to the neutralizer and then to the thermal oxidizer. During the

			inspection, the waste gas valves were open.
V.3	Styrene shall not be charged to TK-500 unless the unloading system is satisfactorily operated; satisfactory operation includes blowing back lines to the railcar and system shutdown after use, hatches and openings closed, device or procedure to minimize liquid drainage; procedures shall be developed incorporating the listed requirements.	Compliance	The styrene car unloading procedures were provided in the March 9, 2021 submittal. During the inspection, a styrene transfer was not witnessed.
V.4	ACN storage tank (TK-524) shall be filled with satisfactory vapor balance or venting to thermal oxidizer; satisfactory vapor balance includes: vapor-tight collection line before transfer, nitrogen purge of vapor line after transfer, hatches and openings closed, nitrogen purge of liquid line after transfer, device to minimize liquid drainage; procedures shall be developed incorporating the listed requirements.	Compliance	The ACN car unloading procedures were provided in the March 9, 2021 submittal. During the inspection, an ACN transfer was not witnessed.

<sup>1</sup> The facility reports 12-month rolling styrene emissions less than 0.24 tons per year (480 lbs). Within the April 9, 2019 submittal, BASF reported styrene emissions greater than the emission limit specified in EUPOLGRAFT, SC II.B.1.2 for every month from January 2019 through December 2020. The March 9, 2021 submittal indicated styrene emissions greater than the emission limit. This was the also the case during the 2019 inspection. During 2019 BASF revised emissions with the following explanation. "The styrene emissions represented in the prior submittal represent all process styrene emissions w/o the tank working/breathing losses. Attached are the working/breathing losses as calculated using the tank working/breathing emission factor submitted in the permit, I realize that EPA Tanks would be the preferred method which factors in monthly temps however, EPA tanks no longer works on our MS Windows 10 laptop computers. Looking for a work around on this (i.e. other tanks tools) and when resolved I will go back and backfill the data. Going forward I will also add the tk-500 tank emissions to the facility tracking spreadsheet where the current process styrene emissions are currently tracked and documented." For the 2021 submittal BASF again revised the emissions, by removing the process emissions (see May 4, 2021 email). Revised emissions meet the 12-month rolling emission limit. At this time the AQD accepts the documentation and explanation provided.

4.5. TDI Storage Tank TK-536 – EUPOLTKFARM – MI-ROP-B4359-2003b

AQD visited storage tank TK-536, which contains toluene diisocyanate (TDI). AQD also visited the acrylonitrile (ACN) storage tank TK-539 and styrene tank TK-500.

4.5.1. EUPOLTKFARM Special Conditions and Compliance Status

SC(s)	Brief Condition Summary	Determination	Explanation
I.B.1	Exhaust gases from the carbon canister on TK-536 shall discharge unobstructed vertically upwards with	Compliance	During the inspection, compliance was determined based on visual observation of the carbon canister. Measurements were not collected.

	maximum diameter of 3 inches and height of not less than 35 feet above ground.		
II.1 and III.A.3.3	TDI throughput in TK-536 shall not exceed 5,000,000 gallons per 12-month rolling time period; records	Compliance	BASF reports the monthly and 12-month TDI throughput for the period January 2019 through December 2020; each 12-month total is less than the 5,000,000 gallon limit. BASF claims this data as "Confidential Business Information". In the 2020 MAERS, BASF reports the annual throughput of TDI at 965,000 gallons through RGPOLTANKS; TK-536 is not listed as a member of this reporting group, but that may be an oversight.
II.B.1.1 and 2, III.B.1 through 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	Compliance with the 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 annual emission limit as well.
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	According to the March 9, 2021 submittal, the last carbon drum changeout occurred during June 2020. AQD observed the activated carbon canister installed on the top of TK-536.
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.
V.2	TDI storage and transfer facilities shall incorporate a dry air or nitrogen gas pad for moisture control.	Compliance	According to BASF, TK-536 employs a nitrogen blanket. This blanket provides a slight positive pressure. According to BASF staff, the nitrogen blanket is on tanks except for styrene. AQD observed nitrogen at 70 PSI (pounds per square inch).
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. BASF staff indicated that the facility would consult their emergency response shift supervisor. They explained that water should be put on the TDI release.

4.6. Polyols Cold Cleaner – EUPOLCOLDCLEANERS - MI-ROP-B4359-2003b

During the inspection, in the machining/maintenance area, AQD observed the facility cold cleaner. The cold cleaner was closed and uses a Simple Green cleaning solution. The safety datasheet (SDS) was provided in the facility records. During cleaning, agitation occurs, which is mechanically assisted.

4.6.1. EUPOLCOLDCLEANERS Special Conditions and Compliance Status

SC(s)	Brief Condition Summary	Determination	Explanation
II.A.1.1	Less than 5% of any combination of methylene chloride, perchloroethylene, trichloroethylene, 1,1,1-trichloroethane, carbon tetrachloride, and chloroform	Compliance	The SDS for the cleaning solvent, "Extreme Simple Green Aircraft Precision Cleaner", is provided in the facility's record submittal. The cleaner is water based (>78% water) and does not contain the indicated compounds.
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	AQD observed the lid was closed. AQD did not evaluate whether operating instruction were posted; these were 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.

4.7. Thermal Oxidizer – FGPOLEMCON – MI-ROP-B4359-2003b

The FGPOLEMCON natural gas-fired thermal oxidizer (TO) controls emissions from both the conventional and graft polyol systems. The TO is in sequence with the caustic and water scrubbers.

AQD visited the thermal oxidizer during the facility inspection. The TO was operating during the inspection. According to facility staff, the temperature setpoint is approximately 1820 °F. At approximately 11:24 AM, AQD observed temperatures of 1829.4 °F and 1818.0 °F.

According to facility staff, the TO operates almost 24 hours a day, 7 days a week, even when conventional and graft systems are down, because it takes a long time to heat and get back up to temperature.

4.7.1. FGPOLEMCON Special Conditions and Compliance Status

SC(s)	Brief Condition Summary	Determination	Explanation
I.B.1	Stack dimensions for SVPOL80; exhaust gases discharged unobstructed vertically upwards.	Compliance	AQD observed that the stack was unobstructed and exhausted vertically. From a visual observation, stack dimensions appeared similar to permitted dimensions.
II.B.1.1	VOCs from equipment venting through the thermal oxidizer shall not exceed 6.4 pounds per hour on a daily average.	Compliance	Testing conducted December 4, 2001 through December 7, 2001 measured an emission rate of 1.71 pounds per hour VOC. Testing conducted December 6, 2010 through December 9, 2010 measured an emission rate less than 0.03 pounds per hour VOC. The tests are not dispositive for the VOC emission limit because the

			<p>sampling periods were less than the 24 hours of a calendar day. However, in the case of the 2010 test, as BASF organized process operations so as to direct the greatest amount of VOC loading to the thermal oxidizer during the 8-hour test period, and as the VOC emissions measured during the 8-hour test period represent less than 1% of the allowed daily amount, AQD concludes the test serves as a successful compliance demonstration unless future information should suggest the maximum VOC loading rate from the process was not measured during the test. Please see report B435915927.</p>
II.B.1.2, II.B.2 through 6, Appendix 2-4.2 and 3	<p>Emissions from equipment venting through the thermal oxidizer and from the thermal oxidizer itself shall not exceed the following on a 12-month rolling time period basis: 16 tons VOC; 2.2 tons PO; 0.89 tons EO; 0.72 tons ACN; 0.41 tons styrene; 15.3 tons NOx. VOC, PO, EO, ACN, styrene, and NOx monthly/12-month calculations kept for five years.</p>	Compliance	<p>The March 9, 2021 submittal lists monthly and 12-month rolling emissions for the period from January 2019 through December 2020; each 12-month total is less than the annual emissions limitation. BASF claims this data as "Confidential Business Information". In MAERS 2020, BASF reports emissions of 371 pounds (0.19 tons) VOC and 3167 pounds (1.58 tons) NOx for EUPOLEmCon.</p>
III.B.1 through 3	<p>Testing of EO, PO, ACN, and styrene between June 1, 2008 and December 1, 2008 unless demonstrated last tests remain valid.</p>	Compliance	<p>In a letter dated July 3, 2008, BASF asserted the testing conducted in December 2001 remained valid. In an email of July 21, 2008 and a letter dated July 23, 2008, AQD agreed the December 2001 remained valid and stated testing for EO, PO, ACN, and styrene was not required in the referenced time period. Tests were conducted from December 6, 2010 through December 9, 2010. Please see report B435915927.</p>
V.1 and 2, Appendix 2-4.1	<p>Thermal oxidizer temperature shall be continuously (at least once every 15 minutes) monitored with an acceptable device; the position of the waste gas inlet control valves to the thermal oxidizer shall be continuously monitored with an acceptable device; records of temperature and waste gas inlet control valve position</p>	Compliance	<p>From a record of the facility's Process Information Management System (PIMS) taken December 14, 2020, it appears TO temperature is recorded at least every 15 minutes. Talking with Mr. Hughes, TO temperature may be taken every 60 seconds. Please see discussions regarding Condition V.4 of EUPOLCONV and Condition V.1 of EUPOLGRAFT.</p>
VI.1	<p>Permittee shall comply with applicable requirements of MACT A and Subpart PPP</p>	Compliance	<p>Please see discussion above under Condition VI.1 of EUPOLCONV as it relates to the MACT PPP.</p>
VI.2 and 3	<p>Instrument for measuring liquid flowrate of water scrubber shall be calibrated,</p>	Compliance	<p>Please see discussion above under Conditions III.A.1, III.A.3.3, and V.9 of EUPOLCONV.</p>

	maintained, and operated according to manufacturer's specifications		
III.A.3.2.a and c, Appendix 2-3.1 through 3	Regular inspection of thermal oxidizer; records of inspection; records of malfunctions or failures and corrective actions	Compliance	In the submittal of March 9, 2021, the thermal oxidizer inspection record checklist was provided with notes indicating that no major findings were identified during the September 2020 inspection. There was typical refractory repair patching and the burner assembly was in good condition.

**4.8. Fugitive Emissions from Polyol – FGPFUG – MI-ROP-B4359-2003b**

This flexible group contains fugitive emissions requirements for the conventional and graft polyol systems. Per PTI 143-09, the individual emission limits for EO, PO, ACN, and styrene have been removed.

**4.8.1. FGPFUG Special Conditions and Compliance Status**

SC(s)	Brief Condition Summary	Determination	Explanation
III.A.2.1 and 2, III.A.3.1, 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	Since the end of the last FCE period (January 24, 2019), pursuant to 63.1439(e) (6), MACT PPP semiannual reports have been received on March 14, 2019, September 13, 2019, March 3, 2020, September 1, 2020, and March 4, 2021. Please see reports CA_B435948318, CA_B435950469, CA_B435952787, CA_B435955414, and CA_B435957342. These reports include summaries of MACT PPP LDAR activities. Rule 628 LDAR semiannual reports have been received on March 14, 2019, September 13, 2019, March 3, 2020, September 1, 2020, and March 4, 2021. Please see reports CA_B435948317, CA_B435950454, CA_B435952786, CA_B435955413, and CA_B435957341.

**4.8.2. 40 CFR Part 63 Subpart PPP LDAR Program - Compliance Background**

Based on information obtained during an inspection from March 17, 2008 through March 20, 2008 and from subsequent 114(a) requests, USEPA Region 5 found BASF in violation of MACT PPP as detailed in a Finding of Violation (FOV) issued September 29, 2008 and an FOV issued September 25, 2009. AQD followed with Violation Notices dated October 28, 2009 and May 9, 2012 concerning MACT PPP deficiencies, similar deficiencies for NSPS VV predating the MACT, and also for failing to conduct visual inspections for pumps subject to the Rule 629 (now Rule 628) equivalent LDAR program at the graft plant. These Violation Notices were forwarded to USEPA. Please see reports B435908007 and B435917762. On June 15, 2012, USEPA and BASF entered into an Administrative Consent Order (ACO), and on June 19, 2012, a Consent Agreement and Final Order (CAFO) between USEPA and BASF was filed which resolved the MACT PPP violations. AQD considers the agreement sufficient to resolve the Violation Notices.

**4.9. Polyol Site-Wide Conditions – FGPFACILITY – PTI 143-09 & MI-ROP-B4359-2003b**

This flexible group aggregates permitted, exempt, and grandfathered equipment at the polyol plant and total emissions limitations. Under PTI 143-09 the individual emission limits for EO, PO, ACN, styrene, and HAPs have been removed.

**4.9.1. FGPFACILITY Special Conditions and Compliance Status**

SC(s)		Determination	Explanation
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	Brief Condition Summary		
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.
III.A.3.2, III, IV. 4, and V.1	Requirement to comply with 40 CFR 63, Subpart PPP	Compliance	Please see discussion of Subpart PPP in EUPOLCONV and FGOLFUG sections
V.2	Requirement to comply with 40 CFR 60, Subpart YYY	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.
V.3	Requirement to comply with 40 CFR 60, Subpart Kb	Compliance	Please see discussion in NSPS Tanks Flexible Groups section.

5. Chemical Engineering Research – ROP MI-ROP-B4359-2003b and PTI 272-04, 84-07, 80-11B, 14-18, 115-18, 186-18, and 67-20

AQD visited Chemical Engineering Research (CER) in the afternoon on Thursday September 15, 2021. 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). Emissions are controlled by vacuum pumps with dry ice traps. 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.

During the inspection, emission unit EUCHEMARS7 was not observed. EUCHEMARS7 produces a catalyst, through a process that takes an existing catalyst (vanadium) and improves the efficiency. Emissions from EUCHEMARS7 are controlled by a venturi scrubber and dust collector. The facility reports emissions per Rule 290. According to MAERS, EUCHEMARS7 did not operate in 2020.

5.1. Poly-THF Production – EUCHEPOLYTHF – MI-ROP-B4359-2003b

This emission unit covers production of poly-THF in reactors R-30, R-62, and R-63. From site inspections and reports, Poly-THF appears to not have 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 reactors during the facility inspection.

5.2. Conventional Polyol Reactors – EUCHEPOLYOL – PTI 272-04

This emission unit covers production of conventional polyether polyols in reactors R-20, R-30, and R-100. The emission unit in the ROP was modified in Permit to Install No. 272-04, issued January 19, 2005. These reactors appear to be located in buildings 53 and 55. Oxide storage tanks are at a tank farm. From talking with facility staff, these reactors all vent to the wet scrubber T-110 via knockout pot D101. According to BASF staff, the scrubber uses a phosphoric acid solution which converts oxides (EO and PO) to glycol (ethylene glycol and propylene glycol). The scrubber solution is replaced with new water and acid every couple of months depending on the scrubber solution values.

5.2.1. EUCHEPOLYOL Special Conditions and Compliance Status

SC(s)	Brief Condition Summary	Determination	Explanation
		Compliance	

I.B.1 through 8	Stack maximum diameters and minimum heights for eight stacks SVCHE054, SVCHE057, SVCHE525, SVCHE526, SVCHE527, SVCHE528, SVCHET-110, and SVCHEWJET		AQD observed stack SVCHET-110. The stack is unobstructed and exhausts vertically. From visual observation, the height appears similar to its 41 foot minimum height. According to BASF staff, the stack is insulated. Visually, the stack appears wider than its maximum 2.1 inch diameter. This wider appearance is likely due to the thick insulation along the stack, so that the outer diameter is wider than the inner diameter.
II.B.1 through 4, III.B.1 through 3, Appendix 3-4.2j through m	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	In the March 9, 2021 submittal, BASF reports combined EO, PO, and VOC emissions of 111.13 lbs (2019) and 184.24 lbs (2020). It is assumed that the BO was not used in production (zero emissions). The summation of the emissions is significantly less than all individual emission limits. From MAERS 2020, annual emissions of VOC for the emission unit are reported at 189 pounds (0.0945 tons); as EO and PO are classified as VOCs, the individual emissions for these pollutants are 189 pounds or less.
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	From the March 9, 2021 submittal, for the period January 2019 through December 2020 BASF's production logs document 33 total batches and total 457,293 pounds of polyol produced (2019 and 2020 combined).
III.A.2.5, V.3 and 4, Appendix 3-4.2g and h	Equipment shall not vent out of the north or south vacuum jet unless the associated vacuum jet condenser system is installed and operating properly and with a condenser exhaust gas temperature of 113°F or less; equipment shall not vent out of the east or west vacuum jet unless the associated vacuum jet condenser system is installed and operating properly and with a condenser exhaust gas temperature of 140°F or less; device installed to monitor temperature continually; temperature records.	Compliance	AQD observed the north/south vacuum jet on the fourth floor of building 55 and on a facility monitor screen. The jet was not operating at the time of the inspection and registered a temperature of 38.1 °C (or 100.6 °F). Nothing was being controlled at the time. Similarly, east/west vacuum jets were not operating. Temperature was being monitored and read 29.1 °C.  West vacuum jet temperatures were provided for December 10, 2020 via a graph. Temperatures continually register less than 21.5°C (70.7°F). The south jets were not in operation on December 10, 2020 and therefore data was not provided on temperature for that day. According to BASF correspondence dated May 4, 2021, "east and north jets do not have intercoolers and are not used to produce Polyols" under EUCHEPOLYOL.
III.A.2.1 and 3 through 4 and 6, V.5,	Process steps involving the release of EO, PO, and/or BO shall not be operated unless	Compliance	Monitoring data for December 1, 2020 is included in the April 9, 2019 submittal. During the inspection, the oxide scrubber

<p>Appendix 3-4.2d through f and i</p>	<p>the T-110 wet scrubber is installed and operating properly. Proper operation of the T-110 wet scrubber includes: (a) maintaining the pH to 3.0 or less; (b) maintaining the pump outlet pressure at 2.0 bar gauge or less; (c) maintaining the water concentration to 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. A device shall be installed to monitor the pump outlet pressure. Records of the above maintained. 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.</p>		<p>was operating. A control panel showed a T-110 wet scrubber pump outlet pressure of 0.96 bar. According to the previous inspection, an alarm sounds at 2 bar and the pH is sampled monthly. From talking with BASF staff, a wet chemical lab onsite at the building tests the solution pH and water content. The operations log entry for December 1, 2020 showed a scrubber water concentration of 99.0% and a pH of 2.08 and T-110 wet scrubber pump outlet pressure of 0.97 bar. Included in the March 9, 2021 submittal are the corrective actions taken in response to scrubber equipment faults (alarms). On site, AQD observed the log book for monthly pH and water concentration.</p>
<p>III.A.2.2, Appendix 3-4.2c</p>	<p>A visual inspection of all equipment in EO, PO, and BO service will be performed at the beginning of every month to ensure that there are no leaks; any leaking equipment shall be repaired or replaced prior to the start of any subsequent batch. Keep records.</p>	<p>Compliance</p>	<p>AQD did not request records of monthly equipment inspections during this inspection. As part of the previous facility inspection during January 24 and 25, 2019, LDAR activities were provided on the monthly production sheets for January 2019 (April 9, 2019 submittal).</p>
<p>V.6, Appendix 3-4.2n</p>	<p>Magnesium silicate use limited to 77,000 pounds per 12-month rolling time period; records kept</p>	<p>Compliance</p>	<p>In the March 9, 2021 submittal, BASF reports total magnesium silicate usage at 2,190 pounds in the period from January 2019 through December 2020.</p>
<p>VI.1</p>	<p>Permittee shall comply with NSPS A and Kb as they apply to storage tanks as ACCE.</p>	<p>Compliance</p>	<p>Please see NSPS Tanks Flexible Groups discussion (section 6.4 of this activity report).</p>

**5.3. Graft Polyols - EU-CheGraft and EU-CheGraftFug – PTI 84-07**

PTI 84-07 was issued July 6, 2007. 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, similar to the manner in which EUCHEPOLYOL is utilized for research and for the production of conventional polyether polyols. From the information submittal provided, BASF reports no graft polyol was produced for commercial production during the last two years. 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. AQD did not visit these emission units during the facility inspection.

**5.4. Organic Activator Production – EUCHEORGACT – PTI 80-11B**

EUCHEORGACT was originally permitted under PTI 80-11, issued on September 1, 2011. PTI 80-11B was issued September 24, 2018. Emission unit EUCHEORGACT covers production of organic activator

in reactor R-803. The emission unit is also used for research and development. BASF states that the EUCHEORGACT has not operated for 2 years and that the unit is operated under EUCHEX5400 (evaluated below).

5.5. X-5400 Catalyst Production – EUCHEX5400 – PTI 80-11B – 40 CFR Part 63, Subpart VVVVVV  
PTI 80-11B was issued September 24, 2018. AQD observed reactor R803 during the facility inspection. The unit is being cleaned this week so wasn't in operation. X-5400 catalyst production uses hexane as a reaction base solvent utilizing existing equipment, including the condenser (E802), the decanter and receiver (D802 and R802), the reactor vessel (R803), tank TK-98 for hexane storage, tank TK-99 for final product X-5400 storage, two exhaust stacks (EF-1 and EF-2) and an enclosed filter to filter the final product (F803). Emissions are controlled by a condenser system cooled with an inlet chilled liquid solution operating at an inlet temperature at the condenser of 57°F or less and a vapor balancing system for transfers to and from both bulk storage tanks.

5.5.1. EUCHEX5400 Special Conditions and Compliance Status

SC(s)	Brief Condition Summary	Determination	Explanation
I.1, VI.5	VOC emissions shall be less than 1.0 tpy on a 12-month rolling time period.	Compliance	The reported VOC emissions from the production of X-5400 is 649 lbs (0.32 tons) in 2019 and 1111 lbs (0.55 tons) in 2020.
II.1, VI.3	Maximum 183 batches of X-5400 catalyst in EUCHEX5400 per 12-month rolling time period.	Compliance	The facility reports 101 batches of X-5400 during 2019 and 59 batches during 2020.
III.1 and 2, VI.2	Shall not operate EUCHEX5400 unless the condenser system is installed, maintained, and operated in a satisfactory manner, and unless the condenser system (E802) inlet chilled liquid solution is maintained at 57 °F or less. Install, maintain, and operate a device to monitor and record, on a continuous basis, the inlet chilled liquid solution temperature of the condenser system.	Compliance	The facility appears to be meeting these requirements. The liquid temperature is recorded on a continuous basis and provided within the March 9, 2021 submittal for December 19, 2020. The log shows temperatures less than 1.4°C (34.52°F).
III.3	Shall not transfer any material to or from TK-98 or TK-99 unless vapor balancing system is installed, maintained, and operated in a satisfactory manner.	Compliance	AQD did not observe a transfer during the facility inspection.
V.1	Upon the request from the AQD, shall verify VOC emission rates from EUCHEX5400.	Compliance	At this time testing has not been requested.
VI.1	Shall complete all required calculations in an acceptable format.	Compliance	
VI.4	Shall 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	Not evaluated	The facility asserts that there are no materials emitted requiring a Rule 225 evaluation.

	compound name and CAS number and a calculation demonstrating the emission rate of each material.		
VIII.1-4	Stack conditions for EF-1, EF-2, TK-98, and TK-99	Not evaluated	AQD did not observe these stacks during this facility inspection.
IX.1	Comply with 40 CFR Part 63 Subpart A and VVVVVV	Compliance	<p>The AQD has accepted delegation of Subpart VVVVVV through R 336.1960 (adopted by reference in R 336.1902). Within the June 10, 2019 submittal, BASF states that "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 as described above under SC II. 1 and SC VI. 3.</p> <p>On July 19, 2019, the facility submitted a Notice of Compliance Status (NOCS) for EUCHEX5400. The NOCS received is an update to the NOCS submitted dated May 22, 2013 (received May 28, 2013). According to the submittal, the product "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."</p>

5.6. Rain Coat Production – EURAINCOAT – PTI 14-18

AQD did not visit EURAINCOAT during the facility inspection. According to BASF staff, the product is not currently being made.

PTI 14-18 for EURAINCOAT was issued April 30, 2018. Raincoat production process utilizes existing equipment in building 53, including a 2,200-gallon stainless steel reactor (R-62), the primary condenser (E-6), two receiver tanks (TK-64 and TK-65), multiple steam jets, a hot well, an intercondenser, and one (1) exhaust stack (SVCHEWJET). Emissions are controlled by a condenser system consisting of the primary condenser and the intercondenser.

5.6.1. EURAINCOAT Special Conditions and Compliance Status

SC(s)	Brief Condition Summary	Determination	Explanation
I.1 and VI.4	VOC emissions shall be less than 1.3 tpy on a 12-month rolling time period.	Compliance	The reported VOC emissions from the production of EURAINCOAT is 214.4 lbs or 0.11 tons during 2019. EURAINCOAT did not operate during 2020.
II.1, VI.2	Shall not process more than 400 batches of Raincoat in EURAINCOAT per 12-month rolling time period.	Compliance	The facility reports that 32 batches were processed during 2019. EURAINCOAT did not operate during 2020.
		Compliance	

III.1 and 2, VI.1	Shall not operate EURAINCOAT unless the outlet gas temperature from the hotwell is 115 °F or less. Shall install, maintain, and operate a device to monitor and record, a on a continuous basis, the outlet gas temperature from the hotwell.		The facility appears to be meeting these requirements. The west jet temperature (following the hotwell is recorded on a continuous basis and provided within the March 9, 2021 submittal for the last day of Raincoat production (December 4, 2019). The log shows temperatures less than 22° C (71.6°F).
IV.1	Shall not operate EURAINCOAT unless the condenser system is installed, maintained, and operated in a satisfactory manner.	Compliance	The facility appears to be meeting this requirement. A record of condenser temperatures is not required.
VI.3	Shall complete all required calculations in an acceptable format.	Compliance	
VIII.1 and 2	Stack conditions for SVCHEWJET shall meet 3.1 inches maximum diameter and minimum 52 feet above ground.	Not evaluated	AQD did not visit SVCHEWJET during the facility inspection. The stack appeared to meet parameters when visually observed during the 2019 facility inspection.

**5.7. Blocked Acid Catalyst Production – EUBACATALYST – PTI 115-18**

PTI 115-18 was issued September 19, 2018. 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). AQD observed reactor train R63 during the facility inspection.

**5.7.1. EUBACATALYST Special Conditions and Compliance Status**

SC(s)	Brief Condition Summary	Determination	Explanation
I.1 and VI.3	VOC emissions shall be less than 0.123 tpy on a 12-month rolling time period.	Compliance	The reported VOC emissions from the production of EUBACATALYST is 5.4 lbs (0.0027 tons) for 2019 and 2020 combined. According to BASF staff, emissions are based on emission factors.
II.1, VI.2	Shall not process more than 30 batches of blocked acid catalyst in EUBACATALYST per 12-month rolling time period.	Compliance	The facility reports 2 batches of blocked acid catalyst have been produced in 2019 and 2020 combined.
VI.1	Shall complete all required calculations in an acceptable format.	Compliance	
VIII.1	Stack conditions for SVCHEWJET shall meet 3.1 inches maximum diameter, 52 feet above ground, and discharge unobstructed vertically upwards.	Not evaluated	AQD did not visit SVCHEWJET during the facility inspection. The stack appeared to meet parameters when visually observed during the 2019 facility inspection.

**5.8. Rawmat 3334 Production – EURAWMAT3334 – PTI 186-18**

PTI 186-18 was issued December 14, 2018 for production of Rawmat 3334 in a batch process. Equipment includes reactor R-30, process condenser E-4, decanter D-59, receiver tank TK-52, and steam jets. ADQ didn't visit these pieces of equipment specifically. From talking with BASF staff, this is an example of permitting a formulation rather than permitting specific equipment.

**5.8.1. EURAWMAT3334 Special Conditions and Compliance Status**

SC(s)	Brief Condition Summary	Determination	Explanation
I.1 and VI.3	VOC emissions shall be less than 0.4 tpy on a 12-month rolling time period.	Compliance	The reported VOC emissions from the production of EURAWMAT3334 is 34.2 lbs (0.017 tons) for 2019 and 2020 combined.
II.1, VI.2	Shall not process more than 35 batches of Rawmat 3334 in EURAWMAT3334 per 12-month rolling time period.	Compliance	The facility reports 2 batches of Rawmat 3334 have been produced in 2019 and 2020 combined.
VI.1	Shall complete all required calculations in an acceptable format.	Compliance	
VIII.1	Stack conditions and dimensions for SVCHEWJET, SVFA20002, and SVCHE057.	Not evaluated	AQD did not observe these stacks during the facility inspection. The stacks were observed in 2019 and found to have dimensions similar to the those required in the facility permit.

**5.9. Resin Solution Replacement Process – EURESINRESOLV – PTI 67-20**

PTI 67-20 was issued July 21, 2020. This is a resin solution replacement process for "Resin A" and "Resin B" using reactor R-63 and tank TK-65 in building 53Z in the Chemical Engineering Research Plant. AQD visited reactor R63, but this process was not operating.

**5.9.1. EURESINRESOLV Special Conditions and Compliance Status**

SC(s)	Brief Condition Summary	Determination	Explanation
I.1 and VI.2	VOC emissions shall be less than 100 pounds per year on a 12-month rolling time period.	Compliance	The reported VOC emissions from the production of EURESINRESOLV is 5 lbs for 2020.
III.1 and 2, VI.3 and 4	Shall not process more than 20 batches of Resin A and 20 batches of Resin B in EURESINRESOLV per 12-month rolling time period.	Compliance	The facility reports 1 batch of resin produced in 2020 (records do not specify Resin A or Resin B).
VI.1	Shall complete all required calculations in an acceptable format.	Compliance	
VIII.1	Stack conditions and dimensions for SCCHEWJET and SVCHE057	Not evaluated	AQD did not observe these stacks during the facility inspection. The stacks were observed in 2019 and found to have dimensions similar to the those required in the facility permit.

**5.10. Hardlen Mixing/Blending Operation - EUCHEHARDLEN – Rule 290 – 40 CFR Part 63 Subpart VVVVVV**

In some mixing/blending operations, BASF appears to use resin Hardlen F-2P which contains less than 1.5% chloroform is by weight according to its safety datasheet. 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 VVVVVV applies to certain equipment at the CER plant associated with EUCHEHARDELEN. The AQD accepted delegation of Subpart VVVVVV through R 336.1902 and R 336.1960.

According to the Subpart VVVVVV 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

EUCHEHARDELEN at 3 lbs/year chloroform for 10 batches made in 2012. As part of the January 2019 facility inspection, EUCHEHARDELEN 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 EUCHEHARDELEN was not evaluated for full compliance with Subpart VVVVVV.

**6. Site-Wide Regulatory Discussion**

Below is a discussion of general conditions listed in each ROP section; source-wide special conditions listed at the beginning of each ROP section; emission units subject to Rule 290; tanks subject to 40 CFR Part 60 Subpart Kb throughout this facility; and a discussion of consent order ACO AQD No. 2018-03.

**6.1. MI-ROP-B4359-2003b, Sections 1 through 4, General Conditions**

These general conditions (GC) are listed in each ROP section and are addressed here in total.

GC(s)	Brief Condition Summary	Determination	Explanation
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 September 9, 14, and 15, 2021 inspection.
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	During the inspection on September 9, 14, and 15, 2021, visible emissions were not observed.
12	Nuisance emissions prohibited	Compliance	Since the last facility inspection on January 24 and 25, 2019, AQD's Detroit Office has received six complaints for BASF Wyandotte operations. For four of the complaints, AQD visited downwind of the facility the same day and observed either no odors or level 1 (light) chemical/plastic type odors that did not unreasonably interfere with the comfortable enjoyment of life and property. One was a call from the facility about a 30-minute RTO malfunction. The last complaint was not able to be investigated in a timely manner.
		Compliance	



19 through 23, 25 (and under individual EU/FG tables at SC III.B.IV.1 through 3)	Certification of reports and prompt reporting of deviations		Annual certifications and semiannual deviation reports were received or postmarked March 15, 2019, September 13, 2019, March 12, 2020, September 1, 2020, and March 15, 2021. Please see MACES reports CA_B435948310, CA_B435950477, CA_B435953506, CA_B435955366, and CA_B435957731.
24	Submissions to the Emissions Inventory	Compliance	The AQD received this facility's 2019 and 2020 MAERS databases on (or postmarked) March 15, 2020 and March 15, 2021.

6.2. MI-ROP-B4359-2003b, Sections 1 through 4, SOURCE-WIDE

These plant-wide special conditions (SC) are repeated at the beginning of each ROP section and are addressed here in total.

SC(s)	Brief Condition Summary	Determination	Explanation
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 January 2019 through December 2020 in the March 9, 2021 submittal. Monthly total HAP emissions range between 1.054 and 1.205 tons. Acrylic acid registered the highest total of any single HAP for a 12-month rolling period at 2.661 tons (end of January 2019). BASF reported that the highest 12-month rolling total HAPs occurred at the end of September 2019 at 14.0876 tons.
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	Not determined	During the 2015 inspection, a conversation was held with Mr. 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.

6.3. MI-ROP-B4359-2003b, Sections 1 through 4, Rule 290 Flexible Groups

Multiple sections of the ROP contain flexible group and/or emission units relating to Rule 290 subject equipment installed in each area (section) of the ROP. R336.1290 exempts from R336.1201 those sources with limited emissions. The rule is divided into three general sections and further divided into subsections, depending on the type of emission (VOC, particulate, etc.), the carcinogenicity of the emissions, and the health-based screening level(s) of the emissions. Only those rules applicable to the Rule 290 emission units at the stationary source will be addressed.

6.3.1. Rule 290 Brief Summary and Compliance Status

R 336.1290(a) through (d) – **Further evaluation needed** – Emissions less than 1000 lbs. uncontrolled and 500 lbs. controlled with more restrictive limits for certain ITSL/IRSLs; particulates limited to emissions of 0.01 lbs. particulate per 1000 lbs. gas, controlled by dust collector or equivalent installed and maintained, 5% opacity limit and monthly visible emission observation; description on file and records maintained. Required records are as follows for each emission unit: written description of the emission unit and control device, including the design control efficiency and exhaust gas flowrate; identify air contaminants emitted, carcinogenicity, screening level, and level of control; monthly emissions calculations; record of monthly visible emission readings.

The following emission units are listed as Rule 290 subject in the 2020 MAERS with their reported annual emissions in pounds.

*MAERS emissions reported (in pounds)*

Section	Emission Unit	EU Description in MAERS	VOC	PM10
1	EUSTENWORKGROUN	The North Works Groundwater Pump and Treat System utilized for on-site groundwater remediation.	0.563	-----
2	EUPOLGRAFTINDEX	This emission group includes all equipment utilized in the filtration of finished graft polyol. This emission unit is exempt from Rule 201 reporting requirements pursuant to Rule 290.	315	-----
2	EUPolSugarPent	This emission group includes equipment utilized for transferring sugar into the sugar bins prior to adding sugar to the reactors. This emission unit is exempt from Rule 201 reporting requirements pursuant to Rule 290.	Did not operate	
2	RGPOLTANKS	Polyol product storage tanks at Polyols Plant that are (a) Rule 290-exempt or (b) Rule 284-exempt and subject to NSPS.	2,923.34	-----
3	EUCheBlends	Liquid/solids non hazmaterial blends	0	-----
3	EUCheEpilmine	Reaction product of Epichlorohydrin & polyamine	Did not operate	
3	EUCheGraftedPoly	Production of a modified polyol	1,373	-----
3	EUCHEGRAFTINDEX	This emission unit consists of an index filter that is used to filter various materials that have low vapor pressures. This emission unit is exempt from Rule 201 requirements pursuant to Rule 290.	Did not operate	
3	EUCheHalfEster	Acid catalyst	Did not operate	
3	EUCheMacromer	Production of a prepolymer	Did not operate	
3	EUCheNMP	Recovery of Spent Solvents	9	-----
3	EUCHEHardlen	Mixing/Blending operation in existing flexible small scale production equipment. Process is covered by Rule 290 and CMAS (VVVVVV) Neshap Area Source	1.2	-----
4	EUTPUFURNACE	Equipment pyrolysis cleaning furnace at the TPU Synthesis Plant.	28	43
4	EUTPUSYNTHESIS	Thermoplastic polyurethane manufacturing process at TPU Synthesis Plant	3,256	161

The emission unit EUTPUFURNACE is also reported to have emitted 95 pounds of CO, 44 pounds of NOx, and 3 pounds of SO2 during the 2020 calendar year. In addition, four Rule 290 emission units are listed as did not operate (EULuwBatch, EULuwCont, EULuwWW, EULuwFug) that relate to the shutdown Amino Resins Plant.

While not conclusive, as Rule 290 data is evaluated for compliance month-by-month, the annual emissions data largely suggests compliance with the Rule 290 emission limits because they are well

beneath the controlled limit extrapolated for a calendar year (6,000 pounds). RGPOLTANKS consists of 24 storage tanks, so the average annual emission from any single tank is likely less than a ton.

BASF provided Rule 290 emissions records on a monthly basis for TPU and CER emissions units in 2019 and 2020.

EUPOLGRAFTINDEX monthly emission records were provided for 2019 and 2020. The Rule 290 records also demonstrate that emissions are less than the Rule 290 limits except for emissions of styrene. According to the Michigan Air Toxics System, styrene (CAS No. 100425) appears to have an initial risk screening levels (IRSL) of 2 micrograms per meter cubed (ug/m3). Per Rule 290(2)(a)(ii)(B), for toxic air contaminants with IRSLs greater than or equal to 0.4 ug/m3, total uncontrolled or controlled emissions shall not exceed 20 or 10 pounds per month, respectively. The provided facility records indicate emissions of styrene exceeding 20 pounds for several months in 2019 and 2020. BASF claims these records as "Confidential". AQD will follow up with the facility regarding the Rule 290 exemption status of EUPOLGRAFTINDEX.

#### 6.4. MI-ROP-B4359-2003b, Sections 1-4, NSPS Tanks Flexible Groups

NSPS Subpart Kb – **COMPLIANCE** – This subpart regulates volatile organic compound storage tanks that commenced construction or modification after July 23, 1984. The affected facility is defined at 40 CFR 60.110b as storage vessels containing volatile organic liquids (as defined in the subpart) and with capacities greater than or equal to 75 cubic meters (19,813 gallons).

Multiple sections of the ROP contain either a general flexible group or specific conditions to encompass requirements applicable to all NSPS subject storage tanks installed in each area (section) of the ROP. References to NSPS Kb in the ROP are as follows:

FGPOLNSPSKBTANKS (Section 2 – emission unit table – contains list of tanks)  
 FGPOLFACILITY, SC V.3 (Section 2)  
 EUCHEPOLYOL, SC V.1 (Section 3)  
 EUCHETK-43 (Section 3)

Please see the April 9, 2019 submittal for tanks subject to this subpart at the stationary source and how they comply with NSPS Kb. Not all tanks listed in the ROP as NSPS Kb subject remain so because after the October 2003 revision to NSPS Kb, those tanks sized less than 75 cubic meters but greater than 40 cubic meters, formerly subject to NSPS Kb, are no longer subject to the regulation.

#### 6.5. ACO AQD No. 2018-03

On May 7, 2018, ACO AQD No. 2018-03 became effective. The compliance program and implementation schedule are evaluated below (paragraphs 9 and 10).

Paragraph	Brief Condition Summary	Determination	Explanation
9.A	Shall keep online and offline checks performed by the Durr and all checks to verify proper function of the rotary valve and thrust bearing assembly performed by Durr on the RTO.	Compliance	The inspections were conducted March 28, 2018 (online) and September 18, 2020 (offline). <sup>1</sup>
9.B	Shall have completed modifications to the stack associated with FG-DRUMMING, to bring it into compliance with the requirements of PTI 113-07A, as amended.	Compliance	As described above under FG-DRUMMING, SC VIII.1., BASF has satisfied this requirement.
9.C	Shall have completed modifications to the stack	Compliance	As described above under FG-PRODUCTS, SC VIII.1, BASF has

	associated with FG-PRODUCTS to bring it into compliance with the requirements of PTI 113-07A, as amended.		satisfied this requirement through the issuance of PTI 113-07B.
10.A	Shall comply with the VOC pounds per hour limit, which is based on a daily average, for FGPOLEMCON.	Compliance	The facility appears to be meeting this requirement. There have been no more reported emissions bypassing the thermal oxidizer.
10.B	Shall comply with the minimum VOC destruction efficiency limits for FG-RAWMATLS and FG-RTO in PTI 113-07A, as amended.	Compliance	<p>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)).</p> <p>Testing conducted on September 21, 2017 indicates an average TOC destruction efficiency of 99.41% demonstrating compliance. Testing conducted on November 26, 2019 indicates an average TOC destruction efficiency of 95%. This was not in compliance with PTI 113-07A, FG-RTO, IV.1 (see below) and Consent Order AQD No. 2018-03. A violation notice was issued on February 25, 2020 regarding this issue. Testing conducted on May 13, 2020 indicated an average TOC destruction efficiency of 98.0% demonstrating compliance.</p>
10.C through G	No later than December 31, 2019 and continuing every two years thereafter, shall submit test plan for FG-RTO to determine the VOC destruction efficiency. Within thirty days after AQD approval of test plan, shall conduct stack testing. Within sixty days after test completion, shall 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	Testing was conducted on November 26, 2019, which did not indicate compliance with the minimum VOC destruction efficiency. Testing conducted on May 13, 2020 indicated an average TOC destruction efficiency of 98.0% demonstrating compliance. It appears a second consecutive event demonstrating compliance with the minimum VOC destruction efficiency has not yet occurred.

<sup>1</sup> BASF provided the offline inspection report from the offline inspection on September 18, 2020. The conclusion states that overall, the RTO "is in good operating condition." The report notes "rotary valve not being greased." The report discusses how aspects related to the thrust bearing assembly look good. Regarding checking that the air spring is clean and centered below thrust bearing carrier, this "looks good." Regarding verifying the rotor shaft alignment in the thrust bearing housing plate, this is "good". Regarding the setscrew for the thrust bearing carrier being tight and clean, this "looks good."

## Conclusion

Based on the AQD inspection and records review, it appears that BASF 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 PTI 67-20, 186-18, 115-18, 14-18, 145-17, 80-11B, 143-09, 174-08A, 113-07B, 84-07, and 272-04; and ACO AQD No. 2018-03. AQD will follow up with BASF regarding what appears to be a rain cap on the FG-RTO bypass stack, and regarding Rule 290 emissions for EUPOLGRAFTINDEX.

**[1] The group of three BASF stationary sources obtained the enforceable permit limitations to become an area source for HAPs on February 7, 2006. The opt out permit was obtained prior to the compliance deadlines of May 3, 2013 and October 19, 2013 (§63.6595(a)). Therefore, the stationary source B4359 is considered an area source for the applicability of MACT ZZZZ.**

**[2] On March 9, 2021, the facility provided a table of each emergency generator and firewater pump as well as its heat input. The highest heat input is 4,642,600 Btu/hr for EUSTEFIREPUMP1, EUSTEFIREPUMP2, and EUSTEFIREPUMP3.**

NAME 

DATE 4/8/22

SUPERVISOR JK