

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

P102772385

FACILITY: DDP Specialty Electronic Materials US, LLC		SRN / ID: P1027
LOCATION: 3400 S. Saginaw Rd Unit 96, MIDLAND		DISTRICT: Bay City
CITY: MIDLAND		COUNTY: MIDLAND
CONTACT: Randy Reinke , Environmental Specialist		ACTIVITY DATE: 06/25/2024
STAFF: Nathanael Gentle	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MEGASITE
SUBJECT: EUANION_XCHG Scheduled Onsite Inspection		
RESOLVED COMPLAINTS:		

On June 25, 2024, AQD staff conducted a scheduled onsite inspection of the emission unit (EU) identified as EUANION_XCHG at DDP Specialty Electronic Materials US, LLC, SRN P1027. The purpose of the inspection was to determine compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control of Natural Resources and Environmental Protection Act, 1994 Public Act 451; Michigan Department of Environment Great Lakes and Energy, Air Quality Division (AQD) Administrative Rules and Renewable Operating Permit, MI-ROP-P1027-2020b. At the time of inspection, the facility was found to be in compliance.

Facility Description and History

DDP Specialty Electronic Materials US, LLC is a megasite located at 3400 South Saginaw Road Unit 96, Midland, Midland County, Michigan 48640. The stationary source consists of DDP Specialty Electronic Materials US, LLC and Nutrition & Biosciences USA 1, LLC (SRN P1027), The Dow Chemical Company (SRN: A4033), Dow Silicones Corporation (SRN: A4043), SK Saran Americas LLC (SRN: P1026), Corteva Agriscience LLC (SRN: P1028), and Trinseo LLC (SRN: P1025). During the June 25, 2024, inspection, compliance was evaluated for EUANION_XCHG.

EUANION_XCHG is an ion exchange resin manufacturing process located in the ion exchange resins manufacturing complex. Emissions from the process are controlled by scrubber control and a direct flame afterburner. The process produces ionized styrene copolymer beads. The ionized beads are sold to customers to be used in water filtering processes. The EUANION_XCHG process consists of reactors, separators, storage tanks/silos and related equipment. The product manufacturing process consists of three stages including, Chloromethylation, Amination, and Washing. A total of four production trains exist within the emission unit which include, three Anion production trains and one Special Resin train. Equipment and production steps within each train are comparable, with the primary variability being specialty resins are used in amination stage of the Special Resin train. Turn around and maintenance of EUANION_XCHG is typically conducted in end of April into May.

In the Chloromethylation stage, copolymer beads, ether(chloromethyl ether), and FeCl₃ catalyst are added to a reactor. A reaction ensues which creates active sites on the beads. The beads then undergo a series of washes within the reactor using various grades of organics to remove impurities. Wash materials are sent to a recovery loop. Next, the chloromethylated beads are transferred to an aminator. In the amination stage a functional group is attached using select amines. Caustic and aqueous HCl are added to maintain pH and neutralize. The beads then undergo a series washes in the animator using water. Wash materials are sent to a recovery loop. The aminated resin beads are transferred to wash tanks where the product undergoes a series of additional washes using hot and cold water to remove residuals. Water from the wash tank process is sent to the onsite wastewater treatment plant. Vents from the wash stage are sent to a water scrubber (Scrubber 4) for control. Scrubber 4 vents to atmosphere. Following the wash stage, the product is packaged for sales.

The recovery loop in EUANION_XCHG utilizes a series of steps including absorption, evaporation, neutralization, and distillation to recover raw materials used in the EUANION_XCHG process. Emissions from the process recovery loop are controlled by a series of scrubbers including Scrubber 3, Scrubber 1, and Scrubber 2, as well 963Throx and its associated scrubber, Scrubber 6.

EUANION_XCHG is subject to the Miscellaneous Organic Chemical Manufacturing MON (40 CFR Part 63, Subpart FFFF) and Organic Liquids Distribution (Non-Gasoline) OLD (40 CFR Part 63, Subpart EEEE). By virtue of being subject to Subpart FFFF, the emission unit is also subject to the equipment leak provisions of 40 CFR Part 63, Subpart H. EUANION_XCHG is a CAM subject emission unit subject to the requirements of 40 CFR Part 64. The CAM subject pollutant for the emission unit is Volatile Organic Compounds (VOC). CAM subject control devices associated with EUANION_XCHG include 963THROX and Scrubber 4.

Compliance Evaluation

The process vents for EUANION_XCHG and associated control pathways are grouped by composition. Ether/HCl containing process vents are sent to an absorber to recover ether. The recovered ether is sent to ether storage to be reused in production. Amine containing process vents are sent to Scrubber 3, a venturi water scrubber. Vapor streams from the absorber, Scrubber 3, and organic containing process vents are combined and sent to Scrubber 1, then Scrubber 2; both scrubbers are packed tower water scrubbers. The primary purpose of Scrubber 1 and Scrubber 2 is to remove acidic vapors (HCL). The vent stream from Scrubber 2 is sent 963THROX and Scrubber 6. An emergency pressure release vent exists for the vent stream from Scrubber 2. In the event 963THROX were to become unavailable for control, the emission unit will enter full cooling to drop pressure and hold vent streams within the system. If the pressure were to build in the system, the pressure release valve would open to relieve the pressure, venting the vent stream from Scrubber 2 to atmosphere.

Scrubber 5A and Scrubber 5B control FeCl₃ catalyst emissions during periods when catalyst is being added to the Chloromethylation reactors. Both scrubbers are water scrubbers with an induced fan. The scrubbers infuse dust particles with water and mixes the two through a fixed-position dual opposed blade system. The vent streams from Scrubbers 5A and 5B are discharged to atmosphere via stack ID nos. SVEG9204A and SVEG9204B.

Emissions from wash tank vents, storage tank reliefs and the MeOH vent are sent Scrubber 4. Scrubber 4 is a packed tower water scrubber. The scrubber vapors are discharged to atmosphere via stack ID no. SVEG9202. Scrubber 4 is a CAM subject control device.

The permittee shall not operate the process steps of EUANION_XCHG exhausted to Scrubber 4 unless a minimum liquid flow rate of 45 gallons per minute (gpm), or any other liquid flow rate limit demonstrated during testing is maintained, Special Condition (S.C.) III.1. Scrubber 4 is equipped with a liquid flow rate indicator, S.C.IX.3. Staff report the liquid flow rate of the scrubber is maintained at approximately 55 gpm. The system will sound a low flow alarm at 46 gpm. In the event of low flow, operators manually shut down processes and hold vent streams venting to the scrubber. The liquid flow rate indicator is reported to be recalibrated every 15 months, S.C.VI.7. The monitoring device was most recently calibrated in May 2024.

At the time of inspection, the liquid flow rate readout of Scrubber 4 on the operator screen was observed to be 55gpm. The device id on the operator screen was FT38138 and AI332. Scrubber 4 was visually verified to be equipped with a liquid flow rate monitor with a corresponding device id tag. Readout on liquid flow indicator was observed to be 55.1 gpm.

Records of scrubber liquid flow rates and liquid levels are maintained in excel spreadsheets. Staff explained liquid flow rate records and liquid level data is automatically continuously recorded and stored in the processes data control system for a limited period. The data stored in the data control system is automatically transferred to a data historian system. Onsite staff take the scrubber data stored in the data historian system and place it into an excel spreadsheet to track and maintain records of the appropriate parameters and time periods. Staff report they review the transferred data as part of a monthly compliance review. If there were instances where scrubber data was below the minimum requirements, staff review the time period of the dip to determine if a violation occurred. If staff were to determine a violation occurred, it would be reported in the appropriate deviation report.

Special Condition VI.1. stipulates the permittee shall monitor and record the scrubber liquid flow rate for Scrubber 4 on an hourly basis. Hourly records of liquid flow rates were requested and provided for the dates July 11, 2023, July 19, 2023, February 6, 2024, and February 24, 2024. In addition, graph representation of the hourly records of liquid flow rate were provided and reviewed for the months of July 2023 and February 2024. Hourly liquid flow rate records were maintained and provided for the dates reviewed. During the dates for which hourly records were reviewed, the liquid flow rate ranged from 51.4 to 53.3 gpm. Graph representation of Scrubber 4 liquid flow rates was provided and reviewed for the months of July 2023 and February 2024. During both months, graphs provided show the liquid flow rate of Scrubber 4 was maintained above 50 gpm. Records reviewed demonstrate the minimum liquid flow rate of 45 gallons per minute (gpm) is being maintained for Scrubber 4 and appropriate records documenting the liquid flow rate of the scrubber are being maintained.

The permittee shall not operate the process steps of EUANION_XCHG exhausted to the following scrubbers unless Scrubber 1, Scrubber 2, Scrubber 3, Scrubber 5A, and Scrubber 5B are installed, maintained, and operated in a satisfactory manner, S.C.III.2. Satisfactory operation includes maintaining a minimum liquid flow rate for Scrubber 1, Scrubber 2, and Scrubber 3. Satisfactory operation of Scrubber 5A and Scrubber 5B includes maintaining a minimum level of water in each scrubber reservoir.

Scrubber 1, Scrubber 2, and Scrubber 3 are each equipped with a liquid flow rate indicator, S.C.IX.4. Scrubber 1 and Scrubber 2 are equipped with two liquid flow rate indicators each, a recirculation inlet flow indicator and an inlet liquid flow indicator. Scrubber 1, Scrubber 2, and Scrubber 3 each have a low flow set point in which an alarm will sound. Additionally, a low-low set point is established for each. If the liquid flow rate were to be at or below the low-low setpoint, pumps automatically shut off and batch processes cease. All reactors in the process enter a max cooling mode to minimize pressure in the system. Venting is stopped as much as possible by holding vent streams within the system. If 963 THROX is available, vent streams are sent there for control. In the event 963 THROX is unavailable, emergency venting to atmosphere would occur, as needed, to relieve pressure.

Special Condition VI.3. stipulates the permittee shall keep hourly records of scrubber liquid flowrates for Scrubber 1, Scrubber 2, and Scrubber 3. Hourly records of liquid flow rates were requested and provided for the dates July 11, 2023, July 19, 2023, February 6, 2024, and February 24, 2024. In addition, graph representation of the hourly records of liquid flow rate were provided and reviewed for the months of July 2023 and February 2024.

Scrubber 1 shall be operated with a minimum liquid flow rate of 90 gpm, S.C.III.2. Staff report the liquid flow rate of the scrubber is maintained at approximately 200 gpm. The system will sound a low flow alarm at 115 gpm. Low-low is set to 100 gpm, ensuring the scrubber is always operated above the minimum flow rate of 90 gpm. At the time of inspection, the liquid flow rate readout of Scrubber 1 on the operator screen was observed to be 200 gpm. The device id on the operator screen was FT63010 and AI633.

Scrubber 1 was visually verified to be equipped with a liquid flow rate monitor with a corresponding device id tag. Readout on the liquid flow indicator was observed to be 199.8 gpm.

Hourly records of liquid flow rates of Scrubber 1 were provided and reviewed for the dates July 11, 2023, July 19, 2023, February 6, 2024, and February 24, 2024. During the dates for which hourly records were reviewed, the liquid flow rate of recirculation flow ranged from 134 gpm to 158 gpm. Graph representation of Scrubber 1 liquid flow rates was provided and reviewed for the months of July 2023 and February 2024. During July 2023, the graph provided showed the liquid flow rate of Scrubber 1 was maintained above 120 gpm, except one instance in which the liquid flow rate dropped below 60 gpm mid-July. Staff reviewed the instance with AQD as part of the onsite inspection. The drop in the liquid flow rate was the result of the pump needing to be reset which took approximately 5 minutes. Hourly scrubber flow rates remained above the minimum 90gpm. During February 2024, graph records provided showed the liquid flow rate was maintained above 120 gpm. Records reviewed demonstrate the minimum liquid flow rate of 90 gallons per minute (gpm) is being maintained for Scrubber 1 and appropriate records documenting the liquid flow rate of the scrubber are being maintained.

Scrubber 2 shall be operated with a minimum liquid flow rate of 45 gpm, S.C.III.2. Staff report the liquid flow rate of the scrubber is maintained at approximately 70 gpm. The system will sound a low flow alarm at 55 gpm. Low-low is set to 50 gpm, ensuring the scrubber is always operated above the minimum flow rate of 45 gpm. At the time of inspection, the liquid flow rate readout of Scrubber 2 on the operator screen was observed to be 71.1 gpm. The device id on the operator screen was FT63110 and AI634. Scrubber 2 was visually verified to be equipped with a liquid flow rate monitor with a corresponding device id tag. Readout on the liquid flow indicator was observed to be 71.2 gpm.

Hourly records of liquid flow rates of Scrubber 2 were provided and reviewed for the dates July 11, 2023, July 19, 2023, February 6, 2024, and February 24, 2024. During the dates for which hourly records were reviewed, the liquid flow rate of recirculation flow ranged from 70.2 gpm to 76.3 gpm. Graph representation of Scrubber 2 liquid flow rates were provided and reviewed for the months of July 2023 and February 2024. During both months, graphs provided show the liquid flow rate of Scrubber 2 was maintained above 50 gpm. Records reviewed demonstrate the minimum liquid flow rate of 45 gallons per minute (gpm) is being maintained for Scrubber 2 and appropriate records documenting the liquid flow rate of the scrubber are being maintained.

Scrubber 3 shall be operated with a minimum liquid flow rate of 25 gpm, S.C.III.2. Staff report the liquid flow rate of the scrubber is maintained at approximately 38 gpm. The system will sound a low flow alarm at 35 gpm. Low-low is set to 30 gpm, ensuring the scrubber is always operated above the minimum flow rate of 25 gpm. At the time of inspection, the liquid flow rate readout of Scrubber 3 on the operator screen was observed to be 37.8 gpm. The device id on the operator screen was FT63210 and AI637. Scrubber 3 was visually verified to be equipped with a liquid flow rate monitor with a corresponding device id tag. Readout on liquid flow indicator was observed to be 37.67 gpm.

Hourly records of liquid flow rates of Scrubber 3 were provided and reviewed for the dates July 11, 2023, July 19, 2023, February 6, 2024, and February 24, 2024. During the dates for which hourly records were reviewed, the liquid flow rate of recirculation flow ranged from 37.2 gpm to 38.2 gpm. Graph representation of Scrubber 3 liquid flow rates was provided and reviewed for the months of July 2023 and February 2024. During both months, graphs provided show the liquid flow rate of Scrubber 3 was maintained above 30 gpm. Records reviewed demonstrate the minimum liquid flow rate of 25 gallons per minute (gpm) is being maintained for Scrubber 3 and appropriate records documenting the liquid flow rate of the scrubber are being maintained.

Scrubber 5A and Scrubber 5B are each equipped with liquid level monitors, S.C.IX.5. Satisfactory operation of Scrubber 5A and Scrubber 5B includes maintaining a minimum level of 5 inches of water in each

scrubber reservoir when Scrubber 5A and Scrubber 5B are in use, S.C.III.2. Staff report the scrubbers are only used during periods in which catalyst is being added to reactors during the Chloromethylation stage. Computer controls are in place to prevent the addition of catalyst, unless a minimum of 6 inches of water is in place. In the event water levels were to drop below 5 inches while catalyst was in the process of being loaded, a low-level alarm would sound to the operators. Operators would then take steps to bring water levels back up to the minimum, which may include manually opening the fill valve to the reservoir.

At the time of inspection, the water level in the reservoir readout on the operator screen for Scrubber 5A was observed to be 6.5inches. The device id on the operator screen was LT40501 and AI222. Scrubber 5A was visually verified to be equipped with a liquid level indicator with a corresponding device id tag. The water level in the reservoir readout on the operator screen for Scrubber 5B was observed to be 7.4inches. The device id on the operator screen was LT34146 and AI724. Scrubber 5B was visually verified to be equipped with a liquid level indicator with a corresponding device id tag. The liquid level indicators were not equipped with readout at the device.

Special Condition VI.4. stipulates the permittee shall keep per shift records of each liquid level of the scrubber reservoirs associated with Scrubber 5A and Scrubber 5B. Per shift records of liquid levels in the reservoirs were requested and provided for the dates July 11, 2023, July 19, 2023, February 6, 2024, and February 24, 2024. During the period of records reviewed, per shift liquid levels in Scrubber 5A ranged from 6.1 to 7.6 inches. Per shift liquid levels in Scrubber 5B ranged from 6.6 to 7.1 during the period reviewed. Records reviewed demonstrate the minimum liquid level of 5 inches of water is being maintained in each scrubber reservoir and appropriate records documenting the liquid levels in Scrubbers 5A and 5B are being maintained.

A pneumatic conveying system is used to transport paraformaldehyde. The system uses N₂ to transport paraformaldehyde delivered on railcars to storage hoppers. The closed loop nitrogen system shall be installed, maintained, and operated in a satisfactory manner, S.C.IX.2. The permittee shall keep maintenance and/or inspection records for the pneumatic conveying system used for the transfer of paraformaldehyde, S.C. VI.5. Staff report routine maintenance is conducted during the annual shutdown of EUANION_XCHG. The facility ensures maintenance is completed using a work order system. Maintenance tasks to be completed are based on manufacturer specifications and judgment of process engineers. Records of the most recent maintenance were provided and reviewed. The records provided show maintenance was completed in May 2024. Maintenance conducted included visual inspections, replacement of components, cleaning lines, and rebuilding motors. Records provided demonstrate routine maintenance is being conducted and sufficient documentation of activities is being maintained.

Permitted emission limits for EUANION_XCHG are established for Volatile Organic Compounds (VOC), HCl, and Chlorine. These limits include 4.3 pph and 2.6 tpy VOC, 2.2 pph HCl, and 1.0 pph Chlorine. The permittee shall keep records of monthly emission calculations and results to demonstrate compliance with the emission limits, S.C.VI.6.

Facility staff track and calculate emissions using an emissions spreadsheet. Staff track and input the number of days the process was operating and the number and type (anion vs specialty resin) of batches washed each month. This data is used with predetermined emission factors to calculate the monthly emissions. Emission factors were determined using worst case emission rates for all three pollutants. The emissions from the stack vent for 963THROX and the stack vent for Scrubber 4 are calculated separately. During the records review portion of the onsite inspection, emission totals from both vents were not being summed. Further discussion with onsite staff and review of the permit limits determined emission limits are total for EUANION_XCHG and do not differentiate between vents within the emission unit. Onsite staff promptly added a section to the emissions spreadsheet in which emissions from each vent are summed, thereby calculating the total emissions from EUANION_XCHG for each pollutant. Staff ensured this

calculation would be included in the emission records provided and maintained in emission calculations moving forward.

Records of monthly and 12-month rolling emission calculations were requested and reviewed for the most recent 12-month time period, June 2023 to May 2024. During the period of records reviewed, the maximum hourly emission rate of VOC was recorded as 0.63lb/hr, below the permitted limit of 4.3pph, S.C.I.1. Records of 12-month rolling VOC records are maintained. During the 12-month period reviewed, the 12-month rolling VOC emission rate ranged from 1.22 tpy to 1.25 tpy, below the permitted emission limit of 2.6 tpy, S.C.I.2. The maximum hourly emission rate of HCl during the period reviewed was 1.396 lb/hr, below the limit of 2.2 pph, S.C.I.3. The maximum hourly emission rate of chlorine was 0.596 lb/hr, below the limit of 1.0 pph, S.C.I.4. Records provided and reviewed demonstrate the facility maintains up to date emission records to demonstrate compliance with the permitted emission limits.

During the period of records reviewed, bypass of 963THROX occurred in April 2024 for 1.667 minutes. Staff explained the bypass resulted from the 963THROX being down and the emergency pressure release venting needing to occur. Following the release, onsite staff calculated emissions that occurred to verify exceedance of an hourly emission limit did not occur. Additionally, staff report the release was assessed to determine if a Rule 912 notice needed to be submitted to the AQD. The duration of the bypass and emissions resulting from it are tracked in the emissions spreadsheet and included in monthly and 12-month rolling calculations. Exceedances of the permitted emission limits do not appear to have occurred from the emergency venting. The venting of emissions without 963THROX control is a deviation of the MON-MACT. Staff stated the instance will be reported as a deviation in the next MON-MACT deviation report.

MACT Compliance

EUANION_XCHG is subject to the requirements of 40 CFR Part 63, Subpart FFFF (MON) and 40 CFR Part 63, Subpart EEEE (OLD). EUANION_XCHG is also subject to the equipment leak provisions of the HON (40 CFR Part 63, Subpart H). Staff report initial MACT applicability assessments were completed by the facility for the process. As updates or changes occur to the regulations, staff report the entire process is assessed for applicability and when necessary, actions are taken to ensure compliance. When process updates occur, a management of change (MOC) is utilized. Staff explained the MOC process entails review of process changes by environmental personnel. If the process change were determined to affect the processes' s applicability, actions would be taken to ensure compliance. In addition, staff report the facility has compliance related policies, procedures, and internal inspections that are updated during the MOC review process. In addition to during the MOC review process, internal compliance inspections are conducted routinely. These inspections are tracked using a digital task management system to ensure they are completed within the required timeframe. Each month, staff conduct a reasonable inquiry to assess compliance of the previous month with the MON, HON, and OLD MACT. LDAR monitoring is performed by an onsite contractor and an internal database of all components associated with the emission unit is maintained.

EUANION_XCHG is comprised one MON-MACT group one continuous processes vent. This vent was identified as being to a distillation column in the process recovery loop. Vapors from the group one continuous vent are identified as being controlled by a thermal incinerator, 963THROX. The emission unit consists of a number of group one batch process vents. The group one batch process vents are identified in the facility's Notice of Compliance Status (NOCS) report, which was provided to the AQD. Control device type identified for the group one batch process vents is thermal incinerator. The control option selected to reduce collective uncontrolled OHAP emissions from the sum of all batch process vents within the process by >=98 percent by weight is by venting emissions from a sufficient number of vents through one or more CVS to any combination of non-flare control devices. For halogenated vents in which the facility is using a

combustion device, the facility uses a halogen reduction device after the combustion device to reduce emissions of hydrogen halide and halogen HAP by $\geq 99\%$ by weight.

Based on the information provided and reviewed, the facility appears to be taking appropriate steps to ensure compliance with the applicable MACT standards.

Summary

On June 25, 2024, AQD staff conducted a scheduled onsite inspection of the emission unit (EU) identified as EUANION_XCHG at DDP Specialty Electronic Materials US, LLC, SRN P1027. DDP Specialty Electronic Materials US, LLC is a megasite located at 3400 South Saginaw Road Unit 96, Midland, Midland County, Michigan 48640. EUANION_XCHG is an ion exchange resin manufacturing process located in the ion exchange resins manufacturing complex. The process produces ionized styrene copolymer beads used in water filtering processes. EUANION_XCHG is subject to the Miscellaneous Organic Chemical Manufacturing MON (40 CFR Part 63, Subpart FFFF) and Organic Liquids Distribution (Non-Gasoline) OLD (40 CFR Part 63, Subpart EEEE). By virtue of being subject to Subpart FFFF, the emission unit is also subject to the equipment leak provisions of 40 CFR Part 63, Subpart H. EUANION_XCHG is a CAM subject emission unit subject to the requirements of 40 CFR Part 64. The CAM subject pollutant for the emission unit is Volatile Organic Compounds (VOC). CAM subject control devices associated with EUANION_XCHG include 963THROX and Scrubber 4. At the time of inspection, the facility was found to be in compliance.

Nathanael Dente
NAME

DATE 8/14/2024

Mike J. [Signature]
SUPERVISOR