

State Registration Number
A4033

**RENEWABLE OPERATING PERMIT
STAFF REPORT**

ROP Number
MI-ROP-A4033-2024

The Dow Chemical Company

State Registration Number (SRN): A4033

Located at

1790 Building, Washington Street, Midland, Midland County, Michigan 48674

Permit Number: MI-ROP-A4033-2024

Staff Report Date: October 2, 2023

This Staff Report is published in accordance with Sections 5506 and 5511 of Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451). Specifically, Rule 214(1) of the administrative rules promulgated under Act 451, requires that the Michigan Department of Environment, Great Lakes, and Energy (EGLE), Air Quality Division (AQD), prepare a report that sets forth the factual basis for the terms and conditions of the Renewable Operating Permit (ROP).

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RENEWABLE OPERATING PERMIT

OCTOBER 2, 2023 - STAFF REPORT

ROP Number

MI-ROP-A4033-2024

Purpose

Major stationary sources of air pollutants, and some non-major sources, are required to obtain and operate in compliance with an ROP pursuant to Title V of the federal Clean Air Act; and Michigan’s Administrative Rules for Air Pollution Control promulgated under Section 5506(1) of Act 451. Sources subject to the ROP program are defined by criteria in Rule 211(1). The ROP is intended to simplify and clarify a stationary source’s applicable requirements and compliance with them by consolidating all state and federal air quality requirements into one document.

This Staff Report, as required by Rule 214(1), sets forth the applicable requirements and factual basis for the draft ROP terms and conditions including citations of the underlying applicable requirements, an explanation of any equivalent requirements included in the draft ROP pursuant to Rule 212(5), and any determination made pursuant to Rule 213(6)(a)(ii) regarding requirements that are not applicable to the stationary source.

General Information

Stationary Source Mailing Address:	The Dow Chemical Company 1790 Building, Washington Street Midland, Michigan 48674
Source Registration Number (SRN):	A4033
North American Industry Classification System (NAICS) Code:	325520
Number of Stationary Source Sections:	1
Is Application for a Renewal or Initial Issuance?	Renewal
Application Number:	202100177
Responsible Official:	Kristan Soto EH&S Responsible Care Leader 989-633-1809
AQD Contact:	Kathy Brewer Senior Environmental Quality Analyst 989 493-2100
Date Application Received:	September 21, 2021
Date Application Was Administratively Complete:	September 21, 2021
Is Application Shield in Effect?	Yes
Date Public Comment Begins:	October 2, 2023
Deadline for Public Comment:	November 1, 2023

Source Description

The Dow Chemical Company (Dow Chemical) is a chemical manufacturer located at 701 Washington Street in Midland, Michigan. The facility is located in an industrial area surrounded by other chemical manufacturers. Commercial businesses are approximately 1/3 mile north of the facility and the closest residential areas are approximately 1/2 mile north, northwest, and northeast of the facility. The Tittabawassee River flows through the west portion of the facility. Dow Chemical manufactures chemical products using a variety of process equipment including: reactors, storage tanks/silos, condensers, thermal heat recovery and oxidation units, scrubbers, etc. Dow Chemical maintains and operates an industrial hazardous waste incinerator and wastewater treatment plant, research and development facilities, storage tank farms, office buildings, and ancillary equipment such as engines.

The Dow Chemical Company (Dow Chemical) (SRN: A4033) is located within a single Stationary Source with Dow Silicones Corporation (Dow Silicones) (SRN: A4043), DDP Specialty Electronic Materials US, Inc. (DDP) (SRN: P1027), Nutrition & Biosciences USA 1, LLC (N&B/IFF) (SRN: P1027), Trinseo LLC (Trinseo) (SRN: P1025), Corteva Agrisciences, LLC (Corteva) (SRN P1028), and Clean Harbors Industrial Services (SRN P1028).

In 2016, Dow Silicones became a wholly owned subsidiary of Dow Chemical. On April 1, 2019, Dow Chemical underwent a restructuring and split off its assets to form an industrial park with SK Saran Americas, LLC, Dow AgroSciences, LLC, Trinseo, and DDP. SK Saran Americas, LLC ceased operations at the site in 2020. N&B/IFF has acquired and begun operating some assets formerly owned by DDP, and Dow AgroSciences, LLC is now Corteva.

Dow Chemical is considered the landlord of the industrial park or stationary source whereas the other facilities are considered tenants that will own and operate their assets. They are one stationary source pursuant to the Clean Air Act. Dow Chemical owns the land and has lease agreements, product supply agreements, licensing agreements, business service agreements, technical service agreements, site service agreements, and other agreements with the facilities that give Dow Chemical common control.

Dow Chemical requested that each facility acquire its own Part 70, Title V, renewable operating permit (ROP). The Department of Environment, Great Lakes, and Energy (EGLE), Air Quality Division (AQD), had the facilities submit individual ROP Significant Modification applications to enable each facility to acquire its own ROP. In the Source-Wide Requirements section of each facility’s ROP, language has been added to indicate that all the facilities are one stationary source, and specific federal requirements or standards that apply to the entire stationary source have also been included.

Currently some emissions unit owned by one company can vent process exhaust to a control device owned by another company. Language has been included in the ROP that requires the generator of the emissions to acquire and the owner of the control device to provide adequate monitoring and records to demonstrate compliance with conditions in the ROP.

Control Device	Current Control Device Owner	Emission Unit	Current Emission Unit Owner
FG954THROX	Corteva (SRN P1028)	EU01, EU02, EU1028	Corteva (SRN P1028)
		EU06HIGH PURITY*, EU06LOW PURITY*, EU08+, EUB2, EUB5	DDP and N&B/IFF (SRN P1027)
		EU91	Trinseo (SRN P1025)
FG963THROX	DDP (SRN P1027)	EU88, EUANION_XCHG, EURULE290; EUB2 (N&B/IFF)	DDP (SRN P1027)
		EU03, EU12b	Corteva (SRN P1028)

		EUB1	Trinseo (SRN P1025)
		EU82	Dow Chemical (SRN A4033)
FGHCLSCRUBBER	DDP (SRN P1027)	EU06HIGH PURITY* (N&B/IFF), EU06LOW PURITY*	DDP (SRN P1027)
		EU05*	Corteva (SRN P1028)

*Former EU85 (PTI No.78-03)

+Former EU93 (PTI No. 284-07)

The following table lists Dow Chemical SRN A4033 portion of the stationary source emission information as reported to the Michigan Air Emissions Reporting System (MAERS) for the year **2021**.

TOTAL STATIONARY SOURCE EMISSIONS

Pollutant	Tons per Year
Carbon Monoxide (CO)	1.46
Nitrogen Oxides (NO _x)	131
Particulate Matter (PM10 Filterable)	1.15
Particulate Matter (PM 10 Primary)	0.5
Sulfur Dioxide (SO ₂)	1.7
Volatile Organic Compounds (VOCs)	96.9
Ammonia	20.8

MAERS does not require individual and accumulative HAPs to be reported annually. The activities and processes at the Dow Chemical facility emit numerous Hazardous Air Pollutants (HAPs) listed in Section 112(b) of the federal Clean Air Act. For Dow Chemical, HAPs emissions are determined and recorded as required by the conditions in the ROP and per state and federal regulations.

For the Dow Chemical portion of the Dow iPark, and for entire stationary source, the ROP reissuance application does not require the reporting of HAP emissions.

See Parts C and D in the ROP for summary tables of all processes at the stationary source that are subject to process-specific emission limits or standards.

Regulatory Analysis

The following is a general description and history of the source. Any determinations of regulatory non-applicability for this source are explained below in the Non-Applicable Requirement part of the Staff Report and identified in Part E of the ROP.

The stationary source is in Midland County, which is currently designated by the United States Environmental Protection Agency (USEPA) as attainment/unclassified for all criteria pollutants.

The stationary source is subject to Title 40 of the Code of Federal Regulations (CFR) Part 70, because the potential to emit of particulate matter, volatile organic compounds, carbon monoxide, and nitrogen oxides exceeds 100 tons per year and the potential to emit of any single HAP regulated by Section 112 of the federal Clean Air Act, is equal to or more than 10 tons per year and/or the potential to emit of all HAPs combined is equal to or more than 25 tons per year.

The facility is an existing Major Stationary Source for federal Prevention of Significant Deterioration (PSD) (40 CFR 52.21) regulations. The 32 hazardous waste incinerator at Dow Chemical is considered a "synthetic minor" source with regard to PSD as Dow Chemical accepted legally enforceable permit

conditions limiting the potential to emit from the incinerator for sulfur dioxide (SO₂), PM (particulate matter), PM₁₀ (PM less than 10 microns in diameter), PM_{2.5} (PM less than 2.5 microns in diameter), carbon monoxide (CO), fluorides, and sulfuric acid. The 32 hazardous waste incinerator originally was able to “net out” of PSD for NO_x.

Some processes at Dow Chemical have emission limits associated with categories based on applicable AQD established initial threshold screening level for toxic air contaminants of > 0.001 micrograms per cubic meter for any averaging time.

The AQD’s Rules 287 and 290 were revised on December 20, 2016. FGRULE287(2)(c) and FGRULE290 are flexible group tables created for emission units subject to these rules but not required to obtain a Permit to Install (PTI). Emission units installed before December 20, 2016, can comply with the requirements of Rule 287 and Rule 290 in effect at the time of installation or modification as identified in the tables. However, emission units installed or modified on or after December 20, 2016, must comply with the requirements of the current rules as outlined in the tables.

EU1310RADIOTOWERRICE, EUEVOWIFLSRICE, EU633RICE, and EU123RICE FGDIVERSIONDIESELA, and FGDIVERSIONDIESELB at the stationary source are subject to the Standards of Performance for Stationary Source Compression Ignition Internal Combustion Engines promulgated in 40 CFR Part 60, Subparts A and IIII

EUAUSTINLIFTSTATION at the stationary source is subject to the Standards of Performance for Stationary Source Compression Ignition Internal Combustion Engines promulgated in 40 CFR Part 60, Subparts A and JJJJ

Site wide the stationary source is subject to the National Emission Standard for Hazardous Air Pollutants for asbestos promulgated in 40 CFR Part 61, Subparts A and M.

EU32INCINERATOR at the stationary source is subject to the National Emission Standard for Hazardous Air Pollutants for Mercury promulgated in 40 CFR Part 61, Subparts A and E.

Sitewide, the stationary source is subject to the National Emission Standard for Hazardous Air Pollutants for Site Remediation promulgated in 40 CFR Part 63, Subparts A and GGGGG.

EUB7, EU32INCINERATOR, and EUC3 at the stationary source are subject to the National Emission Standard for Hazardous Air Pollutants for Offsite Waste and Recovery Operations promulgated in 40 CFR Part 63, Subparts A and DD.

EU32INCINERATOR at the stationary source is subject to the National Emission Standard for Hazardous Air Pollutants from Hazardous Waste Combustors promulgated in 40 CFR Part 63, Subparts A and EEE.

EU82 and EU1353 at the stationary source are subject to the National Emission Standard for Hazardous Air Pollutants for Organic Liquid Distribution promulgated in 40 CFR Part 63, Subparts A and EEEE.

EU82, EU1353, and EU1353-02 at the stationary source are subject to the National Emission Standard for Hazardous Air Pollutants for Miscellaneous Organic Chemical Manufacturing (MON) promulgated in 40 CFR Part 63, Subparts A and FFFF.

EU82, EUB7, EU32INCINERATOR, and EU1353-02 at the stationary source are subject to the leak provisions of the National Emission Standard for Hazardous Air Pollutants for Equipment Leaks in 40 CFR Part 63, Subparts A and H.

EU845_MOD2, and EU845_AEH10 emission units at the stationary source are subject the National Emission Standard for Hazardous Air Pollutants for Miscellaneous Coatings Manufacturing Operations promulgated in 40 CFR Part 63, Subparts A and HHHHH.

EU1803-HP1480, EU1803-HP1070, EU1803-HP525, EU1100-HP370, FGDIVERSIONDIESELA, and FGDIVERSIONDIESELB at the stationary source are subject to the National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines promulgated in 40 CFR Part 63, Subparts A and ZZZZ.

The monitoring conditions contained in the ROP are necessary to demonstrate compliance with all applicable requirements and are consistent with the "Procedure for Evaluating Periodic Monitoring Submittals."

The emission limitations of 0.013 gr/dscf Particulate Matter and 100 ppmv dry basis CO at the stationary source with the underlying applicable requirement(s) of 40 CFR Part 63, Subpart EEE from EU32INCINERATOR are exempt from the federal Compliance Assurance Monitoring (CAM) regulation pursuant to 40 CFR 64.2(b)(1)(i) because the 0.013 gr/dscf Particulate Matter and 100 ppmv dry basis CO emission limitations meet the CAM exemption for NSPS or MACT proposed after November 15, 1990.

The following Emission Units/Flexible Groups are subject to CAM:

Emission Unit/Flexible group ID	Pollutant and Emission Limit	UAR(s)	Control Equipment	Monitoring (Include Monitoring Range)	Emission Unit/Flexible Group for CAM	PAM?*
EUB7	VOC 11 pph 1.2 TPY	R336.1702 (a)	Carbon beds Condenser	For Carbon beds regeneration weekly. Carbon bed operating temperature outlet gas to exchanger maximum temperature is <135 C.	EUB7	No
EU32INCINERATOR	PM 0.013 gr/dscf	R 336.133 1(1)(c)	Quench tower, condenser, venturi scrubber, nine ionizing wet scrubbers	Numerous. See ROP EU32INCINERATOR SC VI.3 and VI.17	EU32INCINERATOR	No
	PM=24.9 TPY	R 336.120 5(1)				
	PM ₁₀ =30 mg/dscm	40 CFR 52.21(c) & (d)				
	PM ₁₀ =14.9 TPY	R 336.120 5(1) 40 CFR 52.21(c) & (d)				
	PM _{2.5} =9.9 TPY	R 336.120 5(1) 40 CFR 52.21(c) & (d)				
EU32INCINERATOR	NO _x =151 pph	40 CFR 52.21(d)	Post Secondary Combustion	NO _x CEMS= 151 pph and 185.9 TPY 12-	EU32INCINERATOR	No

Emission Unit/Flexible group ID	Pollutant and Emission Limit	UAR(s)	Control Equipment	Monitoring (Include Monitoring Range)	Emission Unit/Flexible Group for CAM	PAM?*
	185.9 TPY 12-month rolling period	R 336.1205 (1) 40 CFR 52.21(b)(3) 40 CFR 52.21(c) & (d)	Chamber NOx abatement reactor, quench tower, condenser, venturi scrubber, chlorine scrubber	month average period		
EU32INCINE RATOR	SO2 = 36.4 pph (in 1 hour) 26.6 pph (in 3-hours) 39 tpy 12-month rolling period	40 CFR 52.21(d) 40 CFR 52.21(c) & (d) R 336.1205 (1) 40 CFR 52.21(c) & (d)	quench tower, condenser, venturi scrubber, chlorine scrubber	SO2 CEMS= 39 TPY, 36.4 lbs/hr, one hour average period, and 26.6 lbs/hr three hour average period	EU32INCINE RATOR	No
EU32INCINE RATOR	CO = 100 ppmv, dry basis in 1 hour 99 TPY 12-month rolling period	R 336.170 2(a) R 336.1205 (1)	Secondary Combustion Chamber	CO CEMS = 99 TPY and 100 ppmv dry basis one hour average period	EU32INCINE RATOR	No

*Presumptively Acceptable Monitoring (PAM)

For EUB7, performing the carbon bed regeneration at least once per week cleans the carbon and ensures the carbon beds are achieving the designed control efficiency. Maintaining the temperature of the of the condenser exit gas temperature during steam desorption ensures proper operation and control efficiency is being achieved by the condenser. Emissions only exhaust through the condenser during carbon bed regeneration, not normal process operation. Therefore, condenser exit gas temperature is only monitored during regeneration events.

The indicator range for the carbon beds is simply tracking whether or not the carbon beds have been regenerated. This indicator is tracked on a calendar week basis by the building. Failure to regenerate the carbon beds in a calendar week would trigger an inspection and corrective action as necessary. No QIP threshold has been selected for this indicator.

The indicator range for the condenser exit gas temperature is set based on the maximum temperature than can be measured in the exit gas stream while still achieving the necessary control efficiency. No QIP threshold has been selected for this indicator.

The facility is using CEMS for NOx, CO, and SO₂ to show compliance with the emissions limit. 40 CFR Part 63, Subpart EEE (63.1209) contains monitoring requirements and standards including those in

40 CFR 63.8 and Appendix B on 40 CFR Part 60 for CEMS used to monitor CO emissions. CEMS readings and flow values are used to calculate and record and NO_x, CO, and SO₂ emissions.

Based on pre-control emissions provided by Dow Chemical, the emission units EUC3, EU1353-01, and EU1353-02 are not subject to CAM requirements because the pre-control emissions are less than the CAM applicability threshold of 100 tons per year.

Pre-controlled Emissions (TPY)			
	Emission Unit		
Pollutant	EUC3	EU1353-01	EU1353-02
VOC	52.71	4.34	76.14
PM	2.19 (Packed tower Scrubber)	14.17 (PM 2.5)	1.89E-03
	68.33 (Silo Fabric Filter)	14.17 (PM10) 14.17 (PM)	

Please refer to Parts B, C, and D in the draft ROP for detailed regulatory citations for the stationary source. Part A contains regulatory citations for general conditions.

Source-Wide Permit to Install (PTI)

Rule 214a requires the issuance of a Source-Wide PTI within the ROP for conditions established pursuant to Rule 201. All terms and conditions that were initially established in a PTI are identified with a footnote designation in the integrated ROP/PTI document.

The following table lists all individual PTIs that were incorporated into previous ROPs for the assets retained by Dow Chemical. PTIs incorporated into previous ROPs for assets now owned by other Dow iPark tenants are included in Source-Wide PTIs issued with the ROPs for each tenant based on ROP Significant Modification No. 201900086. PTIs issued after the effective date of April 12, 2017, for ROP No. MI-ROP-A4033-2017 are identified in Appendix 6 of the ROP.

PTI Number	
4-04 (EU82)	226-15 (EU32INCINERATOR)
678-83A (EUB7)	129-06 (EUC3)

Streamlined/Subsumed Requirements

This ROP does not include any streamlined/subsumed requirements pursuant to Rules 213(2) and 213(6).

Non-applicable Requirements

Part E of the ROP lists requirements that are not applicable to this source as determined by the AQD, if any were proposed in the ROP Application. These determinations are incorporated into the permit shield provision set forth in Part A (General Conditions 26 through 29) of the ROP pursuant to Rule 213(6)(a)(ii).

Processes in Application Not Identified in Draft ROP

The following table lists processes that were included in the ROP Application under Rule 212(4). These processes are not subject to any process-specific emission limits or standards in any applicable requirement.

PTI Exempt Emission Unit ID	Description of PTI Exempt Emission Unit	Rule 212(4) Citation	PTI Exemption Rule Citation
EURULE282a	Processes or process equipment which are electrically heated or which fire sweet gas fuel or no. 1 or no. 2 fuel oil at a maximum total heat input rate of not more than 10,000,000 BTU per hour and meet the criteria of R 336.1282(a).	Rule 212(4)(c)	Rule 282(2)(a)
EURULE282b	Fuel-burning equipment which is used for space heating, service water heating, electric power generation, oil and gas production or processing, or indirect heating and which only burns the fuels specified in R 336.1282(b).	Rule 212(4)(c)	Rule 282(2)(b)
EURULE284b	Storage of butane, propane, or liquefied petroleum gas in a vessel that has a capacity of less than 40,000 gallons.	Rule 212(4)(d)	Rule 284(2)(b)
EURULE284g	Gasoline or natural gas storage and handling equipment, as follows: Gasoline storage and handling equipment at loading facilities handling less than 20,000 gallons per day or at dispensing facilities.	Rule 212(4)(d)	Rule 284(2)(g)(i)
EURULE284i	Storage or transfer operations of volatile organic compounds or noncarcinogenic liquids in a vessel that has a capacity of not more than 40,000 gallons where the contents have a true vapor pressure of not more than 1.5 psia at the actual storage conditions.	Rule 212(4)(d)	Rule 284(2)(i)
EURULE285g	Internal combustion engines that have less than 10,000,000 BTU/hour maximum heat input.	Rule 212(4)(e)	Rule 285(2)(g)
EURULE285vi	Equipment for carving, cutting, routing, turning, drilling, machining, sawing, surface grinding, sanding, planing, buffing, sand blast cleaning, shot blasting, shot peening, or polishing ceramic artwork, leather, metals, graphite, plastics, concrete, rubber, paper stock, wood, or wood products which meets the subsequent requirements of 285(vi).	Rule 212(4)(e)	Rule 285(2)(l)(vi)

For an exempt process determined to be subject to a National Emission Standard for Hazardous Air Pollutants Source Category, the applicable requirements will be implemented including updates to the appropriate Notice of Compliance.

Draft ROP Terms/Conditions Not Agreed to by Applicant

This draft ROP does not contain any terms and/or conditions that the AQD and the applicant did not agree upon pursuant to Rule 214(2).

Compliance Status

The AQD finds that the stationary source is expected to be in compliance with all applicable requirements as of the effective date of this ROP.

Action taken by EGLE, AQD

The AQD proposes to approve this ROP. A final decision on the ROP will not be made until the public and affected states have had an opportunity to comment on the AQD's proposed action and draft permit. In addition, the USEPA is allowed up to 45 days to review the draft ROP and related material. The AQD is not required to accept recommendations that are not based on applicable requirements. The delegated decision maker for the AQD is Chris Hare, Bay City District Supervisor. The final determination for ROP approval/disapproval will be based on the contents of the ROP Application, a judgment that the stationary source will be able to comply with applicable emission limits and other terms and conditions, and resolution of any objections by the USEPA.

State Registration Number
A4033

RENEWABLE OPERATING PERMIT
NOVEMBER 29, 2023 - STAFF REPORT ADDENDUM

ROP Number
MI-ROP-A4033-2023

Purpose

A Staff Report dated October 2, 2023, was developed to set forth the applicable requirements and factual basis for the draft Renewable Operating Permit (ROP) terms and conditions as required by Rule 214(1) of the administrative rules promulgated under Act 451. The purpose of this Staff Report Addendum is to summarize any significant comments received on the draft ROP during the 30-day public comment period as described in Rule 214(3). In addition, this addendum describes any changes to the draft ROP resulting from these pertinent comments.

General Information

Responsible Official:	Kristan Soto EH&S Responsible Care Leader 989-633-1809
AQD Contact:	Kathy Brewer Senior Environmental Quality Analyst 989 493-2100

Summary of Pertinent Comments

The following comments were received from the Environmental Protection Agency during the 30-day public comment period:

1. The Applicable Requirements listed in EU32INCINERATOR Special Condition 1. Monitoring of NOx and SOx are not detailed enough to understand if the listed requirements are based on applicable Best Available Control Technology (BACT).
2. The EU32INCINERATOR is subject to 40 CFR Part 63 Subpart EEE. Special Condition II.4.e. states the waste feed cutoff will be initiated immediately upon detection. After review of the facility's Notice of Compliance for 40 CFR Part 63 Subpart EEE, and confirmation by Dow that pressure transducers on the kiln record a data point every second, a waste feed cutoff is initiated after a 3 second positive pressure condition, and, a one second positive pressure event is considered a reportable event, it was determined that the compliance method for the kiln plenums pressure control and response was acceptable for the kilns current operating conditions.

Changes to the October 2, 2023 Draft ROP

1. The UARs for Special Condition VI.1. in EU32INCINERATOR were changed to more specific Federal Regulation citations. The additional Federal Regulation citation information is included to clarify the specific provision and that the requirement is not based on a BACT limit.
2. No changes to the ROP for the EU32INCINERATOR Special Conditions related to kiln pressure monitoring and associated waste feed cutoffs were necessary.