Notification of Compliance (NOC)
40 CFR 63 Subpart EEE
Hazardous Waste Combustor MACT Standard

Owner/Operator/Title:	The Dow Chemical Company
Street Address:	1790 Building, Washington Street
City:	Midland **State:** Michigan **Zip Code:** 48674
Plant Name:	Michigan Operations, 32 Incinerator
Plant Contact / Title:	Jim Nemeth, EH&S Delivery Specialist

Plant Address (if different than owner/operator's)

Street Address:	
City:	Midland **State:** Michigan **Zip Code:** 48667
Major or Area Source:	This source is located at a facility that is an area source of Hazardous Air Pollutants.

MACT Emission Limits

The 32 Incinerator is considered an existing source under the HWC MACT permanent replacement standards. The 40 CFR 63 Subpart EEE emission standards that are applicable to this unit are specified in Table 1.

Because the 32 Incinerator was a new unit under the interim standards and is an existing unit under the permanent replacement standards, the Subpart EEE emission standards for dioxins and furans, mercury, semivolatile metals, and total chlorine that now apply actually increased. However, Dow has agreed with EGLE to accept state enforceable emission limits equal to the lower limits with the exception of the chlorine limit.

Table 1. 40 CFR 63 Subpart EEE Emissions Standards

32 Incinerator		
Hazardous Air Pollutant	**40 CFR 63 Subpart EEE Limit**	**EGLE State Limit**
Dioxins and Furans	0.40 ng TEQ/dscm[1]	0.20 ng TEQ/dscm[1]
Mercury	130 µg/dscm[1]	45 µg/dscm[1]
Particulate Matter (PM)	30 mg/dscm[1] (including condensable particulate matter (PM-10)	30 mg/dscm[1] (including condensable particulate matter (PM-10)
HCl/Cl_2	32 ppmv as Cl^- equivalents[1]	32 ppmv as Cl^- equivalents[1]
Carbon Monoxide	100 ppmv, dry basis[1]	100 ppmv, dry basis[1]
Total Hydrocarbons	10 ppmv, dry basis[1], demonstrated during the DRE performance test	10 ppmv, dry basis[1], demonstrated during the CPT
Semivolatile metals (Pb, Cd)	230 µg/dscm[1]	120 µg/dscm[1]
Low Volatile Metals (As, Be, Cr)	92 µg/dscm[1]	92 µg/dscm[1]
Destruction and Removal Efficiency	99.99% DRE	99.999% DRE

[1] Corrected to 7% O_2

Operating Parameter Limits (OPLs)

The operating parameters and limits listed in Table 2 were demonstrated during the November 2019 Comprehensive Performance Test (CPT) or are based on good engineering practices and manufacturer's recommendations. The AWFCO limits demonstrated in the most recent CPT are listed in Table 3. These will ensure compliance with the emission limits specified above.

The operating permit MI-ROP-A4033-2017b, EU32INCINERATOR-S1, also specifies operating parameter limits. The more restrictive of a limit specified in Table 3 or in MI-ROP-A4033-2017b has been set as an Automatic Waste Feed Cutoff (AWFCO) limit.

Table 2. 40 CFR 63 Subpart EEE Operating Parameter Limits Demonstrated During August 2014 Comprehensive Performance Test

Operating Parameter	Units	Basis[1]	Averaging Period	Demonstrated November 2019
Minimum O_2 Content	%	GEP	15-minute	3
Maximum Combustion Gas CO Concentration	ppmv, corrected, dry	Subpart EEE	HRA	100
Maximum Hazardous Waste Feed - Incinerator	lb/hr	CPTM	HRA	38,943
Maximum Pumpable Hazardous Waste Feed – Kiln	lb/hr	CPTM	HRA	12,883
Maximum Hazardous Waste Feed – SCC	lb/hr	CPTM	HRA	7,178
Maximum Ash Feed Rate	lb/hr	CPTA	12-HRA	12,491
Maximum Chlorine/Chloride Feed Rate	lb/hr	CPTA	12-HRA	5,488
Maximum SVM Feed Rate (Cd, Pb)	lb/hr	CPT/EXT	12-HRA	13.56
Maximum LVM Feed Rate (As, Be, Cr)	lb/hr	CPT/EXT	12-HRA	26.13
Maximum Pumpable LVM Feed Rate (As, Be, Cr)	lb/hr	CPT/EXT	12-HRA	3.00
Maximum Mercury Feed Rate	lb/hr	CPT/EXT	12-HRA	0.072
Minimum Kiln Temperature	°C	CPTA	HRA	750
Minimum SCC Temperature	°C	CPTA	HRA	960
Flame Detectors[2]	On/Off	GEP	Instantaneous	On
Maximum Combustion Chamber Pressure	in. w.c.	Subpart EEE	Instantaneous	< atm
Maximum Stack Gas Flow Rate	scfm	CPTM	HRA	55,337
Minimum Water Flow to Quench	gpm	CPTA	HRA	605
Minimum Blowdown from Quench	gpm	CPTA	HRA	445
Maximum Condenser Inlet Temperature	°C	GEP	HRA	120
Minimum Water Flow to Condenser	gpm	CPTA	HRA	2,708
Minimum Condenser Differential Pressure	In.w.c.	GEP/MS	HRA	0.25
Minimum Inlet Water Pressure to Condenser	psig	GEP/MS	HRA	5
Minimum Water Flow from Condenser to Quench	gpm	CPTA	HRA	293
Minimum Water Flow to Venturi	gpm	CPTA	HRA	750

Table 2. Continued

Operating Parameter	Units	Basis[1]	Averaging Period	Demonstrated November 2019
Minimum Venturi Differential Pressure	In. w.c	CPTA	HRA	55
Minimum Scrubber pH	pH	CPTA	HRA	7.7
Minimum Water Flow to Chlorine Scrubber	gpm	CPTA	HRA	1,000
Minimum Chlorine Scrubber Differential Pressure	In.w.c.	GEP/MS	HRA	0.35
Minimum Blowdown from Chlorine Scrubber/Venturi	gpm	CPTA	HRA	70
Minimum Purge IWS to Packed Tower Condenser	gpm	CPTA	HRA	163
Minimum IWS Plate Flush	gpm	GEP/MS	HRA	15[3]
Minimum IWS 1st Stage Water Flow	gpm	GEP/MS	HRA	900
Minimum IWS 2nd Stage Water Flow	gpm	GEP/MS	HRA	900
Minimum IWS 3rd Stage Water Flow	gpm	GEP/MS	HRA	900
Minimum IWS Voltage	kv	GEP/MS	2-minute	8[3]

[1] CPTA = Established during the CPT as the average of the test run averages; CPTM = Established during the CPT as the average of the maximum HRA for each test run; CPT/EXT = Extrapolated by factor of 3X from measured rate; GEP = Good Engineering Practice; MS = Manufacturer's Specification

[2] The Flame Detectors are only used during startup until the combustion chamber has reached the auto-ignition temperature.

[3] In 7 or more IWS units

HRA = Hourly rolling average

12-HRA = 12-hour rolling average

Table 3. AWFCO Limits

Operating Parameter	Units	Averaging Period	Table 2 Limit	AWFCO Limit
Minimum O_2 Content	%	15-minute	3	3
Maximum Combustion Gas CO Concentration	ppmv, corrected, dry	HRA	100	100
Maximum Hazardous Waste Feed - Incinerator	lb/hr	HRA	38,943	38,943
Maximum Pumpable Hazardous Waste Feed – Kiln	lb/hr	HRA	12,883	12,883
Maximum Hazardous Waste Feed – SCC	lb/hr	HRA	7,178	7,178
Maximum Ash Feed Rate	lb/hr	12-HRA	11,705	12,491
Maximum Chlorine/Chloride Feed Rate	lb/hr	12-HRA	5,488	5,488
Maximum SVM Feed Rate	lb/hr	12-HRA	13.56	13.56
Maximum LVM Feed Rate	lb/hr	12-HRA	26.13	26.13
Maximum Pumpable LVM Feed Rate	lb/hr	12-HRA	3.00	3.00
Maximum Mercury Feed Rate	lb/hr	12-HRA	0.072	0.072
Minimum Kiln Temperature	°C	HRA	750	750
Minimum SCC Temperature	°C	HRA	960	960
Flame Detectors[1]	On/off	Instantaneous	On	Off
Maximum Combustion Chamber Pressure	in. w.c.	Instantaneous	< atm	Alternate Monitoring Scenario Approved[2]
Maximum Stack Gas Flow Rate	scfm	HRA	55,337	55,337
Minimum Water Flow to Quench	gpm	HRA	605	605
Minimum Blowdown from Quench	gpm	HRA	445	445
Maximum Condenser Inlet Temperature	°C	HRA	120	120
Minimum Water Flow to Condenser	gpm	HRA	2,708	2,708
Minimum Condenser Differential Pressure	In.w.c.	HRA	0.25	0.25
Minimum Inlet Water Pressure to Condenser	psig	HRA	5	5
Minimum Water Flow from Condenser to Quench	gpm	HRA	293	293
Minimum Water Flow to Venturi	gpm	HRA	750	750
Minimum Venturi Differential Pressure	In. w.c	HRA	55	55
Minimum Scrubber pH	pH	HRA	7.7	7.7
Minimum Water Flow to Chlorine Scrubber	gpm	HRA	1,000	1,000
Minimum Chlorine Scrubber Differential Pressure	In.w.c.	HRA	0.35	0.35
Minimum Blowdown from Chlorine Scrubber/Venturi	gpm	HRA	70	70
Minimum Purge IWS to Packed Tower Condenser	gpm	HRA	163	163[3]
Minimum IWS Plate Flush	gpm	HRA	15[4]	15[3,4]
Minimum IWS 1st Stage Water Flow	gpm	HRA	900	900
Minimum IWS 2nd Stage Water Flow	gpm	HRA	900	900
Minimum IWS 3rd Stage Water Flow	gpm	HRA	900	900
Minimum IWS Voltage	kv	2-minute	8[4]	8[3,4]

[1] The flame detectors are only used during startup until the combustion chamber has reached the auto-ignition temperature.

[2] If the pressure in the kiln is greater than ambient, and any of the following three scenarios occur:

a) The pressure difference between the kiln pressure and the inlet and/or outlet plenums is less than 0.2 inches of water.
b) The pressurizing equipment for either plenum fails.
c) The pressure in the kiln is greater than the pressure in the inlet and/or outlet plenums at any time.

[3] Limit documented in IWS Monitoring Plan approved by EGLE on 6/9/04.

[4] In seven or more IWS units.

Hazardous Waste Residence Time

The maximum solids hazardous waste residence time in 32 Incinerator based on the operating limits specified in Table 3 has been determined to be 75.2 minutes. This is based on calculation using an equation from Chemical Engineering Handbook, Perry's 5th Edition.

Since atomized liquid waste vaporizes almost instantaneously upon entering the combustion chambers, liquid and gaseous waste entering the kiln has a residence time of approximately two seconds and liquid and gaseous waste entering the SCC has a residence time of approximately 3.5 seconds. These times are calculated based on volumes and combustion gas flow rates.

MACT Required Plans

The following plans have been prepared and are recorded in the Operating Record:

- Startup, Shutdown, Malfunction Plan (SSMP);
- Feedstream Analysis Plan (FAP);
- Operation and Maintenance Plan (OMP);
- Continuous Monitoring System Performance Evaluation Plan (CMS PEP); and
- Emergency Safety Vent Operating Plan (ESVOP).

Automatic Waste Feed Cutoff

Dow has equipped the unit with a functioning AWFCO system that immediately and automatically cuts off the hazardous waste feed, as follows:

1. When any of the following are met or exceeded:
   - operating parameter limits specified in Table 3, and
   - an emission standard monitored by a Continuous Emission Monitor (CEM);
2. When the span value of any Continuous Monitor System (CMS) detector, except a CEM, is met or exceeded;
3. Upon malfunction of a CMS or CEM monitoring an operating parameter limit or emission standard specified in Table 3; or
4. When any component of the automatic waste feed cutoff system fails except as documented in an Alternate Monitoring Application approved by EPA on June 17, 2003.

The AWFCO system will be operational at all times when hazardous waste is in the combustion chamber.

Training

Operator training and certification has been conducted and completed.

Description of the Air Pollution Control Equipment

The stack is the only emission point for this unit. Efficiency data on control devices associated with the 32 Incinerator CPT is provided in Table 4.

Table 4. Control Devices

Hazardous Air Pollutant	Control Device	Control Efficiency (%)[1]
HCl/Cl_2	Packed Tower	> 99.9995
LVM	Condenser	> 99.996 [2]
	Venturi Scrubber	> 99.960 [3]
SVM		> 99.999
Mercury	Chlorine Scrubber	> 99.995
Particulate Matter	IWS	> 99.996 [4]

[1] Control efficiency is based upon input loadings to the 32 Incinerator and emission rates from the stack, calculated as the average of all of the test runs during Condition 1 of the August 2014 Comprehensive Performance Test, except as noted.

[2] This is the control efficiency for total LVM, demonstrated during Test Condition 1.

[3] This is the control efficiency for pumpable LVM, demonstrated during Test Condition 1.

[4] Particulate matter (PM) control efficiency was demonstrated during Test Condition 1 using the average ash feed rate and the average total PM (filterable and condensable) emission rate.

Monitoring, Recordkeeping, and Reporting Requirements

The 32 Incinerator uses both process parameter CMS and CEMs. Carbon monoxide and oxygen are parameters that are monitored using CEMs. The 32 Incinerator also uses process instruments, which include thermocouples, flowmeters, pH meters, and pressure transmitters, to document compliance with applicable operating parameter limits. The process instruments continuously monitor and record operating parameters of the 32 Incinerator.

The CEMs and CMS are integrated with the AWFCO system. The AWFCO system operates on a continuous basis and is designed to cutoff hazardous waste feed when one or more AWFCO parameters exceeds allowable limits. These limits exist to ensure that the 32 Incinerator is operating properly to meet compliance emission standards. During an AWFCO event, the control system activates an alarm and interrupts the hazardous waste feed to the unit. Hazardous waste feed to the unit will not resume until all parameters are within proper operating limits. Failure of the analyzers will also result in an AWFCO.

Dow has a data management system that provides the controls required by the HWC MACT. This data management system continuously communicates with the existing control system obtaining one minute averages (OMAs), and calculating one-hour rolling averages (HRAs), and 12-hour rolling averages (12-HRAs). Additionally, the system will access feed rate data for each feed mechanism and component concentrations of ash, SVM, LVM, mercury, and chlorine for each waste stream. The feed rate and component concentration information will be used on a real-time basis, and communicate back to the control system that the component feed rates are below the established maximum feed rates for each component. This management system is on-line and operating and will be programmed to ensure the incinerator's compliance with the operating parameter limits presented in Table 3.

The following reports to the agency will be submitted as needed:

- 2-Day Startup, Shutdown and Malfunction (SSM) Deviation Report
- 7-Day SSM Deviation Report
- Semi-annual Startup, Shutdown and Malfunction Report;
- Excessive Emissions and Continuous Monitoring System Performance Report and/or a Summary Report for both CEMs and CMS;
- Excessive Exceedances Report; and
- Emergency Safety Vent Opening Report.

Alternative Mode of Operation When Hazardous Waste Is Not in the Combustion Chamber

The 32 Incinerator does not currently anticipate an alternative mode of operation allowed under 40 CFR 63.1206(b)(ii) whenever hazardous waste is no longer in the combustion chamber (i.e., the hazardous waste feed to the incinerator has been cut off for a period of time not less than the hazardous waste residence time). Dow will comply with all otherwise applicable requirements and standards promulgated under the authority of section 112 or 129 of the Clean Air Act. As stated in the preamble to the February 14, 2002 final rule (p. 6979):

> If the agency has not promulgated Section 112 or 129 MACT requirements applicable to the source, the source is exempt from operating requirements under the alternative, otherwise applicable MACT standards mode of operation provided that: 1) the hazardous waste residence time has expired; and 2) the source establishes this mode of operation under 63.1209(q) and notes in the operating record when it enters and leaves this mode of operation. The source must nonetheless identify this mode of operation (i.e., where it is exempt from operating requirements) in the DOC, NOC, and title V permit application to assist compliance assurance.

As of November 1, 2019 there are no other applicable 112 or 129 standards for the 32 Incinerator.

As new MACT standards are promulgated Dow will review the applicability of the new rule to the 32 Incinerator and if applicable will comply with this MACT standard when hazardous waste is not in the combustion chamber.

Results of Comprehensive Performance Test

The results of the November 2019 Comprehensive Performance Test are provided in Attachment 1, Final Report, Comprehensive Performance Test, dated February, 2020. The CPT report includes:

- The methods that were used to determine compliance;
- The results of the performance tests, continuous monitoring system (CMS) performance evaluations, and other monitoring procedures that were conducted; and
- The type and quantity of hazardous air pollutants emitted, reported in units and averaging times and in accordance with the test methods specified in the Subpart EEE.

Table 5 summarizes the results of the emissions sampling during the November 2019 Comprehensive Performance Test.

Table 5. Summary of HWC MACT Emission Standards Results November 2019 CPT

HWC MACT Standard	Test Method	Units	Dow/EGLE Agreed Limit	Test Condition 1
Carbon Monoxide	Facility Installation compliant with PS4B	ppmvd[1]	100	<0.6
PCDD/PCDF	EPA Method 23	ng TEQ/dscm[1]	0.20	0.0069
HCl/Cl_2, as Cl^- equiv.	EPA Method 26A	ppmv[1]	32	< 0.01
Particulate Matter	EPA Method 5	mg/dscm[1]	30	<14
SVM (Cadmium and Lead)	EPA Method 29	ug/dscm[1]	120	<2.6
LVM (Arsenic, Beryllium, and Chromium)	EPA Method 29	ug/dscm[1]	92	<2.7
Mercury	EPA Method 29	ug/dscm[1]	45	<0.38

[1] Corrected to 7% O_2

Table 6 summarizes the results of the Destruction and Removal Efficiency during the August 2014 Comprehensive Performance Test.

Table 6. Summary of HWC MACT DRE Results August 2014 CPT

HWC MACT Standard	Test Method	Units	Dow/EGLE Agreed Limit	Test Condition 1
DRE (Monochlorobenzene)	SW-846 Method 0030	%	≥ 99.999	> 99.999993
DRE (Naphthlene)	SW-846 Method 0010	%	≥ 99.999	> 99.9998
Total Hydrocarbons	EPA Method 25A	ppmvd[1]	10	< 0.5

Continuous Emission Monitoring and Continuous Monitoring Systems

All CEMS and CMS have been certified per the HWC MACT standards, are in continuous operation, and meet specifications. Results of the Continuous Emission Monitoring Performance Evaluation Test are provided in Appendix A of Attachment 1, Final Report, Comprehensive Performance Test, dated February, 2020.

MACT Notification of Compliance Certification

Based upon information and belief formed after a reasonable inquiry, I, as the Responsible Official, certify the information contained in this Notification of Compliance is accurate and true to the best of my knowledge. The 32 Incinerator has complied with the emission standards of 40 CFR 63 Subpart EEE and other applicable requirements referenced in this standard.

08/17/2020

Date

Kristan A Soto

Authorized Signature

Kristan Soto

EH&S Responsible Care Leader