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:	Joe Jachens, EH&S Delivery Leader

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.

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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 MDEQ 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

Hazardous Air Pollutant	40 CFR 63 Subpart EEE Limit	MDEQ State Limit
Dioxins and Furans	0.4 ng TEQ/dscm[1]	0.2 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 August 2014 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-A4033-2017, EU32INCINERATOR-S1 and PTI 226-15, also specifies operating parameter limits. The most restrictive of a limit specified in Table 3 or the permits 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 August 2014
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	35,538
Maximum Pumpable Hazardous Waste Feed – Kiln	lb/hr	CPTM	HRA	13,763
Maximum Hazardous Waste Feed – SCC	lb/hr	CPTM	HRA	7,806
Maximum Ash Feed Rate	lb/hr	CPTA	12-HRA	13,287
Maximum Chlorine/Chloride Feed Rate	lb/hr	CPTA	12-HRA	5,838
Maximum SVM Feed Rate	lb/hr	CPT/EXT	12-HRA	48.6
Maximum LVM Feed Rate	lb/hr	CPT/EXT	12-HRA	29.4
Maximum Pumpable LVM Feed Rate	lb/hr	CPT/EXT	12-HRA	8.28
Maximum Mercury Feed Rate	lb/hr	CPT/EXT	12-HRA	0.74
Minimum Kiln Temperature	°C	CPTA	HRA	761
Minimum SCC Temperature	°C	CPTA	HRA	962
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	55,485
Minimum Water Flow to Quench	gpm	CPTA	HRA	628
Minimum Blowdown from Quench	gpm	CPTA	HRA	430
Maximum Condenser Inlet Temperature	°C	GEP	HRA	120

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

Operating Parameter	Units	Basis[1]	Averaging Period	Demonstrated August 2014
Minimum Water Flow to Condenser	gpm	CPTA	HRA	2,707
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	300
Minimum Water Flow to Venturi	gpm	CPTA	HRA	750
Minimum Venturi Differential Pressure	In. w.c	CPTA	HRA	54
Minimum Scrubber pH	pH	CPTA	HRA	7.5
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	76
Minimum Purge IWS to Packed Tower Condenser	gpm	CPTA	HRA	156
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 a factor of 3X; 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	ROP Limit	AWFCO Limit
Minimum O_2 Content	%	15-minute	3	3	3
Maximum Combustion Gas CO Concentration	ppmv, corrected, dry	HRA	100	100	100
Maximum Hazardous Waste Feed - Incinerator	lb/hr	HRA	35,538	35,538	35,538
Maximum Pumpable Hazardous Waste Feed – Kiln	lb/hr	HRA	13,763	13,763	13,763
Maximum Hazardous Waste Feed – SCC	lb/hr	HRA	7,806	7,806	7,806
Maximum Ash Feed Rate	lb/hr	12-HRA	13,287	13,287	13,287
Maximum Chlorine/Chloride Feed Rate	lb/hr	12-HRA	5,838	5,838	5,838
Maximum SVM Feed Rate	lb/hr	12-HRA	48.6	48.6	48.6
Maximum LVM Feed Rate	lb/hr	12-HRA	29.4	29.4	29.4
Maximum Pumpable LVM Feed Rate	lb/hr	12-HRA	8.28	8.28	8.28
Maximum Mercury Feed Rate	lb/hr	12-HRA	0.74	0.74	0.74
Minimum Kiln Temperature	°C	HRA	761	761	761
Minimum SCC Temperature	°C	HRA	962	962	962
Flame Detectors[1]	On/off	Instantaneous	On	Off	Off
Maximum Combustion Chamber Pressure	in. w.c.	Instantaneous	< atm	Alternate Monitoring Scenario Approved [2]	Alternate Monitoring Scenario Approved [2]
Maximum Stack Gas Flow Rate	scfm	HRA	55,485	55,485	55,485
Minimum Water Flow to Quench	gpm	HRA	628	628	628
Minimum Blowdown from Quench	gpm	HRA	430	430	430
Maximum Condenser Inlet Temperature	°C	HRA	120	120	120
Minimum Water Flow to Condenser	gpm	HRA	2,707	2,707	2,707
Minimum Condenser Differential Pressure	In.w.c.	HRA	0.25	0.25	0.25
Minimum Inlet Water Pressure to Condenser	psig	HRA	5	5	5
Minimum Water Flow from Condenser to Quench	gpm	HRA	300	300	300
Minimum Water Flow to Venturi	gpm	HRA	750	750	750
Minimum Venturi Differential Pressure	In. w.c	HRA	54	54	54
Minimum Scrubber pH	pH	HRA	7.5	7.5	7.5
Minimum Water Flow to Chlorine Scrubber	gpm	HRA	1,000	1,000	1,000
Minimum Chlorine Scrubber Differential Pressure	In.w.c.	HRA	0.35	0.35	0.35
Minimum Blowdown from Chlorine Scrubber/Venturi	gpm	HRA	76	76	76
Minimum Purge IWS to Packed Tower Condenser	gpm	HRA	156	161[3]	161[3]
Minimum IWS Plate Flush	gpm	HRA	15[4]	15[3,4]	15[3,4]
Minimum IWS 1st Stage Water Flow	gpm	HRA	900	900	900
Minimum IWS 2nd Stage Water Flow	gpm	HRA	900	900	900
Minimum IWS 3rd Stage Water Flow	gpm	HRA	900	900	900
Minimum IWS Voltage	kv	2-minute	8[4]	8[3,4]	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 MDEQ 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.

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. Information on control devices associated with the 32 Incinerator 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 Venturi Scrubber	>99.996[2] >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-hou 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 Deviation Report;
- ✓ 7-Day 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 May 1, 2017, 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 August 2014 Comprehensive Performance Test were submitted in the Comprehensive Performance Test Report, dated November 2014. 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 August 2014 Comprehensive Performance Test.

Table 5. Summary of HWC MACT Emission Standards Results August 2014 CPT

HWC MACT Standard	Test Method	Units	Dow/MDEQ Agreed Limit	Test Condition 1
DRE (Monochlorobenzene)	SW-846 Method 0030	%	≥99.999	> 99.999993
DRE (Naphthalene)	SW-846 Method 0010	%	≥99.999	> 99.9998
Carbon Monoxide	Facility Installation compliant with PS4B	ppmvd[2]	100	2
Total Hydrocarbons	EPA Method 25A	ppmvd[2]	10	< 0.5
PCDDs/PCDFs	EPA Method 23	ng TEQ/dscm[2]	0.20 & 0.40	0.064
HCl/Cl_2 as Cl^- equiv.	EPA Method 26A	ppmv[2]	32	< 0.15
Particulate Matter [1]	EPA Method 5	mg/dscm[2]	30	< 4.51
SVM (Cadmium & Lead)	EPA Method 29	ug/dscm[2]	120	< 1.19
LVM (Arsenic, Beryllium, Chromium)	EPA Method 29	ug/dscm[2]	92	< 9.23
Mercury	EPA Method 29	ug/dscm[2]	45	< 0.27

[1]Includes condensable particulate matter (PM-10).
[2]Corrected to 7% O_2.

Results of Confirmatory Performance Test

The results of the February 15, 2017 Confirmatory Performance Test are provided in Attachment 1. The Confirmatory Performance Test 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 emissions of PCDDs/PCDFs, reported in units and averaging times and in accordance with the test methods specified in the Subpart EEE.

Table 6 summarizes the results of the emissions sampling during the February 15, 2017 Confirmatory Performance Test.

Table 6. Summary of HWC MACT Confirmatory Performance Test Results February 2017

HWC MACT Standard	Test Method	Units	Limit	Test Condition 1
PCDDs/PCDFs	EPA Method 23	ng TEQ/dscm, at 7% O2	0.20	0.003

* The Federal HWC MACT limit is 0.40 ng TEQ/dscm, at 7% O_2, but the 32 Incinerator operates with a lower state only limit of 0.20 ng TEQ/dscm, at 7% O_2.

Continuous Emission Monitoring and Continuous Monitoring Systems

Results of the Continuous Emission Monitoring Performance Evaluation Test conducted as part of the Confirmatory Performance Test are provided in Appendix A of Attachment 1 (Michigan Operations Incineration Complex, PCDDs/PCDFs Confirmatory Performance Test Report). The Relative Accuracy Test Audit (RATA) conducted on January 24, 2017 for the CO and O_2 CEMS was previously submitted to the MDEQ and demonstrated compliance.

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.

5/10/2017

Date

Authorized Signature

Scott Bemis
EH&S Responsible Care Leader

ATTACHMENT 1

Michigan Operations
Incineration Complex

PCDDs/PCDFs Confirmatory
Performance Test Report

Midland Kiln

THE DOW CHEMICAL COMPANY
Midland, Michigan

Sampling Dates: February 15, 2017

***** Please note the process unit is the final copy holder and owner of this document. A temporary electronic copy will be retained by internal stack testing group for a short period of time.***

PCDDs/PCDFs Confirmatory
Performance Test Report

Incineration Complex
Midland Kiln

I certify that I have personally examined and am familiar with the information submitted herein, and based on my inquiries of those individuals immediately responsible for obtaining the information; I believe the submitted information is true, accurate, and complete.

Chuck Glenn
Dow U.S.A. Texas Operations
Dow Stack Testing Team

Laura Julich
Dow U.S.A Michigan Operations
Process Focal Point

Spencer Hurley
Dow U.S.A. Texas Operations
EH&S Delivery

Jim Nemeth
Dow U.S.A Michigan Operations
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Michael Abel
Dow U.S.A. Texas Operations
EAC Chemist Technical Review

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1.0 INTRODUCTION

1.1 Summary of Test Program

The Dow Chemical Company (Dow) operates a hazardous waste incineration complex at its Midland, Michigan, chemical manufacturing facility. The incinerator is operated under Permit Number MI-ROP-A4033-2011e. The incinerator is regulated under the National Emission Standards for Hazardous Air Pollutants (NESHAPs) from Hazardous Waste Combustors (Title 40 of the Code of Federal Regulations, Part 63 [40 CFR Part 63], Subpart EEE). 40 CFR 63.1207(d)(2) requires that a Confirmatory Performance Test for polychlorinated dibenzodioxins and polychlorinated dibenzofurans (PCDDs/PCDFs) be conducted within the 31-month period following the commencement of the previous Comprehensive Performance Test. The previous Comprehensive Performance Test for the 32 Incinerator began on August 19, 2014, so the Confirmatory Performance Test is required to be conducted by March 19, 2017.

Dow utilized internal test resources to provide stack sampling, QA/QC coordination, and report preparation for the Confirmatory Performance Test. Vista Analytical Laboratories, El Dorado Hills, CA analyzed the stack gas samples for PCDDs/PCDFs.

Kathy Brewer, David Patterson and Dan Dailey of the Michigan Department of Environmental Quality observed testing.

The following table summarizes the pertinent data for this compliance test:

Responsible Groups	• The Dow Chemical Company • Michigan Department of Environmental Quality (MDEQ) • Environmental Protection Agency (EPA)
Applicable Regulations	• ROP-MI-A4033-2011e • 40 CFR Part 63 Hazardous Waste Combustion MACT SUBPART (EEE)
Industry / Plant	• Environmental Operations (Incineration)
Plant Location	• The Dow Chemical Company Midland, Michigan 48667
Unit Initial Start-up	• 2003
Air Pollution Control Equipment	• NOx abatement control • quench tower • condenser • venturi scrubber • Cl_2 scrubber • nine ionizing wet scrubbers (IWS)
Emission Points	• SVEG32INCIN01 (Stack SK-3300)
Pollutants/Diluent Measured	• Polychlorinated Dibenzodioxins (PCDDs) • Polychlorinated Dibenzofurans (PCDFs) • Oxygen (O_2)
Test Dates	• February 15th, 2017

1.2 Key Personnel

The key personnel who coordinated the test program are:

- Laura Julich provided support as the Process Focal Point. The Process Focal Point is responsible for coordinating the plant operation during the test, ensuring the unit is operating at the agreed upon conditions in the test plan, serving as the key contact for collecting any process data required and providing all technical support related to process operation.

- Jim Nemeth provided support as the Environmental Focal Point. The Environmental Focal Point is responsible for ensuring that all regulatory requirements and citations are reviewed and considered for the testing.

- Chuck Glenn served as the Test Plan Coordinator. The Test Plan Coordinator is responsible for the overall leadership of the sampling program, developing the overall testing plan and determining the correct sample methods.

- Spencer Hurley is the back-up for the Test Plan Coordinator and serves in a technical review role of the test data.

- Michael Abel provided support as a technical review of the test data.

- Treston Devers served as the Sample Team Project Manager. The sample Project Manager is responsible for ensuring the data generated meets the quality assurance objectives of the plan.

- Dan Bennett, Kyle Kennedy and James Edmister served as the field sample team.

2.0 PLANT AND SAMPLING LOCATION DESCRIPTION

2.1 Facility Description

The system consists of a rotary kiln, secondary combustion chamber (SCC), quench chamber, air pollution control (APC) system, induced draft (ID) fans and a stack. The general arrangement is shown on the process flow drawing presented as Figure 2-1. Wastes are fed to the incinerator as bulk liquids directly from transport containers, as bulk liquids from waste storage tanks, as bulk solids, as wastewater treatment solids, and as containerized solids. Both liquid and solid wastes are fed to the rotary kiln, whereas some liquid waste and all gaseous vent streams are fed to the SCC. Ash residue from the rotary kiln is sent to a hazardous waste landfill. The APC train includes a nitrogen oxides (NO_x) abatement reactor, rapid quench chamber, packed tower condenser, high energy venturi scrubber, chlorine scrubber, multi-stage ionizing wet scrubber (IWS), and induced draft fans (2).

2.1.1 Combustion System

The incineration complex involves a combustion system that includes a rotary kiln and SCC. Additional lance feed locations are included on the front face of the kiln. Water and vent lances are also located at the mid-point of the SCC. There are two tri-fuel burners in the kiln and three dual fuel burners in the SCC.

The 32 Incinerator is designed to Dow specifications. The manufacturer of each system component and the associated model number is provided, where possible, in Table 2-1.

The 32 Incinerator has a permitted nominal thermal output capacity of 130 MMBTU/hr.

2.1.2 Combustion Chambers

2.1.2.1 Rotary Kiln

The rotary kiln is a co-current design (waste and combustion gas flow in the same direction) comprised of the feed chute, front face, front seal, refractory lined shell, discharge seal, kiln drive mechanism and associated burners, and lances. The front face is a combination of steel and refractory. The front wall is fitted for the waste feed burners, lances, and solids chute. The kiln is a 14.5-ft ID of the steel shell by 39.4-ft long steel cylinder. The kiln is lined with high density firebrick. The volume of the kiln is 4,835 cubic feet inside the refractory lining.

The kiln is driven by a variable speed main drive motor. An auxiliary drive system provides back up drive capabilities. The kiln rotation is 0.1 to 1.0 rpm. The kiln slopes at a 1.7 degree angle toward the SCC where the ash is collected and then removed. Typical operating temperature is greater than 800°C.

2.1.2.2 Secondary Combustion Chamber

The SCC is a refractory-lined vertical cylindrical chamber 23-ft in diameter by 50-ft high overall and an 8.5-ft in diameter by 64.9-ft long duct. The burners are located midway up the SCC (25-ft from the exit to the duct section). The residence time of the combustion gases in the chamber is in excess of 3.5 seconds. The chamber is operated below atmospheric pressure and is capable of sustained operation greater than 1,000°C. The total residence volume of the SCC is 14,070 cubic feet.

2.1.3 Emergency Safety Vent

This combustion system is equipped with an emergency safety vent (ESV). The purpose of the ESV is to protect personnel working at the facility and downstream equipment in the event of certain system failures. The ESV opens under the following conditions:

- Power failure;
- ID fan failure;
- High quench chamber temperature;
- Low total water flow to the quench chamber; and
- Extremely high pressure.

The counterweighted cover is opened by pneumatically operated cylinders. All waste feeds to the incinerator are stopped immediately in the event that the cover opens. The system cannot be restarted until the cover is closed. An ESV operating plan is included as part of Dow's operating record.

2.1.4 Residence Time Determination

Solids residence time in the kiln is dependent upon the kiln rotation rate, solids bed depth, and a number of other parameters set by design. The maximum solids hazardous waste residence time for 32 Incinerator based on the operating limits specified in the Notification of Compliance 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 greater than 3.5 seconds.

2.1.5 Burner and Feed Systems and Their Capacities

The kiln is equipped with two tri-fuel burners, four lances, a wastewater treatment sludge feed point, and a solid waste feed chute. The secondary combustion chamber is equipped with three (3) dual-fuel burners, two (2) vent nozzles, and one (1) aqueous waste lance. These feed systems are described in this section.

2.1.5.1 Kiln Tri-fuel Burners (BU-2310 and BU-2320)

These burners are equipped with two lances with the capability of firing liquid wastes and supplemental fuel. The burners are rated at 35 MMBTU/hr each. Liquid wastes are atomized with either air or steam. The burners are equipped with flame scanners for burner management control. Each burner has a maximum air flow capacity of 7,000 cubic feet per minute. The turndown ratio of each burner is approximately 6:1.

2.1.5.2 Kiln Lances

Four lances allow feeding of pumpable wastes to the kiln. The rated firing rate to each lance is typically 10 to 40 pounds per minute.

2.1.5.3 Kiln De-slagging Lance

A fuel oil lance with external atomization is available at the discharge end of the kiln for de-slagging purposes. The lance is movable to allow de-slagging from four locations. This lance is only used as needed to melt of the slag that occur in the kiln and is not a routinely fired component of the 32 Incinerator combustion system.

2.1.5.4 Wastewater Treatment Sludge Feeder

The front face of the kiln is equipped with a system to meter a controlled rate of dried wastewater treatment sludge from a hopper using a series of screw feeders. This system can feed up to 8,000 pounds per hour. Filter-pressed wastewater treatment plant sludge may also be fed to the kiln feed chute.

2.1.5.5 Solid Waste Feed Chute

Bulk and containerized solid feed is introduced into the kiln via the feed chute. Bulk solids waste can feed up to 10,000 pounds per hour. Containerized waste can feed up to 6,000 pounds per hour (30 containers per hour at 200 pounds per container). The feed chute is sloped at approximately 55 degrees downward so as to prevent the accumulation of material in the chute. The chute is cooled with a heat transfer media. The chute extends through the front face where the containers and solids enter the kiln.

2.1.5.6 Secondary Combustion Chamber Dual Fuel Burners

The secondary combustion chamber (SCC) is equipped with three dual-fuel burners, each capable of firing one liquid waste stream and natural gas. These burners are rated at 30 million BTU per hour each. The burners are equipped with flame scanners for burner management control. Each burner has a maximum air flow capacity of 6,000 cubic feet per minute. The burners are mounted in the side wall of the SCC above the inlet to the chamber. The lower section of the SCC serves as the vestibule for the kiln entrance and as an ash drop to the ash removal system. The turndown ratio for each burner is approximately 6:1.

2.1.5.7 SCC Aqueous Lance

One aqueous waste feed lance for introduction of wastewater or service water is located near the bottom of the SCC. The feedrate for this lance is 10-40 pounds per minute.

2.1.5.8 SCC Vent Gas Lances

Two vent-gas lances for injection of "off-gases" from the incinerator complex waste storage tank vents and unloading spots are located in the SCC.

2.1.5.9 Waste Handling and Feed Systems

Liquid wastes are received at unloading stations and are either fed directly to the kiln or SCC waste feed lances or they are offloaded into waste storage tanks. Unloading stations are all diked and drainage collection is provided. There are three stations that can handle 200 to 750 gallons, three stations that can handle 1,500 to 2,500 gallons, six stations that can handle tank trucks (typically 3,000 to 6,000 gallons), and a rail car station that can handle up to two 20,000 gallon rail cars.

Containerized solid wastes are received and held in the pack room feed conveyor area and accumulated for placement on the pack conveyor system. Containers are typically 5 gallon to 85 gallons capacity having a maximum heat release rate of 1.50 million BTU per container. The container feedrate can be adjusted on the process control computer. The typical range for introduction of packaged waste is one container every two to six minutes.

Bulk solids are received into a ten cubic yard hopper at the 32 Incinerator facility. At the bottom of the hopper there is a volumetric feeder that allows varying amounts of material to fall onto an elevating conveyor that discharges the material into the feed chute via a set of airlock doors. The chute extends through the front face where the containers and solids enter the kiln. Solids feedrate is controlled by varying the speed of the volumetric feeder.

2.1.5.10 Auxiliary Fuel System

Natural gas is used in the rotary kiln tri-fuel burners and in the secondary combustion chamber dual-fuel burners as the primary auxiliary fuel. Fuel oil is also used as an auxiliary fuel and for de-slagging the kiln.

2.1.5.11 Description of Other Feed Systems - Combustion Air

One combustion air blower provides primary combustion air to the kiln tri-fuel burners and the SCC dual-fuel burners. The combustion air blower is a centrifugal blower sized to provide up to 34,000 actual cubic feet per minute of air. The vent gas from the wastewater treatment plant drying process is introduced into the outlet of the combustion air blower. Auxiliary combustion air is provided to the kiln through the feed chute and the front seal by a second combustion air blower. This combustion air blower is also a centrifugal blower sized to provide up to 28,000 actual cubic feet per minute of combustion air to the system.

2.1.6 Residue Handling System

2.1.6.1 Ash Removal

Ash discharged from the kiln and ash that falls out of the gas stream in the SCC drops into one of two water baths located below the SCC. The water baths act as water seals to allow the removal of ash out of the rotary kiln and SCC without the loss of vacuum on the system. The ash is cooled and solidified in the baths. Two parallel drag-flight conveyors remove the ash from the water and transport the material into the ash marshalling area. The ash is subsequently transported to a licensed hazardous waste landfill for disposal.

2.1.6.2 Front-seal Ash Removal

Ash removed from the front seal of the rotary kiln is recycled to the kiln feed through the bulk solids feed system.

2.1.7 Air Pollution Control (APC) System

The APC system provides removal of nitrogen oxides, particulates, acid gas, and halogens from the combustion of wastes. The APC system is described below.

2.1.7.1 Water System

Water is provided to each APC device throughout the APC system. Recycle water pumps are provided for the quench chamber, condenser tower, venturi scrubber, chlorine scrubber and each stage of ionizing wet scrubbers. Fresh makeup water (either service water or Huron water) is added to each device as needed. Blowdown from the system is treated by Dow's on-site wastewater treatment plant.

2.1.7.2 Nitrogen Oxide Abatement Reactor

Following the SCC, an 8.5-foot diameter by 35-foot reaction chamber is provided for nitrogen oxide (NO_x) abatement. A NO_x reagent (urea) is stored in a 10,000-gallon tank where the temperature of the reagent is maintained at approximately 70°F. The stored urea is mixed with Huron water and fed to the reaction chamber through air-atomized nozzles. The system is used on an as-needed basis for NO_x abatement.

2.1.7.3 Quench Chamber

Flue gases from the NO_x reaction chamber flow into a vertical quench chamber. The primary purpose of the quench chamber is to adiabatically cool, via saturating water sprays, the gas leaving the afterburner chamber from combustion temperatures to below 100°C to protect the downstream operating equipment from thermal damage. Employment of a rapid quench provides a reduced potential for post combustion zone de Novo dioxin/furan formation.

The quench chamber is 14-ft in diameter and 45-ft tall. It is an open chamber lined with a combination of refractory and acid resistant brick. The initial co-current makeup-water injection near the top of the quench chamber utilizes a system of high-dispersion atomizing nozzles. The water vaporization reduces the gas temperature to near the adiabatic saturation temperature. A second, high-volume water stream from the packed tower condenser is injected further down the column to ensure complete adiabatic saturation of the gas. Water from the quench chamber is discharged to the on-site wastewater treatment plant.

2.1.7.4 Packed Tower Condenser

The purpose of the packed tower condenser is to further lower the temperature of the gas stream, to reduce its volume, increase the agglomeration of the fine particulate, and provide scrubbing for the gases. The packed tower condenser is a 14-ft diameter fiberglass-reinforced plastic column and is 43-ft in overall height containing 15-20 ft of 2-inch Kynar packing (Norton Snowflake or equivalent). The packed tower condenser normally operates at approximately 3,000 gallons per minute counter-current water flow for cooling and scrubbing. As described above, a portion of the recycled water is pumped from the bottom of the packed tower condenser to the lower series of water injection nozzles on the quench chamber. Recycled water to the packed tower condenser flows through a heat exchanger as needed to remove heat (cooling) before being reintroduced to the top of the packed section. Service water and purge water from the ionizing wet scrubber system are used to maintain water level in the bottom of the packed tower condenser.

2.1.7.5 Venturi Scrubber

The high-energy venturi scrubber removes the major portion of the very fine particulate material from the gas stream. By agglomerating the very fine particles in the packed tower condenser, the efficiency of the venturi scrubber is significantly enhanced. Secondarily, the venturi scrubber removes halogens and other acid gases from the gas stream. The pH of the venturi scrubber recycle is controlled by addition of a caustic solution to the chlorine scrubber which is the source of water for the venturi scrubber. The pH of the water is controlled to ensure halogen emissions are minimized. The venturi scrubber has an FRP body and a Hastelloy-C damper in the throat to provide a variable pressure drop. The venturi scrubber is operated at a pressure drop of approximately 55 inches of water.

2.1.7.6 Chlorine Scrubber

The chlorine scrubber has two purposes--separation of entrained water from the gas stream leaving the venturi scrubber and reaction of halogens with caustic. The water from the chlorine scrubber bottom is recirculated back to the venturi scrubber and to the top of the chlorine scrubber. Excess water is discharged to the on-site wastewater treatment plant.

The chlorine scrubber is an FRP column that is 14-ft in diameter and 46-ft tall. The packed section of the tower contains approximately 28-ft of 2-inch Kynar and CPVC Tellerete packing (Norton Snowflake or equivalent). The packed section is irrigated with water to prevent the packing from being plugged with fine particulate. As mentioned above, the water from this scrubber is pumped to the venturi scrubber and the top of the chlorine scrubber.

2.1.7.7 Ionizing Wet Scrubber (IWS)

Nine Model 1000 Ceilcote IWS units are installed in three parallel trains each consisting of three stages in series. These units are fabricated from FRP and contain Hastelloy-C ionizing wire and Hastelloy-C plates. The purpose of the IWS scrubber is to remove the low levels of very fine particulate material remaining in the gas stream. Particulate matter, as it enters the units, passes through fields that are typically 10,000 to 30,000 volts which impart a slight electrical charge to the sub-micron particles. The charged particles are removed from the gas as they pass through the 4-ft thick packed beds by being attracted to the flowing water which is at ground potential. The beds are continuously flushed with water.

Each IWS unit continuously recirculates water from their basins to the packed beds. In addition, each IWS unit has a controlled flow of Huron water provided to the plates. Water level is maintained in each stage by pumping excess water to the proceeding stage (third to second, second to first). Excess water from the first stage is pumped to the packed tower condenser system.

Hazardous waste feed to the incinerator will only be allowed when the IWS system is operating properly. The IWS system is operating properly when it meets the following specifications, as defined in the permit:

- A minimum of seven units are operating properly;
- A minimum water flow in each recycled water system of the IWS (1-hour averaging period); and
- A minimum water flow from the IWS to the packed tower condenser (1-hour averaging period).

An IWS unit is operating properly when it meets the following specifications.

- A minimum voltage (2-minute averaging period);
- A minimum water flow to the plates (1-hour averaging period); and
- The unit is not in a cleaning cycle.

2.1.7.8 Induced Draft Fans

The primary, 1,250 horsepower, ID fan provides the main motive force for pulling the combustion gases from the rotary kiln and SCC through the quench chamber, packed tower condenser, venturi scrubber, and chlorine scrubber. The fan wheel is constructed of Hastelloy-C and is sized to provide in excess of 60 inches of water vacuum. This fan assures a negative pressure on all upstream equipment to minimize fugitive emissions.

The secondary, 500 horsepower, ID fan is designed to provide 30 inches of water vacuum. The fan discharges into the base of a 4.5-ft diameter fiberglass stack.

2.1.7.9 Stack

The stack for discharging the scrubbed and cleaned gases is 4.5 ft in diameter and 200-ft high. It is manufactured from fiberglass-reinforced plastic. Sample ports for all stack testing, continuous emission monitoring, and gas analysis are installed in the stack.

2.1.8 Process Monitoring, Control, and Operation

The design, operation, and maintenance practices of the continuous monitoring systems (CMSs), including the stack gas monitoring systems, are described in this section. The incineration operation is controlled and monitored by a Process Control Computer (PCC). This computer monitors the process for proper temperatures, pressures, flows, carbon monoxide, and oxygen.

2.1.8.1 Continuous Monitoring System (CMS)

The continuous monitors required under the HWC MACT Rule meet the definition of a CMS which requires the monitor to sample each regulated parameter without interruption, evaluate the detector response at least once every 15 seconds, and compute and record the average values at least once every 60 seconds.

2.1.8.2 Continuous Emission Monitoring System (CEMS)

The CEMS for the 32 Incinerator includes monitors for oxygen (O_2), carbon monoxide (CO), sulfur dioxide (SO_2), and nitrogen oxides (NO_x). Although the SO_2 and NO_x monitors are not required under the HWC MACT rule, they are included here for consistency with other plans. There are in-place redundant instruments for each of these analyzers.

The oxygen monitor has a range of 0-25%. The unit utilizes an electrochemical transducer for signal generation in proportion to the presence of oxygen. Calibration is accomplished with certified standard gases.

The CO monitor is a non-dispersive infrared analyzer with an extractive system to monitor CO over a range of 0-200 ppmv and 0-3,000 ppmv. Calibration is with certified gases. Output of 4-20 mA is received in the PCC for recording and calculation of hourly averages.

The CO and O_2 monitors have been installed calibrated, maintained, and continuously operated in compliance with the quality assurance procedures for CEMS in the appendix of 40 CFR 63 Subpart EEE and Performance Specification 4B of 40 CFR 60 Appendix B.

The SO_2 and NO_x monitors have been installed, calibrated, maintained and continuously operated in compliance with the quality assurance procedures for CEMS and CERMS in Performance Specifications 2 and 6 of 40 CFR 60 Appendix B.

2.1.8.3 Safety and Automatic Waste Feed Cutoffs

A number of monitors also support the Automatic Waste Feed Cutoff (AWFCO) system. Instrumentation is used to monitor process conditions, to provide data for assuring compliance with regulatory requirements, to ensure appropriate process response and control, to provide operational flexibility, to provide safety interlocking, and to provide various safe shutdown scenarios. Safety and AWFCO shutdown responses are relayed to various equipment items when process limits are not met so that the equipment will go to a fail-safe mode.

2.2 Confirmatory Performance Test Operations

The Confirmatory Performance Test was conducted at one operating condition to demonstrate the system performance with respect to the PCDDs/PCDFs emission standard. During each test run, CMS parameters were monitored and stack gas emissions were measured. The following sections briefly summarize these activities associated with the Confirmatory Performance Test.

2.2.1 Unit Process Data

Process monitoring information pertinent to establishing that the unit was operating at normal conditions was recorded during the test by the 32 Incinerator data acquisition system. One-minute average data was obtained from the process control system for each operating parameter specified in the test plan for each test run. For each operating parameter, an average value was calculated for each test run using the one-minute data.

2.2.2 Confirmatory Performance Test Sampling Protocol

Samples of the stack gas were taken during the Confirmatory Performance Test.

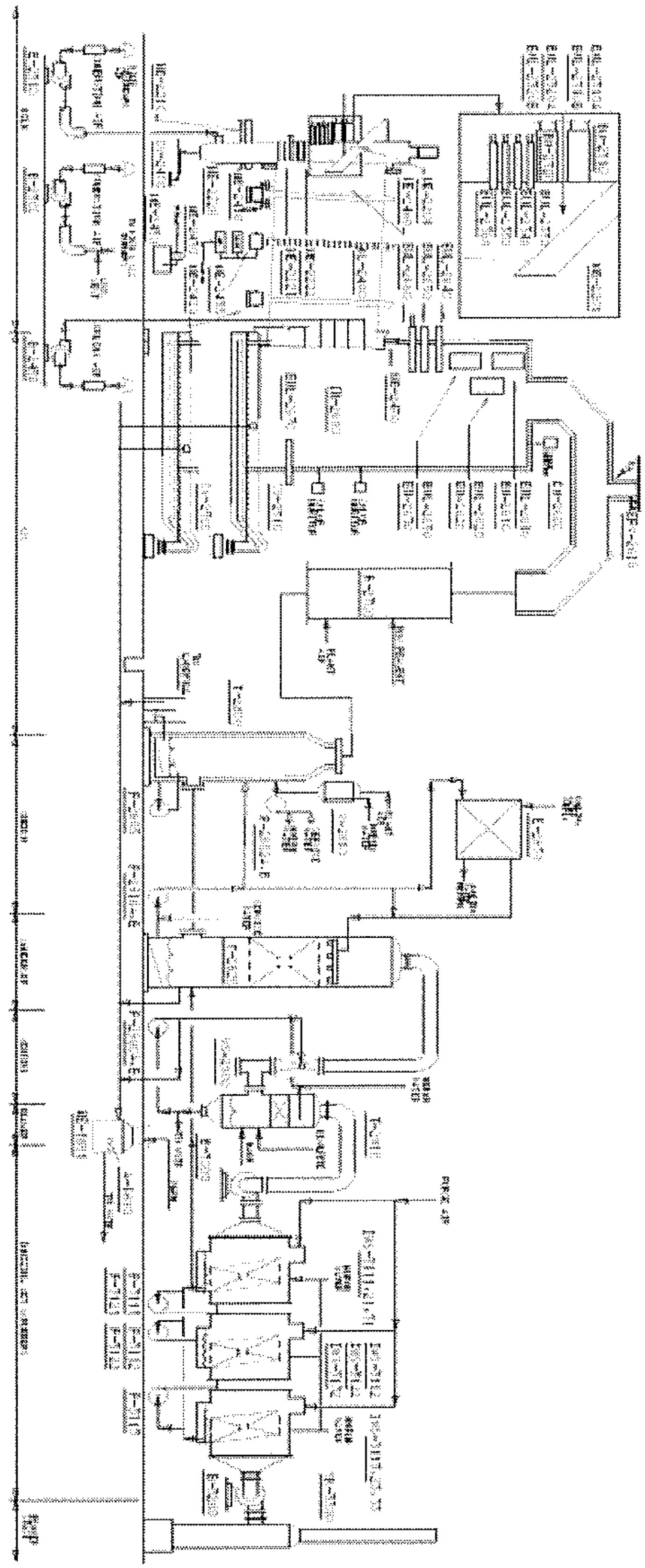

Figure 2-1. 32 Incinerator Process Schematic

Table 2-1. Manufacturer's Name and Model Number

Equipment	Manufacturer	Model Number
Rotary Kiln	C.E.S.	NA
Secondary Combustion Chamber	M.L. Smith, Jr., Inc.	75-934FS
Nitrogen Oxides Abatement Reactor	Technology Licensed from Fuel Tech	NA
Quench Chamber	Gladwin Tank Mfg	NC1248
Packed Tower Condenser	Viatec	110974
Venturi Scrubber	Croll Reynolds	54X 54 H.E.
Chlorine Scrubber	Viatec	110975
Primary ID Fan	Robinson Industries	RP-70FCRT-104
Ionizing Wet Scrubbers	Ceilcote	1000
Secondary ID Fan	Howden Buffalo	H Size 890

3.0 SUMMARY AND DISCUSSION OF TEST PLAN

3.1 Objectives and Test Matrix

40 CFR 63.1207(d)(2) requires that a Confirmatory Performance Test for polychlorinated dibenzodioxins and polychlorinated dibenzofurans (PCDDs/PCDFs) be conducted within the 31-month period following the commencement of the previous Comprehensive Performance Test. The previous Comprehensive Performance Test for the 32 Incinerator began on August 19, 2014, so the Confirmatory Performance Test is required to be conducted by March 19, 2017.

The specific objectives of the test were:

- Verify PCDD/PCDF emissions from the 32 Incinerator are less than 0.40 ng TEQ/dscm corrected to 7% O2 (please note the Incinerator operates with a lower state only limit of 0.20 ng TEQ/dscm corrected to 7% O_2).

3.2 Process Operating Rates

As required by the regulation, all sampling can be completed at normal operating conditions. The table below outlines proposed operating rates.

The Normal Operating Rates were determined using the sum of the rolling average values (hourly where appropriate) recorded each minute over the previous 12 months, divided by the number of rolling averages recorded during that time. The average values do not include calibration data, startup data, shutdown data, malfunction data, and data obtained when not burning hazardous waste.

The Normal Chlorine Feed Rate of 1,161 pounds per hour was determined using the sum of the rolling average values (hourly) recorded each minute over the previous 12 months, divided by the number of rolling averages recorded during that time. The average values do not include calibration data, startup data, shutdown data, malfunction data, and data obtained when not burning hazardous waste.

Parameter	Proposed Operating Rate	Normal Operating Rate
Hazardous Waste Feed Rate - Incinerator (lb/hr)	14,990 – 30,000	14,990 – 30,000
Pumpable Hazardous Waste Feed Rate – Kiln (lb/hr)	6,237-11,409	6,237-11,409
Pumpable Hazardous Waste Feed Rate – SCC (lb/hr)	3,562-6,941	3,562-6,941
Total Chlorine/Chloride Feed Rate (lb/hr)	1,161-5,500	1,161-5,500
Kiln Temperature (Deg C)	783-867	783-867
SCC Temperature (Deg C)	959-1024	959-1024
Stack Gas Flow Rate (scfm)	46,723-51,871	46,723-51,871
Stack Gas CO Concentration (ppmv @ 7% O_2)	0-100	0-100

Emission Results

Sample Type	Test Method	Sampling Time (Min/Run)	Allowable Emission Rate	Actual Emission Rate*
PCDD/PCDF emissions TEQ/dscm corrected to 7% O2	EPA Method 23	192 min	0.4 ng TEQ/dscm, corrected to 7% O2[1]	0.003 ng TEQ/dscm, corrected to 7% O2

* Emissions based on average of three 192-min runs.

[1] The Federal HWC MACT limit is 0.40 ng TEQ/dscm corrected to 7% O_2. The 32 Incinerator operates with a lower state only limit of 0.20 ng TEQ/dscm corrected to 7% O_2.

Testing Run Data

PARAMETER	RUN 1	RUN 2	RUN 3	AVERAGE
Run Date	2/15/2017	2/15/2017	2/15/2017	N/A
Run Times	0942-1118 1130/1306	1346/1522 1538/1714	1729/1905 1910/2046	N/A
Stack Gas Wet Flow (cf/hr)	3.10E+06	3.04E+06	3.13E+06	3.09E+06
Stack Gas Wet Flow Std Cond (scf/hr)	2.85E+06	2.79E+06	2.87E+06	2.84E+06
Stack Gas Dry Flow (dscf/hr)	2.74E+06	2.70E+06	2.76E+06	2.74E+06
Volume gas collected (dscf)	108.207	106.136	108.324	107.56
Volume gas collected (dscm)	3.064	3.005	3.067	3.05
Total Toxicity Equvilants (pg)	6.43	3.33	4.33	4.70
Concentration (ng TEQ/dscm)	0.002	0.001	0.001	0.002
Concentration (ng TEQ/dscm@7%O2)	**0.004**	**0.002**	**0.002**	**0.003**

Operational Rates

PARAMETER	RUN 1	RUN 2	RUN 3	AVERAGE
Run Date	2/15/2017	2/15/2017	2/15/2017	N/A
Run Times	0942-1118 1130/1306	1346/1522 1538/1714	1729/1905 1910/2046	N/A
Hazardous Waste Feed Rate - Incinerator (lb/hr)	16799	16885	16818	16834
Pumpable Hazardous Waste Feed Rate – Kiln (lb/hr)	7995	7980	7959	7978
Pumpable Hazardous Waste Feed Rate – SCC (lb/hr)	3711	3710	3800	3740
Total Chlorine/Chloride Feed Rate (lb/hr)	3456	3446	3696	3533
Kiln Temperature (Deg C)	835	834	826	832
SCC Temperature (Deg C)	1008	1007	996	1004
Stack Gas Flow Rate (scfm)	48773	48694	50068	49178
Stack Gas CO Concentration (ppmv @ 7% O_2)	1.4	1.4	1.4	1.4

4.0 WASTE CHARACTERIZATION

The Dow 32 Incinerator is used to treat hazardous as well as non-hazardous waste. The waste materials may be in solid, liquid, semi-solid, or gaseous forms, and may be introduced to the incinerator in bulk form, injected by pumps, or fed via packages or containers. The physical and chemical characteristics of selected waste streams that may be fed during the PCDDs/PCDFs confirmatory performance test are included in this section.

4.1 Feed Stream Descriptions

Wastes processed at the incinerator include:

- Organic liquid wastes,
- Chlorinated liquid waste,
- Aqueous liquid waste,
- Bulk solid waste,
- Containerized solid waste, and
- Wastewater treatment sludge solids.

For the PCDDs/PCDFs Confirmatory Performance Test, a mixture of wastes was fed to the incinerator representative of typical operations. Along with these wastes fed to the incinerator, natural gas is fed as the primary auxiliary fuel.

Wastes such as lab packs, activated carbon, sludges from process filters, contaminated dirt and sand, empty containers, powders and strong oxidizers are handled as solid wastes. They vary considerably in combustibility and contain varying amounts of halogens and metals. Most of these wastes are handled in individual containers and are typically mixed with absorbents that are known to be non-reactive with the waste material. Solid wastes such as activated carbon, cellulosic and latex polymers, and wastewater treatment solids are normally handled as bulk materials.

Liquid wastes that are managed at the incinerator may be flammable or combustible and have heats of combustion ranging from 0 to 22,000 BTU/lb. Some liquid wastes contain halogens and trace amounts of metals. Liquid wastes cover the range of reactivity from inert to reactive.

4.2 Auxiliary Fuel

The 32 Incinerator uses natural gas as the primary auxiliary fuel. Fuel oil is used as a secondary auxiliary fuel and is also used for deslagging purposes.

4.3 Other Feedstreams (Vent System)

Vapors displaced from the tanks as the tanks are filled are passed to the 32 Incinerator Secondary Combustion Chamber (SCC) or to the activated carbon adsorption system. The nitrogen pad from a containerized vessel that was unloaded is also discharged to the vent system. Depending on operations, vapors are vented preferentially in the following order:

1. 32 Incinerator SCC,
2. Carbon adsorption system.

The air stream from the waste water treatment plant solids drying process passes through a venturi scrubber for particulate removal and is then sent to a packed tower with water as the scrubbing medium. From the packed tower, the air stream is preferentially directed to the 32 Incinerator via the combustion air system.

5.0 SAMPLING AND ANALYTICAL PROCEDURES

5.1 Stack Gas Sampling Procedures

5.1.1 Sample Port Location

The stack is approximately 200-ft high with an inside diameter of 53.5 inches at the elevation of the sampling ports. There are two sample port elevations available for sampling. The first, or lower, set of ports is located approximately 58 feet from the point where gas enters the stack and approximately 121-ft from the end of the stack. The second, or upper, set of ports is located approximately 71-ft from the point where gas enters the stack and approximately 109-ft from the end of the stack. The first, or lower, set of ports were used for this test. The number of sampling points at this port location were determined in accordance with EPA Method 1. Figure 4-1 presents a schematic of the sampling points. A data sheet documenting the sample point locations is included in Appendix E. A cyclonic flow check of the duct was performed.

5.1.2 EPA Methods 2, 3A and 4 (Flow Rate, Gas Composition, and Moisture)

Concurrent with the performance of all isokinetic sampling trains, measurements were made to determine stack gas flow rate by EPA Method 2, gas composition by EPA Method 3A, and moisture by EPA Method 4.

5.1.3 EPA Method 23 (PCDDs/PCDFs)

Stack gas samples were collected for PCDDs/PCDFs using EPA Method 23. Sample gas was collected isokinetically, filtered, and passed through a sorbent module. The sorbent module consisted of a water-cooled condenser followed by the XAD-2 resin trap. Following the resin trap, the sample gas passed through a series of impingers. The sample train was rinsed and the combined extractions of the rinses, filter and sorbent trap was analyzed for PCDDs/PCDFs using HRGC/HRMS according to EPA Method 23, yielding a single analytical result for each sampling train.

Figure 5-1. Sampling Ports and Traverse Point Locations

TRAVERSE POINT	DISTANCE % of diameter	DISTANCE (inches)
1	4.4	2.38
2	14.6	7.88
3	29.6	15.98
4	70.4	38.02
5	85.4	46.12
6	95.6	51.62

		LINEAR DIMENSION (INCHES)	DUCT DIAMETERS
MEASUREMENT SITE #1	A	1454	26.9 (A/E)
	B	700	13.0 (B/E)
MEASUREMENT SITE #2	C	1304	24.1 (C/E)
	D	850	15.7 (D/E)
	E	54	

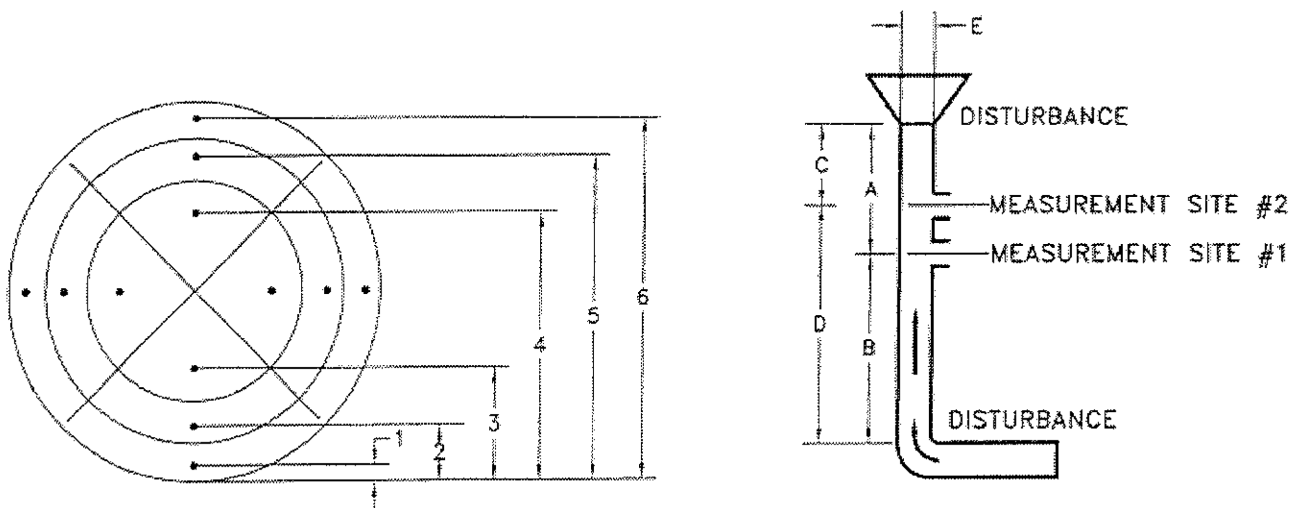

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Figure 5-2. Sample Train Diagram

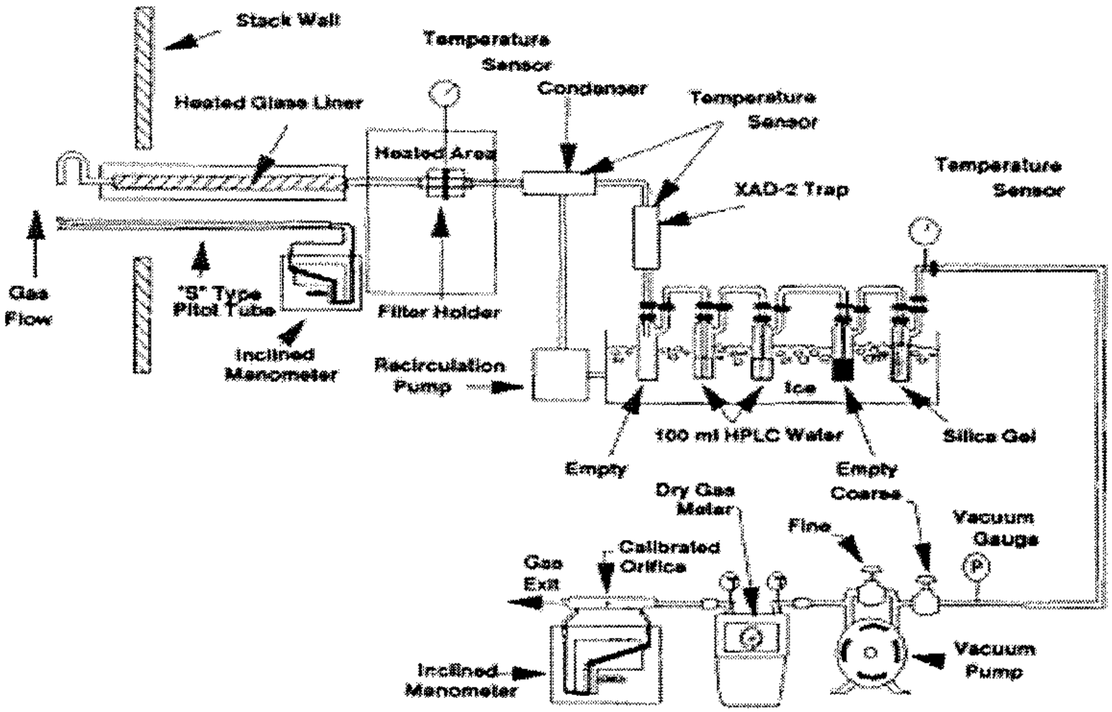

Figure 23.1 Sampling train