Ford Motor Company
Vehicle Operations

Dearborn Truck Plant
3001 Miller Road
PO Box 1659
Dearborn, Michigan 48121

November 4, 2016

Mr. Robert Byrnes
Michigan Department of Environmental Quality
Air Quality Division
Constitutional Hall
525 West Allegan Street
Lansing, MI 48909

RE: Response Letter
Ford Dearborn Truck Plant
MI-ROP-A8648-2015, Section 1

Dear Mr. Byrnes,

The Ford Motor Dearborn Truck Plant is submitting this letter in response to a Violation Notice, dated October 14, 2016 citing various violations of Rule 336.1910 and 336.1911 associated with the facility's Topcoat (EU-Topcoat), Guidecoat (EU-Guidecoat) and Abatement Control (FG-Controls) processes. Each alleged violation is listed below along with the associated response.

Item 1: The permittee operated the emission unit for approximately 58 hours without the required control device (EU-Topcoat).

As discussed below, the Plant undertook extraordinary measures to diagnose and repair the malfunction while still maintaining compliance with its VOC emissions limitations and all air toxic requirements. On August 22, 2016, at approximately 11:05 am the Topcoat RTO shutdown due to a VFD supply fan fault. Upon investigation it was determined that two fuses had blown, the VFD breaker, and the substation breaker had tripped. The plant immediately contacted a third party supplier who promptly dispatched an OEM technician to the plant on the evening of August 22nd. The technician then worked with the plant for approximately 7 hours to assess the damage, develop a list of parts needed for repair, and a corrective action plan. The VFD was a custom installation at the time of install in 2008. Unfortunately, this drive is no longer produced by Allen Bradley and spare parts are no longer being manufactured. On August 23rd, the plant worked diligently to locate shelf parts via various distributors and arrange for them to be transported to the plant as expeditiously as possible (via chartered plane) from multiple locations/states. Simultaneously, all of the damaged parts were removed and the VFD was prepared for repair.

The parts arrived at the plant at approximately 7:00 pm on August 23rd and installation began immediately. However, during installation an additional damaged diode in the diode bridge assembly was discovered. On the morning of August 24th, the plant worked with the supplier on availability of a replacement. Again, due to the age of the VFD, the recommended part could not be located. The OEM reviewed the assembly and decided to replace a diode in the assembly. As quickly as possible, the part was located locally and brought to the site for installation. The RTO system was started at approximately 6:00pm on August 24th and back on-line at 9:00pm.

At the same time these actions were being taken, the third party supplier and OEM located an entire replacement VFD. The replacement VFD arrived at the plant on August 25th.

Root Cause

The VFD supply fan motor malfunctioned due to an inverter power module board failure. The failure of this board caused the VFD breaker fuse and substation breaker fuse to blow. The facility retained a third party supplier to investigate the cause of the initial component failure (e.g. observations, known history, etc.); however, due to the age of the equipment, the parts manufacturer is no longer making the part and investigation is still on-going.

Impact to Emissions

At the time of the malfunction, to ensure that no VOC emissions limitations were being exceeded the facility calculated the expected emissions without the RTO abatement equipment running for the time period corresponding to the malfunction (approximately 50.3 hours during production). The actual 12 month rolling total for VOC emissions for August was 4.3 lb VOC/unit and 820 tons VOC/year. The facility did not exceed any of the VOC emissions limitations of 4.8 lb VOC/unit and 897 tons VOC/year in MI-ROP-A8648-2015. In addition, as previously demonstrated, the plant remained in compliance with all air toxic requirements during this time period as well.

Preventative Actions

Although the VFD components that caused the malfunction were replaced as expeditiously as possible (as described above), the plant has also purchased a spare VFD that can be utilized in the future during emergency situations. The VFD has been placed on a newly poured cement pad and a structure has been constructed around the unit to protect it from inclement weather.

Item 2: Failure to operate control equipment in satisfactory manner due to low carbon flow faults on the Guidecoat fluidized bed (EU-Guidecoat/FG-Controls).

The Guidecoat fluidized bed control technology is a fairly unique technology that Ford is utilizing to minimize energy consumption and enhance VOC control efficiency with a goal of reducing our overall impact to the environment. Over the past five years, the plant has experienced a low carbon flow/level fault on approximately 13 occasions for a total of 36.8 hours compared to 25,355 hours of operation (see Attachment 1), for an uptime of over 99.8%.

Root Cause

Over the years, low carbon flow/level faults have occurred for various reasons; however, the most common cause is due to variation in the flow rate as a result of carbon change outs. When a carbon change-out is required, the process involves opening a valve between the adsorber and desorber in order to expedite removal of the carbon. After the change out is completed, the valve must be put back into the proper position as the system stabilizes or the rate at which the carbon travels from the adsorber to the desorber will be insufficient to maintain proper carbon levels, causing a low carbon level fault.

Preventative Actions

In order to mitigate the carbon flow issue, the Plant typically adjusts the carbon flow rate until the system stabilizes. However, during the next carbon change-out, which is estimated to be in January 2017, the Plant will attempt to minimize variations in carbon flow by installing a new connection line between the Adsorber and the Desorber that will eliminate the existing low slope/flat section present within the existing delivery line.

Item 3: Failure to operate control equipment in satisfactory manner due high oxygen faults on the Guidecoat fluidized bed (EU-Guidecoat/FG-Controls).

The nitrogen generator is used to provide a counterflow inert gas stream that carries away the desorbed concentrated solvents from the Desorber to the Thermal Oxidizer. A high oxygen fault is generated when there is not enough oxygen removed from the nitrogen stream causing the oxygen level to exceed an established set point. Within the past five years, the high oxygen faults associated with the nitrogen generator occurred approximately 9 times for a total of 23 hours compared to 25,355 hours of operation (see Attachment 1), for an uptime of over 99.9%.

Root Cause

High oxygen faults during these 9 instances have occurred for various reasons including, but not limited to, frozen airlines, frozen valves, loose tubing, malfunction due to defective air dryer control module, etc.

Preventative Actions

Addressing the nitrogen generator valves are part of the facility's preventative maintenance program and twice per year the valves are replaced. However, the system is outdoors and oftentimes the valves and associated parts freeze, causing the system to shutdown. To mitigate this issue, the system has been enclosed to protect it from inclement weather.

Item 4: Variable Frequency Drive (VFD) failure on the Topcoat RTO. The Permittee did not maintain spare VFD parts as required in the Operation and Maintenance (O&M) Plan (FG-Contols).

The Ford Dearborn Truck Plant O&M plan, dated 8/1/2016, lists spare parts that are maintained at the facility (page 3). A Solvent Laden Air (SLA) VFD is listed as an installed spare within the "Typical Emission Control Equipment Replacement Parts Inventory" table. The facility does have a spare 300HP SLA VFD installed for the Guidecoat control system. The VFD for the Topcoat system is considerably larger (500 HP); therefore, the two VFDs are not interchangeable. Ford believes that the facility has been maintaining the spare VFD parts as required in the O&M plan.

However, based on the recent malfunction event and review of the Plant's Critical Spare Inventory, we have updated the O&M manual to include the new Topcoat VFD and to be more specific in regards to which system the VFD controls (see Attachment 2).

The actual failure of the topcoat VFD has been addressed in Item 1.

Item 5: The July 2015 RTO inspection report noted the thermocouple was warped and should be replaced. January 2016 thermocouple failure resulting in 3 hours 53 minutes of RTO downtime (FG-Controls).

As part of the 2015 DURR Off-Line Inspection, performed 07/01/2015, it was noted that the RTO Tower #1 combustion chamber thermocouples were "sagging" and needed to be replaced. Though the thermocouple/temperature control unit had been tested/calibrated in December of 2015 as part of the facility's (quarterly) calibration schedule, the thermocouple failed on 1/14/2016, resulting in 3 hours and 53 minutes of downtime. Upon a 5 year review of DTP malfunctions, it was determined that only one other instance of thermocouple failure occurred (due to a loose wire) resulting in 2.5 hours of downtime.

Root Cause

The DURR inspections are extremely comprehensive assessments identifying all potential concerns. Each concern is evaluated and actions are taken to mitigate based on several factors including, but not limited to, risk, operations schedule, and severity. The thermocouple/temperature control unit had been tested/calibrated in December of 2015; therefore it was determined the thermocouple was operating properly and continued use was of little risk.

Preventative Actions

The thermocouple was replaced. The facility will continue to perform thermocouple calibration/testing to verify operational integrity. In addition, the facility will continue to evaluate items identified on the DURR inspections and take action as required to maintain and operate the equipment in a satisfactory manner.

Item 5: The 2015 and 2016 inspection reports for both of the carbon concentrators mention seal gaps and that seals are worn, torn, out of adjustment or should be replaced (FG-Controls).

As part of the 2015 DURR Off-Line Inspection, performed 07/01/2015, it was noted that: 1) All KZR vertical seals were pulled too far, which could potentially cause excessive wear of the seals, 2) KZR #2 desorb exhaust seal needed adjusting or replacing and 3) All desorb exhaust seals (top and bottom) were torn or worn and needed to be replaced.

As part of the mid-July 2015 summer shutdown maintenance activities, the concentrator seals were replaced.

Subsequently, it was noted as part of the 2016 DURR inspection, performed July 11-13, 2016, the seals (that had just been replaced) were again worn, torn or out of adjustment. In addition, it was also noted that the mounting studs were broken off.

Root Cause

Typically seals are pre-cut and delivered to the facility for installation. In 2015 the seals that were delivered to the plant as replacements were cut too wide proving to be the incorrect dimensions. As the carbon wheels rotate, the excess material comes into contact with the ductwork flashing causing the seals to wear and tear. However, gaps in the seals only cause VOC laden air to enter into the heated desorption stream, which is being directed to the thermal oxidizer. Therefore, the overall control efficiency of the device is not impacted.

Preventative Actions

Based on an evaluation performed the weekend of 10/22/16 it was determined that 27 out of 96 seals need to be re-cut and replaced. All replacement actions are planned to be completed November 11, 2016.

Also as part of the 2016 DURR inspection, it was noted that the hot face ceramic blocks were 50-70% plugged with white particulate deposits in the RTO's Combustion Chamber, and some air passages were 100% plugged. It is important to note that gradual buildup within the ceramic media is not unusual during continued operation of all RTOs and does not indicate a failure or decreased destruction efficiency. As part of the facility's annual preventative maintenance activities, the pressure drop across the blocks will be measured to ensure the air flow is adequate for continuous operation. The block is being scheduled for replacement as part of the July 2017 shutdown activities.

The Plant has gone to great lengths to install, operate, manage and maintain all aspects of the painting operations in a manner that consistently minimizes our emissions and impact to the environment. As stated in previous communications, the annual uptime for the plant's abatement equipment is greater than 99%. While we understand the MDEQ's concern about the recent downtime events, we ask that these incidents be viewed relative to the very high level of performance the plant has achieved in equipment reliability and overall emissions performance, including the fact that at no time were any emission limitations (criteria or air toxics) exceeded.

The plant is committed to working diligently with suppliers, distributors and plant personnel to resolve all malfunctions as quickly as possible to minimize impacts to the environment. We are dedicated to maintaining our equipment via scheduled preventive maintenance tasks, third party assessments and quick responses to unforeseen malfunctions to ensure all applicable regulatory requirements are met. If there are any additional questions/concerns, please feel free to contact Tamberlyn Shell at 313-805-5374.

Sincerely,

Bradford Huff

Bradford Huff
Dearborn Truck, Plant Manager

Attachments

.cc/via email:
Ms. Lynn Fiedler, DEQ
Ms. Mary Ann Dolehanty, DEQ
Mr. Chris Ethridge, DEQ
Mr. Thomas Hess, DEQ
Ms. Wilhemina McLemore, DEQ
Mr. Jeff Korniski, DEQ

Ms. April Stevens, DTP
Mr. John Grace, DTP
Mr. Mike Larson, DTP
Ms. Lisa Hansen, EQO
Mr. Glen Logan, EQO

Attachment 1
Downtime Summary

Low Carbon Flow/Level Fault (EU-Guidecoat/FG-Controls)

Root Cause	Date	Duration (mins)	
Flow instability following carbon change-out	1/3/2012	210	
Flow instability following carbon change-out	9/4/2012	288	
Carbon blockage causing airlift blower failure	10/1/2012	73	
No root cause identified	11/1/2012	48	
Flow instability following carbon change-out	11/25/2013	26	
Test port left open allowing carbon to be released	12/15/2013	205	
Carbon blockage causing excessive temperature	12/17/2013	31	
Flow instability following carbon change-out	12/15/2014	525	
Flow instability following carbon change-out	12/16/2014	166	
Flow instability following carbon change-out	12/17/2014	405	
Carbon flow instability	3/18/2015	59	
Flow instability following carbon change-out	2/12/2016	112	
Flow instability following carbon change-out	2/16/2016	62	
Total Low Carbon Flow Downtime:		2210	mins
		36.8	**hours**
Total Prime Operation Time (1/1/2012 - 6/30/2016):		**25,355.0**	**hours**

Nitrogen Generator High Oxygen Level Fault (EU-Guidecoat/FG-Controls)

Root Cause	Date	Duration (mins)	
Loose piece of tubing unsecured after valve replacement	1/2/2013	24	
Frozen valve	1/18/2013	360	
Frozen airline	11/24/2013	272	
Air dryer supporting the nitrogen generator was faulty	2/12/2014	96	
Air dryer supporting the nitrogen generator was faulty	2/13/2014	88	
Air dryer supporting the nitrogen generator was faulty	2/14/2014	44	
Air dryer supporting the nitrogen generator was faulty	2/15/2014	97	
No root cause identified	11/29/2015	26	
Broken stop for nitrogen generator valve	5/3/2016	374	
Total High Oxygen Level Downtime:		1,381	mins
		23.0	**hours**
Total Prime Operation Time (1/1/2012 - 6/30/2016):		**25,355.0**	**hours**

Attachment 2

Dearborn Truck Plant

Title V Renewable Operating Permit
MI-ROP-A8648-2015

Operating and Maintenance Plan
For Flexible Group - FGCONTROLS

Modified August 2016

TABLE OF CONTENTS

DESCRIPTION OF CONTROL EQUIPMENT

A typical paint booth emission control systems consists of three steps: filtration, concentration and destruction. Filtration is achieved through the use of dry filters in a Filter House. Concentration of VOCs is accomplished through continuous adsorption and desorption process in a Zeolite Concentrator or Fluidized Bed Concentrator. The concentrated air stream is then routed to a Regenerative Thermal Oxidizer or Thermal Oxidizer for destruction. Emissions from paint oven operations are routed directly to a Regenerative Thermal Oxidizer for destruction.

PREVENTATIVE MAINTENANCE PROGRAM

Identification of Supervisory Personnel

The Paint Area Manager and Paint Manufacturing Engineering Manager are responsible for overseeing the inspection, maintenance and repair of emission control devices at the Dearborn Truck Plant.

Description of Items and/or Conditions that Shall Be Inspected/Frequency of Inspection or Maintenance

Recommended equipment inspections are performed on a routine basis. Specific inspection and maintenance tasks are incorporated into the facility's electronic Total Equipment Maintenance System (TEMS) that stores inspection and maintenance task information automatically generates work orders and tracks completion dates. The table below lists the minimum preventive maintenance activities performed to assure optimum operating performance of the emission controls systems at the Dearborn Truck Plant. All records of maintenance inspections including the dates, inspection results and dates and reasons for repairs, if made, are located at the Paint Shop and maintained for five years. Preventive maintenance tasks are subject to change based on best engineering judgment and technological/equipment improvements.

Control Device	Frequency	TEMS PM Number	Preventative Maintenance TEMS Task Title/Description of Maintenance Activity
Rotary Zeolite Concentrator	Annually	TPEOS113	Desorption Temperature Calibration Validation of thermocouple accuracy or recalibration of each thermocouple a minimum of once every 12 months. The thermocouple can be replaced in lieu of validation.
Rotary Zeolite Concentrator	Quarterly	34271	Pressure Drop Check Observe and record the pressure drop across the concentrator a minimum of once every calendar quarter.
Rotary Zeolite Concentrator	Annually	66901	Zeolite Media Observation Perform internal observation of adsorbent materials for contamination and erosion a minimum of once every 18 months.[1]
Prime Fluidized Bed Concentrator	Annually	TPEOS113	Desorption Temperature Calibration Validation of thermocouple accuracy or recalibration of each thermocouple a minimum of once every 12 months. The thermocouple can be replaced in lieu of validation.
Prime Fluidized Bed Concentrator	Annually	34251	Carbon Media Observation Perform internal observation of adsorbent materials for contamination and erosion a minimum of once every 18 months.[1]
Regenerative Thermal Oxidizer	Annually	TPEOS113	Combustion Chamber Temperature Calibration Validation of thermocouple accuracy or recalibration of each thermocouple a minimum of once every 12 months. The thermocouple can be replaced in lieu of validation.
Regenerative Thermal Oxidizer	Annually	67035	Cold Face Check / Heat Exchange-Heat Transfer Media Inspection Perform a heat exchange/heat transfer media inspection a minimum of once every 18 months.[1]
Regenerative Thermal Oxidizer	Annually	67710, 67048	Inlet/Outlet Valve Check /Valve Seals Condition Inspection Perform an inspection of the valve seals condition a minimum of once every 18 months.[1]
Prime Thermal Oxidizer	Annually	TPEOS113	Combustion Chamber Temperature Calibration Validation of thermocouple accuracy or recalibration of each thermocouple a minimum of once every 12 months. The thermocouple can be replaced in lieu of validation.

[1] *The requirement to address this issue is satisfied if a performance test (i.e., stack test) has been performed on the control device within the prior 18 month period.*

Identification of Major Replacement Parts to be Maintained in Inventory for Quick Replacement

The emission control devices are equipped with Programmable Logic Controllers to identify conditions that may contribute to malfunctions by generating warning faults and alarms. Typically, only small minor repairs are required (i.e., replacement of proximity switches). However, each facility maintains a list of recommended major replacement parts in the TEM system and routinely verifies part availability (i.e., quarterly). The following is a list of the spare parts maintained at the Dearborn Truck Plant.

TYPICAL EMISSION CONTROL EQUIPMENT REPLACEMENT PARTS INVENTORY

Part Name	Storage Location
Guidecoat Carbon Circulation Blower	Installed Spare
Guidecoat SLA VFD	Installed Spare
Topcoat RTO VFD	Spare
Thermocouples, Honeywell	General Stores
Motors for Blowers	General Stores
Variable Frequency Drive Components	General Stores
Honeywell Flame Detection Components	General Stores
PLC Processors, Allen Bradley	General Stores
Gas Train regulators/switches/valves	General Stores
Gas Firing Controllers	General Stores
Hydraulic Cylinders and Valves	General Stores
Filters	General Stores

FLUIDIZED BED CARBON BEAD REPLACEMENT/REGENERATION RECORDS

Records of carbon bead replacement and regeneration will be stored and maintained on the Dearborn Truck Plant shared drive.

CONTROLLED EMISSION SOURCES

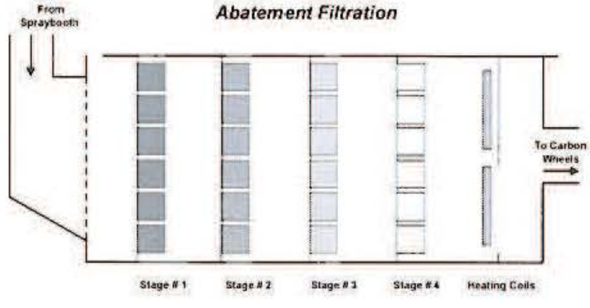
Two rotary zeolite adsorption units followed by a thermal oxidizer for control of VOC emissions from the EU-ECOAT dip tank and EU-TOPCOAT clearcoat automatic sections; a regenerative thermal oxidizer for control of VOC emissions from the EU-ECOAT curing oven, EU-GUIDECOAT oven, and EU-TOPCOAT ovens; and a fluidized carbon concentrator followed by a thermal oxidizer for control of VOC emissions from the EU-GUIDECOAT booth automatic sections.

Emission Units: All emission units and flexible groups associated with automotive painting.

EMISSION CONTROL EQUIPMENT

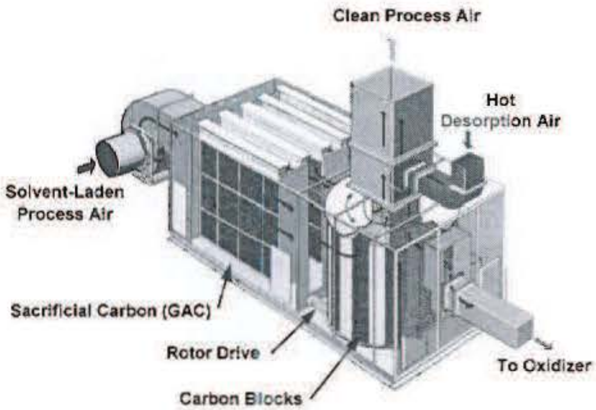
Filter House – Abatement Filtration

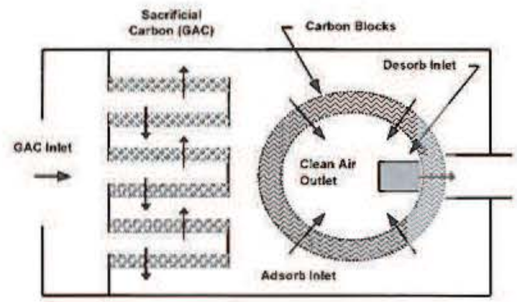
As the solvent laden air passes through four different stages of filtration, smaller and smaller particulate sizes are removed before being directed to the Rotary or Fluidized Bed Concentrator. Differential pressure gauges are located between filtration stages and are monitored to determine the frequency of filter changes. Recommended ranges for differential pressures stages are <1.0 inches water column for Stage 1, <1.25 inches water column for Stage 2, <1.25 inches water column for Stage 3 and <1.5 inches water column for Stage 4. Depending on the type and age of the equipment, the Programmable Logic Controller (PLC) may be programmed to sound an alarm if the differential pressure is outside an acceptable safety margin value. The facility may also inspect and trend the differential pressures on a routine basis to schedule the next required filter change.



Rotary Concentrator – Zeolite Adsorption System (ZAS)

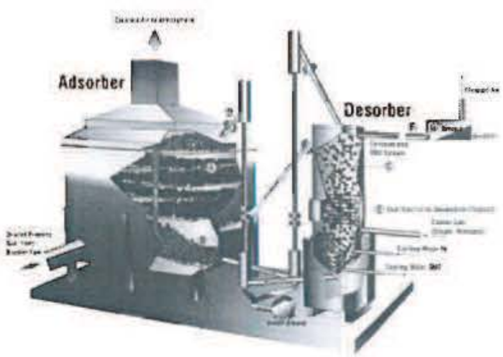
Concentration of VOCs is accomplished through a continuous adsorption and desorption process. The Zeolite Adsorption System consists of two sections of sacrificial carbon and the rotor concentrator. Exhaust air from the Filterhouse enters the ZAS and is directed through a series of sacrificial granular activated carbon columns or trays. The air is then routed to the rotor concentrator. The rotor concentrator is sub-divided into two sections: a large adsorption zone and a small desorption zone. Adsorption is the process by which the VOC molecules present in the exhaust air are collected and retained on the surface of adsorbent media. As the rotary concentrator rotates, VOCs is adsorbed onto the surface of zeolite blocks. Adsorbed VOC is then removed in the desorption zone by hot air. During the desorption cycle, the heat releases the previously absorbed VOC molecules into the isolated desorption air stream and is then routed to an oxidizer for destruction. The desorption air temperature (approximately 390°F typically) is monitored through the Programmable Logic Controller. Depending on the type and age of the equipment, the Programmable Logic Controller (PLC) may be programmed to sound an alarm if the desorption temperature is outside an acceptable safety margin value.





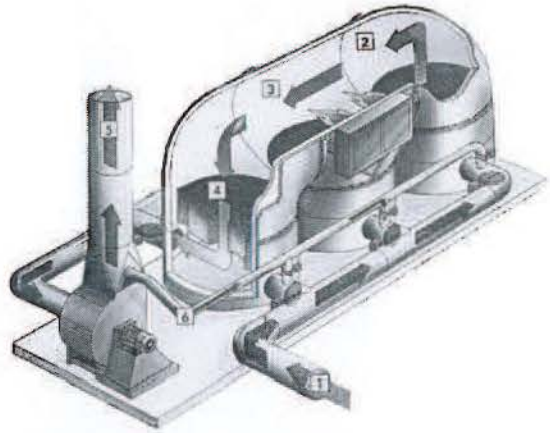
Fluidized Bed Concentrator

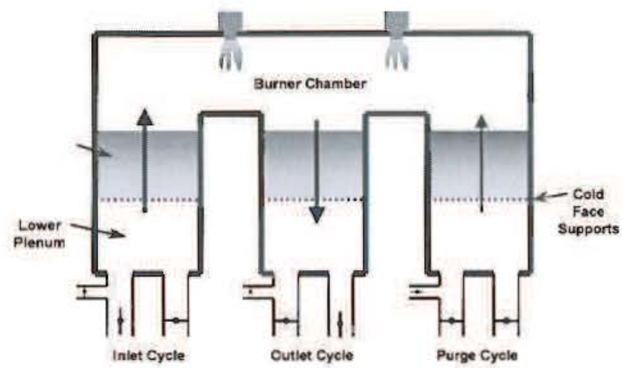
Concentration of VOCs is accomplished through a continuous adsorption and desorption process. The Fluidized Bed consists of two sections: the adsorber and desorber. Exhaust air from the Filterhouse or Wet Electrostatic Precipitator enters the Fluidized Bed and is directed through a series of perforated trays loaded with fluidized bead-shaped activated carbon (BAC). The BAC strips the solvents from the process gas, after which the process gas exhausts to atmosphere. BAC is continuously added to the top fluidized tray, displacing the BAC on the top tray toward the opposite end where a downcomer guides the overflow BAC to the next lower tray in system. The BAC must then traverse the full length of this tray to reach the next downcomer. Finally, the BAC is extracted from the bottom of the Adsorber and is airlifted to the Desorber. In the Desorber, the BAC flows as a packed bed vertically downward through the Desorber. The Desorber is equipped with electrical heating elements to drive off the solvents from the BAC. It is also supplied with a counterflow inert gas stream from the Nitrogen Generator that carries away the desorbed concentrated solvents from the Desorber to the destruction device. The clean BAC is returned to the adsorber top tray for reuse. The middle bed thermocouple (approximately 600°F) is monitored through the Programmable Logic Controller and is programmed to sound an alarm if the temperature is outside an acceptable safety margin value.



Regenerative Thermal Oxidizer (RTO)

The Regenerative Thermal Oxidizer consists of multiple towers installed in a line, each containing a packed bed of inert ceramic based media. Ford RTOs typically consist of three towers that continuously alternate from inlet, outlet and purge stages. Incoming concentrated solvent-laden exhaust from the Rotary Zeolite Adsorption System flows into the bottom of the first tower and up through the hot ceramic saddles or ceramic block. Air is preheated to within 60-100°F of the combustion temperature of approximately 1450°F. The clean hot exhaust gas then flows down through the second ceramic filled tower and transmits most of its thermal energy to the ceramic media before being discharged. After 1-2 minutes the dampers change positions and the air flow is reversed. Solvent laden air flows through the second tower that was preheated. Regenerative Catalytic Oxidizer contains catalyst material in addition to the ceramic media and operates at a lower chamber temperature. The combustion chamber temperature is monitored through the Programmable Logic Controller. Depending on the type and age of the equipment, the Programmable Logic Controller (PLC) may be programmed to sound an alarm if the combustion chamber temperature is outside an acceptable safety margin value.





Direct Fired Thermal Oxidizer (DFTO)

A Direct Fired Thermal Oxidizer (DFTO) consists of a burner operated inside an open insulated chamber. Solvent emissions from the Fluidized Bed Concentrator's desorber are directed into the combustion chamber maintained at temperature by the burner (approximately 1420°F). The solvent concentrations are normally sufficient to sustain the combustion chamber at temperature. Additional cooling air is introduced into the combustion chamber by a separate blower to utilize any additional energy provided by the solvent above the specified chamber temperature.

CORRECTIVE PROCEDURES

Description of the Corrective Procedures Taken in the Event of a Malfunction or Failure

When an abatement equipment fault condition/fault status occurs for more than 15 minutes, the facility Plant Environmental Control Engineer (PECE), Paint ME Manager and Paint Maintenance Superintendent are contacted. The notification includes the piece of abatement equipment the fault occurred on, the time the fault occurred and the estimated time for repairs. If the abatement equipment fault condition/fault status continues for more than 2 hours, a follow-up notification will be sent stating the current status of the incident and information on the cause of the fault. If the PECE cannot be immediately reached by telephone or radio, a text page message is sent. If the PECE does not respond to the text page within 15 minutes, the Paint Area Manager or the Environmental Management Representative (EMR) is contacted.

Once the abatement equipment is back on-line, an Air Emission Control Equipment Breakdown Report is completed with details on the piece of abatement equipment the fault occurred on, the duration of the breakdown (i.e., date, times, shift type), interim corrective actions, root cause of the fault, names and times that any service representatives were contacted and permanent corrective actions. The completed report is submitted to the PECE. The information is also routed to the Environmental Quality Office and Division Engineering office for review and analysis.

The information on the Air Emission Control Equipment Breakdown Report will be used to adjust emission calculations to account for the breakdown. In the unlikely event that the abatement equipment remains off-line long enough to result in an exceedance of an emission limit for 2 hours or more plans will be initiated to begin a sequenced shutdown of the emission source until the abatement equipment can be returned to normal operation. The PECE will notify the MDEQ Air Quality Division in accordance with Rule 912. The notification is made as soon as reasonably possible, but not later than 2 business days after becoming aware of the event. A written report that identifies the emission source, the time and duration of the event, corrective and preventive actions taken, actions taken to minimize emissions and if possible an estimate of the emissions during the event will be submitted to the MDEQ within 10 days of the malfunction event.

COMPLIANCE ASSURANCE MONITORING (CAM) REQUIREMENTS

The requirements of Compliance Assurance Monitoring (CAM), as promulgated under 40 CFR 64.2, apply to a pollutant-specific emissions unit at a major source that is required to obtain a part 70 or 71 permit if the unit satisfies all of the following criteria:

(1) The unit is subject to an emission limitation or standard for the applicable regulated air pollutant (or a surrogate thereof), other than an emission limitation or standard that is exempt under 40 CFR 64.2(b)(1) of this section;
(2) The unit uses a control device to achieve compliance with any such emission limitation or standard; and

(3) The unit has potential pre-control device emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. For purposes of this paragraph, ``potential pre-control device emissions" shall have the same meaning as ``potential to emit," as defined in Sec. 64.1, except that emission reductions achieved by the applicable control device shall not be taken into account.

In accordance with 40 CFR 64.3, to provide a reasonable assurance of compliance with emission limitations or standards for the anticipated range of operations at a pollutant-specific emissions unit, monitoring under this part, the CAM Plan shall meet the following general criteria:

(1) The owner or operator shall design the monitoring to obtain data for one or more indicators of emission control performance for the control device and any associated capture system. Indicators of performance may include, but are not limited to, direct or predicted emissions, process and control device parameters that affect control device (and capture system) efficiency or emission rates, or recorded findings of inspection and maintenance activities conducted by the owner or operator.
(2) The owner or operator shall establish an appropriate range(s) or designated condition(s) for the selected indicator(s) such that operation within the ranges provides a reasonable assurance of ongoing compliance with emission limitations or standards for the anticipated range of operating conditions. In addition, unless specifically stated otherwise by an applicable requirement, the owner or operator shall monitor indicators to detect any bypass of the control device (or capture system) to the atmosphere, if such bypass can occur based on the design of the pollutant-specific emissions unit.
(3) The design of indicator ranges or designated conditions may be based on a single maximum or minimum value if appropriate, may be expressed as a function of process variables, may be expressed as maintaining the applicable parameter in a particular operational status or designated condition, or may be established as interdependent between more than one indicator.

Under 40 CFR 64.4(4)(b), for a CAM Plan, the owner or operator shall submit a justification for the proposed elements of the monitoring plan and if the proposed performance specifications include differences from manufacturer recommendations, the plan shall explain the reasons for the differences. If the CAM Plan relies on presumptively acceptable monitoring, no further justification for the appropriateness of that monitoring should be necessary.

At the Dearborn Truck Plant, the following sources are subject to CAM under the above requirements:

- EU-ECOAT (utilizing rotary zeolite concentrator and regenerative thermal oxidizer for compliance)
- EU-GUIDECOAT (utilizing fluidized bed concentrator and thermal oxidizer for compliance)
- EU-TOPCOAT (utilizing rotary zeolite concentrator and regenerative thermal oxidizer for compliance)

In conjunction with this O&M Plan, the following control device parameters and associated inspection and maintenance activities serve as presumptively acceptable monitoring based on known performance of concentrators and thermal oxidizers for the emission units subject to CAM at the Dearborn Truck Plant:

Rotary Zeolite Concentrators
Desorption Temperature and Calibration: Monitor desorption gas inlet temperature to ensure it is not more than 15 degrees Fahrenheit below the temperature recorded during the most recent performance test (349°F) and calibrate or replace the thermocouple a minimum of once every 12 months to ensure desorption is maintained at a temperature necessary to concentrate volatile organic compounds from the incoming air stream for delivery to the regenerative thermal oxidizer.

Pressure Drop Check: Observe and record the pressure drop across the concentrator a minimum of once every calendar quarter to ensure that solvent-laden air may pass into the concentrator media as designed.

Zeolite Media Observation: Perform an internal observation of adsorbent materials for contamination and erosion a minimum of once every 18 months to ensure that solvent-laden air may pass into the concentrator media as designed (unless tested within the prior 18 months).

Fluidized Bed Concentrators
Desorption Temperature and Calibration: Monitor middle bed temperature to ensure it is not more than 15 degrees Fahrenheit below the temperature recorded during most recent performance test (538°F) and calibrate or replace the thermocouple a minimum of once every 12 months to ensure air stream is maintained at a temperature necessary to concentrate volatile organic compounds from the air stream for delivery to the thermal oxidizer.

Carbon Media Observation: Perform an internal observation of adsorbent materials for contamination and erosion a minimum of once every 18 months to ensure that solvent-laden air may pass into the concentrator media as designed (unless tested within the prior 18 months).

Regenerative Thermal Oxidizers

Combustion Chamber Temperature and Calibration: Monitor combustion chamber temperature to ensure it is not more than 50 degrees Fahrenheit below the most recent performance test (1373°F) and calibrate or replace the thermocouple a minimum of once every 12 months to ensure air stream is maintained at a temperature necessary to destroy the volatile organic compound within the regenerative thermal oxidizer.

Cold Face Check / Heat Exchange-Heat Transfer Media Inspection: Perform a heat exchange/heat transfer media a minimum of once every 18 months to ensure that solvent-concentrated air may pass into the oxidizer as designed (unless tested within the prior 18 months).

Inlet/Outlet Valve Check /Valve Seals Condition Inspection: Perform an inspection of the valve seals condition and verify valve timing/synchronization a minimum of once every 18 months to ensure that the proper retention time for destruction of volatile organic compounds within the oxidizer is maintained (unless tested within the prior 18 months).

Thermal Oxidizers

Combustion Chamber Temperature and Calibration: Monitor combustion chamber temperature to ensure it is no more than 50 degrees Fahrenheit below the most recent performance test (1350°F) and calibrate or replace the thermocouple a minimum of once every 12 months to ensure air stream is maintained at a necessary temperature to destroy the volatile organic compound within the thermal oxidizer.

Monitoring of these key operational parameters described in this section meet the requirements of CAM as defined in 40 CFR Part 64 for each of the affected emission units.

OPERATING AND MAINTENANCE PLAN REVIEWS

This Operating and Maintenance Plan will be reviewed and updated as required to ensure emission control devices are operated in a manner consistent with good air pollution control practices for minimizing emissions. Preventive maintenance tasks and actions taken to respond to malfunctions/faults will be periodically reviewed and changed (if necessary) based on best engineering judgment and technological/equipment improvements.

Reviews of this Operating and Maintenance Plan will be periodically conducted by the PECE and the Paint ME Manager or his designee. Reviews will be completed at least annual or following any abnormal operation which results in an exceedance of an emission limit lasting for more than 2 hours.

Records of the Operating and Maintenance Plan review will be maintained by the PECE for a period of 5 years.

Attachment 2

Dearborn Truck Plant

Title V Renewable Operating Permit
MI-ROP-A8648-2015

Operating and Maintenance Plan
For Flexible Group - FGCONTROLS

Modified August 2016

TABLE OF CONTENTS

DESCRIPTION OF CONTROL EQUIPMENT

A typical paint booth emission control systems consists of three steps: filtration, concentration and destruction. Filtration is achieved through the use of dry filters in a Filter House. Concentration of VOCs is accomplished through continuous adsorption and desorption process in a Zeolite Concentrator or Fluidized Bed Concentrator. The concentrated air stream is then routed to a Regenerative Thermal Oxidizer or Thermal Oxidizer for destruction. Emissions from paint oven operations are routed directly to a Regenerative Thermal Oxidizer for destruction.

PREVENTATIVE MAINTENANCE PROGRAM

Identification of Supervisory Personnel
The Paint Area Manager and Paint Manufacturing Engineering Manager are responsible for overseeing the inspection, maintenance and repair of emission control devices at the Dearborn Truck Plant.

Description of Items and/or Conditions that Shall Be Inspected/Frequency of Inspection or Maintenance
Recommended equipment inspections are performed on a routine basis. Specific inspection and maintenance tasks are incorporated into the facility's electronic Total Equipment Maintenance System (TEMS) that stores inspection and maintenance task information automatically generates work orders and tracks completion dates. The table below lists the minimum preventive maintenance activities performed to assure optimum operating performance of the emission controls systems at the Dearborn Truck Plant. All records of maintenance inspections including the dates, inspection results and dates and reasons for repairs, if made, are located at the Paint Shop and maintained for five years. Preventive maintenance tasks are subject to change based on best engineering judgment and technological/equipment improvements.

Control Device	Frequency	TEMS PM Number	Preventative Maintenance TEMS Task Title/Description of Maintenance Activity
Rotary Zeolite Concentrator	Annually	TPEOS113	Desorption Temperature Calibration Validation of thermocouple accuracy or recalibration of each thermocouple a minimum of once every 12 months. The thermocouple can be replaced in lieu of validation.
Rotary Zeolite Concentrator	Quarterly	34271	Pressure Drop Check Observe and record the pressure drop across the concentrator a minimum of once every calendar quarter.
Rotary Zeolite Concentrator	Annually	66901	Zeolite Media Observation Perform internal observation of adsorbent materials for contamination and erosion a minimum of once every 18 months.[1]
Prime Fluidized Bed Concentrator	Annually	TPEOS113	Desorption Temperature Calibration Validation of thermocouple accuracy or recalibration of each thermocouple a minimum of once every 12 months. The thermocouple can be replaced in lieu of validation.
Prime Fluidized Bed Concentrator	Annually	34251	Carbon Media Observation Perform internal observation of adsorbent materials for contamination and erosion a minimum of once every 18 months.[1]
Regenerative Thermal Oxidizer	Annually	TPEOS113	Combustion Chamber Temperature Calibration Validation of thermocouple accuracy or recalibration of each thermocouple a minimum of once every 12 months. The thermocouple can be replaced in lieu of validation.
Regenerative Thermal Oxidizer	Annually	67035	Cold Face Check / Heat Exchange-Heat Transfer Media Inspection Perform a heat exchange/heat transfer media inspection a minimum of once every 18 months. [1]
Regenerative Thermal Oxidizer	Annually	67710, 67048	Inlet/Outlet Valve Check /Valve Seals Condition Inspection Perform an inspection of the valve seals condition a minimum of once every 18 months.[1]
Prime Thermal Oxidizer	Annually	TPEOS113	Combustion Chamber Temperature Calibration Validation of thermocouple accuracy or recalibration of each thermocouple a minimum of once every 12 months. The thermocouple can be replaced in lieu of validation.

[1] *The requirement to address this issue is satisfied if a performance test (i.e., stack test) has been performed on the control device within the prior 18 month period.*

Identification of Major Replacement Parts to be Maintained in Inventory for Quick Replacement

The emission control devices are equipped with Programmable Logic Controllers to identify conditions that may contribute to malfunctions by generating warning faults and alarms. Typically, only small minor repairs are required (i.e., replacement of proximity switches). However, each facility maintains a list of recommended major replacement parts in the TEM system and routinely verifies part availability (i.e., quarterly). The following is a list of the spare parts maintained at the Dearborn Truck Plant.

TYPICAL EMISSION CONTROL EQUIPMENT REPLACEMENT PARTS INVENTORY

Part Name	Storage Location
Guidecoat Carbon Circulation Blower	Installed Spare
Guidecoat SLA VFD	Installed Spare
Topcoat RTO VFD	Spare
Thermocouples, Honeywell	General Stores
Motors for Blowers	General Stores
Variable Frequency Drive Components	General Stores
Honeywell Flame Detection Components	General Stores
PLC Processors, Allen Bradley	General Stores
Gas Train regulators/switches/valves	General Stores
Gas Firing Controllers	General Stores
Hydraulic Cylinders and Valves	General Stores
Filters	General Stores

FLUIDIZED BED CARBON BEAD REPLACEMENT/REGENERATION RECORDS

Records of carbon bead replacement and regeneration will be stored and maintained on the Dearborn Truck Plant shared drive.

CONTROLLED EMISSION SOURCES

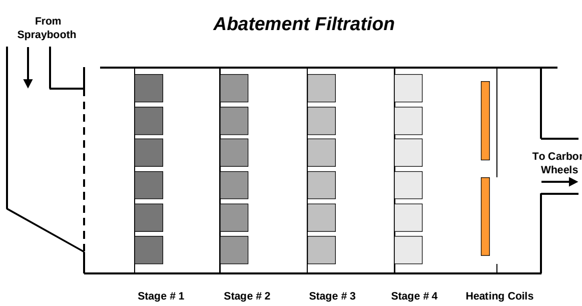
Two rotary zeolite adsorption units followed by a thermal oxidizer for control of VOC emissions from the EU-ECOAT dip tank and EU-TOPCOAT clearcoat automatic sections; a regenerative thermal oxidizer for control of VOC emissions from the EU-ECOAT curing oven, EU-GUIDECOAT oven, and EU-TOPCOAT ovens; and a fluidized carbon concentrator followed by a thermal oxidizer for control of VOC emissions from the EU-GUIDECOAT booth automatic sections.

Emission Units: All emission units and flexible groups associated with automotive painting.

EMISSION CONTROL EQUIPMENT

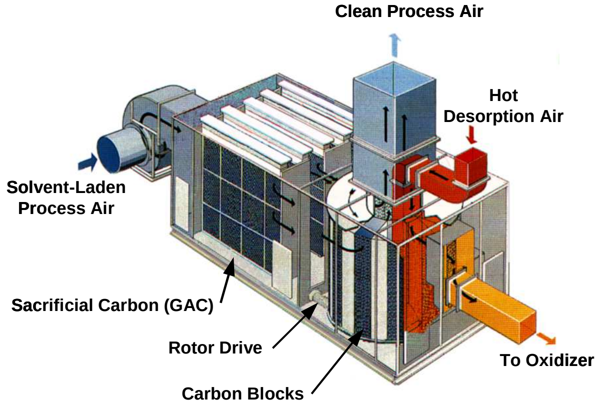
Filter House – Abatement Filtration

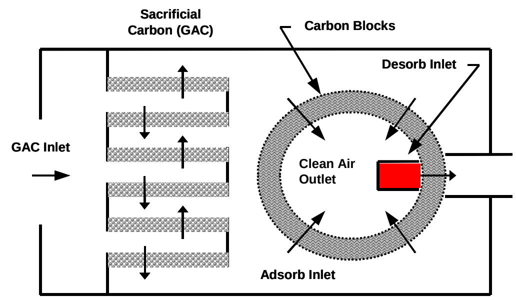
As the solvent laden air passes through four different stages of filtration, smaller and smaller particulate sizes are removed before being directed to the Rotary or Fluidized Bed Concentrator. Differential pressure gauges are located between filtration stages and are monitored to determine the frequency of filter changes. Recommended ranges for differential pressures stages are <1.0 inches water column for Stage 1, <1.25 inches water column for Stage 2, <1.25 inches water column for Stage 3 and <1.5 inches water column for Stage 4. Depending on the type and age of the equipment, the Programmable Logic Controller (PLC) may be programmed to sound an alarm if the differential pressure is outside an acceptable safety margin value. The facility may also inspect and trend the differential pressures on a routine basis to schedule the next required filter change.



<u>Rotary Concentrator – Zeolite Adsorption System (ZAS)</u>

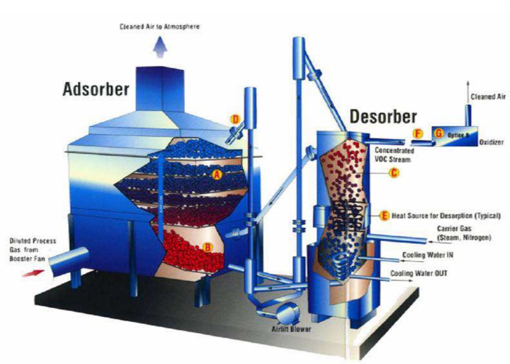
Concentration of VOCs is accomplished through a continuous adsorption and desorption process. The Zeolite Adsorption System consists of two sections of sacrificial carbon and the rotor concentrator. Exhaust air from the Filterhouse enters the ZAS and is directed through a series of sacrificial granular activated carbon columns or trays. The air is then routed to the rotor concentrator. The rotor concentrator is sub-divided into two sections: a large adsorption zone and a small desorption zone. Adsorption is the process by which the VOC molecules present in the exhaust air are collected and retained on the surface of adsorbent media. As the rotary concentrator rotates, VOCs is adsorbed onto the surface of zeolite blocks. Adsorbed VOC is then removed in the desorption zone by hot air. During the desorption cycle, the heat releases the previously absorbed VOC molecules into the isolated desorption air stream and is then routed to an oxidizer for destruction. The desorption air temperature (approximately 390°F typically) is monitored through the Programmable Logic Controller. Depending on the type and age of the equipment, the Programmable Logic Controller (PLC) may be programmed to sound an alarm if the desorption temperature is outside an acceptable safety margin value.





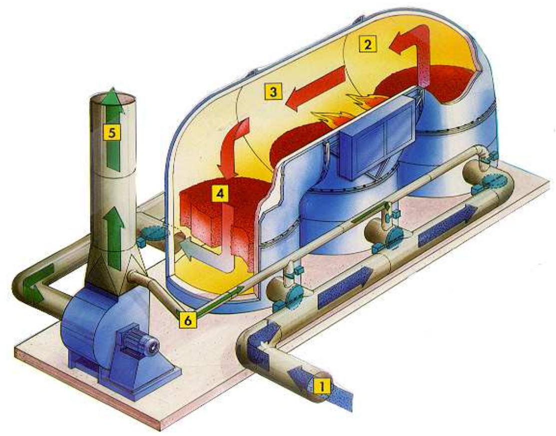
<u>Fluidized Bed Concentrator</u>

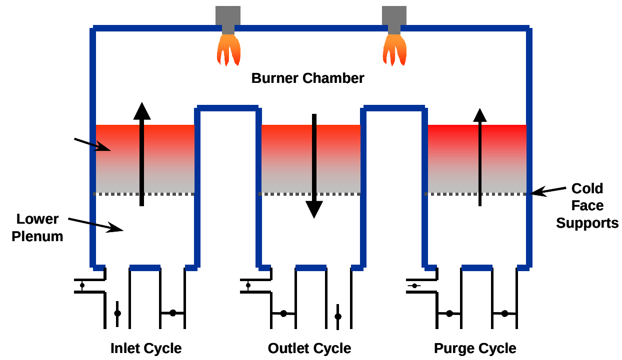
Concentration of VOCs is accomplished through a continuous adsorption and desorption process. The Fluidized Bed consists of two sections: the adsorber and desorber. Exhaust air from the Filterhouse or Wet Electrostatic Precipitator enters the Fluidized Bed and is directed through a series of perforated trays loaded with fluidized bead-shaped activated carbon (BAC). The BAC strips the solvents from the process gas, after which the process gas exhausts to atmosphere. BAC is continuously added to the top fluidized tray, displacing the BAC on the top tray toward the opposite end where a downcomer guides the overflow BAC to the next lower tray in system. The BAC must then traverse the full length of this tray to reach the next downcomer. Finally, the BAC is extracted from the bottom of the Adsorber and is airlifted to the Desorber. In the Desorber, the BAC flows as a packed bed vertically downward through the Desorber. The Desorber is equipped with electrical heating elements to drive off the solvents from the BAC. It is also supplied with a counterflow inert gas stream from the Nitrogen Generator that carries away the desorbed concentrated solvents from the Desorber to the destruction device. The clean BAC is returned to the adsorber top tray for reuse. The middle bed thermocouple (approximately 600°F) is monitored through the Programmable Logic Controller and is programmed to sound an alarm if the temperature is outside an acceptable safety margin value.



<u>Regenerative Thermal Oxidizer (RTO)</u>

The Regenerative Thermal Oxidizer consists of multiple towers installed in a line, each containing a packed bed of inert ceramic based media. Ford RTOs typically consist of three towers that continuously alternate from inlet, outlet and purge stages. Incoming concentrated solvent-laden exhaust from the Rotary Zeolite Adsorption System flows into the bottom of the first tower and up through the hot ceramic saddles or ceramic block. Air is preheated to within 60-100°F of the combustion temperature of approximately 1450°F. The clean hot exhaust gas then flows down through the second ceramic filled tower and transmits most of its thermal energy to the ceramic media before being discharged. After 1-2 minutes the dampers change positions and the air flow is reversed. Solvent laden air flows through the second tower that was preheated. Regenerative Catalytic Oxidizer contains catalyst material in addition to the ceramic media and operates at a lower chamber temperature. The combustion chamber temperature is monitored through the Programmable Logic Controller. Depending on the type and age of the equipment, the Programmable Logic Controller (PLC) may be programmed to sound an alarm if the combustion chamber temperature is outside an acceptable safety margin value.





Direct Fired Thermal Oxidizer (DFTO)

A Direct Fired Thermal Oxidizer (DFTO) consists of a burner operated inside an open insulated chamber. Solvent emissions from the Fluidized Bed Concentrator's desorber are directed into the combustion chamber maintained at temperature by the burner (approximately 1420°F). The solvent concentrations are normally sufficient to sustain the combustion chamber at temperature. Additional cooling air is introduced into the combustion chamber by a separate blower to utilize any additional energy provided by the solvent above the specified chamber temperature.

CORRECTIVE PROCEDURES

Description of the Corrective Procedures Taken in the Event of a Malfunction or Failure

When an abatement equipment fault condition/fault status occurs for more than 15 minutes, the facility Plant Environmental Control Engineer (PECE), Paint ME Manager and Paint Maintenance Superintendent are contacted. The notification includes the piece of abatement equipment the fault occurred on, the time the fault occurred and the estimated time for repairs. If the abatement equipment fault condition/fault status continues for more than 2 hours, a follow-up notification will be sent stating the current status of the incident and information on the cause of the fault. If the PECE cannot be immediately reached by telephone or radio, a text page message is sent. If the PECE does not respond to the text page within 15 minutes, the Paint Area Manager or the Environmental Management Representative (EMR) is contacted.

Once the abatement equipment is back on-line, an Air Emission Control Equipment Breakdown Report is completed with details on the piece of abatement equipment the fault occurred on, the duration of the breakdown (i.e., date, times, shift type), interim corrective actions, root cause of the fault, names and times that any service representatives were contacted and permanent corrective actions. The completed report is submitted to the PECE. The information is also routed to the Environmental Quality Office and Division Engineering office for review and analysis.

The information on the Air Emission Control Equipment Breakdown Report will be used to adjust emission calculations to account for the breakdown. In the unlikely event that the abatement equipment remains off-line long enough to result in an exceedance of an emission limit for 2 hours or more plans will be initiated to begin a sequenced shutdown of the emission source until the abatement equipment can be returned to normal operation. The PECE will notify the MDEQ Air Quality Division in accordance with Rule 912. The notification is made as soon as reasonably possible, but not later than 2 business days after becoming aware of the event. A written report that identifies the emission source, the time and duration of the event, corrective and preventive actions taken, actions taken to minimize emissions and if possible an estimate of the emissions during the event will be submitted to the MDEQ within 10 days of the malfunction event.

COMPLIANCE ASSURANCE MONITORING (CAM) REQUIREMENTS

The requirements of Compliance Assurance Monitoring (CAM), as promulgated under 40 CFR 64.2, apply to a pollutant-specific emissions unit at a major source that is required to obtain a part 70 or 71 permit if the unit satisfies all of the following criteria:

(1) The unit is subject to an emission limitation or standard for the applicable regulated air pollutant (or a surrogate thereof), other than an emission limitation or standard that is exempt under 40 CFR 64.2(b)(1) of this section;
(2) The unit uses a control device to achieve compliance with any such emission limitation or standard; and

(3) The unit has potential pre-control device emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. For purposes of this paragraph, ``potential pre-control device emissions'' shall have the same meaning as ``potential to emit,'' as defined in Sec. 64.1, except that emission reductions achieved by the applicable control device shall not be taken into account.

In accordance with 40 CFR 64.3, to provide a reasonable assurance of compliance with emission limitations or standards for the anticipated range of operations at a pollutant-specific emissions unit, monitoring under this part, the CAM Plan shall meet the following general criteria:

(1) The owner or operator shall design the monitoring to obtain data for one or more indicators of emission control performance for the control device and any associated capture system. Indicators of performance may include, but are not limited to, direct or predicted emissions, process and control device parameters that affect control device (and capture system) efficiency or emission rates, or recorded findings of inspection and maintenance activities conducted by the owner or operator.
(2) The owner or operator shall establish an appropriate range(s) or designated condition(s) for the selected indicator(s) such that operation within the ranges provides a reasonable assurance of ongoing compliance with emission limitations or standards for the anticipated range of operating conditions. In addition, unless specifically stated otherwise by an applicable requirement, the owner or operator shall monitor indicators to detect any bypass of the control device (or capture system) to the atmosphere, if such bypass can occur based on the design of the pollutant-specific emissions unit.
(3) The design of indicator ranges or designated conditions may be based on a single maximum or minimum value if appropriate, may be expressed as a function of process variables, may be expressed as maintaining the applicable parameter in a particular operational status or designated condition, or may be established as interdependent between more than one indicator.

Under 40 CFR 64.4(4)(b), for a CAM Plan, the owner or operator shall submit a justification for the proposed elements of the monitoring plan and if the proposed performance specifications include differences from manufacturer recommendations, the plan shall explain the reasons for the differences. If the CAM Plan relies on presumptively acceptable monitoring, no further justification for the appropriateness of that monitoring should be necessary.

At the Dearborn Truck Plant, the following sources are subject to CAM under the above requirements:

- EU-ECOAT (utilizing rotary zeolite concentrator and regenerative thermal oxidizer for compliance)
- EU-GUIDECOAT (utilizing fluidized bed concentrator and thermal oxidizer for compliance)
- EU-TOPCOAT (utilizing rotary zeolite concentrator and regenerative thermal oxidizer for compliance)

In conjunction with this O&M Plan, the following control device parameters and associated inspection and maintenance activities serve as presumptively acceptable monitoring based on known performance of concentrators and thermal oxidizers for the emission units subject to CAM at the Dearborn Truck Plant:

<u>Rotary Zeolite Concentrators</u>
Desorption Temperature and Calibration: Monitor desorption gas inlet temperature to ensure it is not more than 15 degrees Fahrenheit below the temperature recorded during the most recent performance test (349^{o}F) and calibrate or replace the thermocouple a minimum of once every 12 months to ensure desorption is maintained at a temperature necessary to concentrate volatile organic compounds from the incoming air stream for delivery to the regenerative thermal oxidizer.

Pressure Drop Check: Observe and record the pressure drop across the concentrator a minimum of once every calendar quarter to ensure that solvent-laden air may pass into the concentrator media as designed.

Zeolite Media Observation: Perform an internal observation of adsorbent materials for contamination and erosion a minimum of once every 18 months to ensure that solvent-laden air may pass into the concentrator media as designed (unless tested within the prior 18 months).

<u>Fluidized Bed Concentrators</u>
Desorption Temperature and Calibration: Monitor middle bed temperature to ensure it is not more than 15 degrees Fahrenheit below the temperature recorded during most recent performance test (538^{o}F) and calibrate or replace the thermocouple a minimum of once every 12 months to ensure air stream is maintained at a temperature necessary to concentrate volatile organic compounds from the air stream for delivery to the thermal oxidizer.

Carbon Media Observation: Perform an internal observation of adsorbent materials for contamination and erosion a minimum of once every 18 months to ensure that solvent-laden air may pass into the concentrator media as designed (unless tested within the prior 18 months).

<u>Regenerative Thermal Oxidizers</u>

Combustion Chamber Temperature and Calibration: Monitor combustion chamber temperature to ensure it is not more than 50 degrees Fahrenheit below the most recent performance test (1373°F) and calibrate or replace the thermocouple a minimum of once every 12 months to ensure air stream is maintained at a temperature necessary to destroy the volatile organic compound within the regenerative thermal oxidizer.

Cold Face Check / Heat Exchange-Heat Transfer Media Inspection: Perform a heat exchange/heat transfer media a minimum of once every 18 months to ensure that solvent-concentrated air may pass into the oxidizer as designed (unless tested within the prior 18 months).

Inlet/Outlet Valve Check /Valve Seals Condition Inspection: Perform an inspection of the valve seals condition and verify valve timing/synchronization a minimum of once every 18 months to ensure that the proper retention time for destruction of volatile organic compounds within the oxidizer is maintained (unless tested within the prior 18 months).

Thermal Oxidizers

Combustion Chamber Temperature and Calibration: Monitor combustion chamber temperature to ensure it is no more than 50 degrees Fahrenheit below the most recent performance test (1350°F) and calibrate or replace the thermocouple a minimum of once every 12 months to ensure air stream is maintained at a necessary temperature to destroy the volatile organic compound within the thermal oxidizer.

Monitoring of these key operational parameters described in this section meet the requirements of CAM as defined in 40 CFR Part 64 for each of the affected emission units.

OPERATING AND MAINTENANCE PLAN REVIEWS

This Operating and Maintenance Plan will be reviewed and updated as required to ensure emission control devices are operated in a manner consistent with good air pollution control practices for minimizing emissions. Preventive maintenance tasks and actions taken to respond to malfunctions/faults will be periodically reviewed and changed (if necessary) based on best engineering judgment and technological/equipment improvements.

Reviews of this Operating and Maintenance Plan will be periodically conducted by the PECE and the Paint ME Manager or his designee. Reviews will be completed at least annual or following any abnormal operation which results in an exceedance of an emission limit lasting for more than 2 hours.

Records of the Operating and Maintenance Plan review will be maintained by the PECE for a period of 5 years.

Attachment 1
Downtime Summary

Low Carbon Flow/Level Fault (EU-Guidecoat/FG-Controls)

Root Cause	Date	Duration (mins)	
Flow instability following carbon change-out	1/3/2012	210	
Flow instability following carbon change-out	9/4/2012	288	
Carbon blockage causing airlift blower failure	10/1/2012	73	
No root cause identified	11/1/2012	48	
Flow instability following carbon change-out	11/25/2013	26	
Test port left open allowing carbon to be released	12/15/2013	205	
Carbon blockage causing excessive temperature	12/17/2013	31	
Flow instability following carbon change-out	12/15/2014	525	
Flow instability following carbon change-out	12/16/2014	166	
Flow instability following carbon change-out	12/17/2014	405	
Carbon flow instability	3/18/2015	59	
Flow instability following carbon change-out	2/12/2016	112	
Flow instability following carbon change-out	2/16/2016	62	
Total Low Carbon Flow Downtime:		2210	mins
		36.8	**hours**
Total Prime Operation Time (1/1/2012 - 6/30/2016):		**25,355.0**	**hours**

Nitrogen Generator High Oxygen Level Fault (EU-Guidecoat/FG-Controls)

Root Cause	Date	Duration (mins)	
Loose piece of tubing unsecured after valve replacement	1/2/2013	24	
Frozen valve	1/18/2013	360	
Frozen airline	11/24/2013	272	
Air dryer supporting the nitrogen generator was faulty	2/12/2014	96	
Air dryer supporting the nitrogen generator was faulty	2/13/2014	88	
Air dryer supporting the nitrogen generator was faulty	2/14/2014	44	
Air dryer supporting the nitrogen generator was faulty	2/15/2014	97	
No root cause identified	11/29/2015	26	
Broken stop for nitrogen generator valve	5/3/2016	374	
Total High Oxygen Level Downtime:		1,381	mins
		23.0	**hours**
Total Prime Operation Time (1/1/2012 - 6/30/2016):		**25,355.0**	**hours**