DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Scheduled Inspection

A404323686

FACILITY: Dow Corning - Midland Plant		**SRN / ID:** A4043
LOCATION: 3901 S Saginaw Rd, MIDLAND		**DISTRICT:** Saginaw Bay
CITY: MIDLAND		**COUNTY:** MIDLAND
CONTACT: Mike Gruber , Air & Water Team Leader		**ACTIVITY DATE:** 11/13/2013
STAFF: Jennifer Lang	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MEGASITE
SUBJECT: Scheduled Inspection: FGSITEBLOWER, FGTHROX, FGSITESCRUBBERS, FGBULKMOVE, FGHAP2012A2A & FGFACILITY. All FG's currently covered by Air PTI No. 91-07D and ROP Minor Modification Application No. 201300066.		
RESOLVED COMPLAINTS:		

Inspection date: 11/13/13
Inspection started: 9:00 am
Inspection ended: 4:00 pm

Dow Corning and MDEQ-AQD staff present during the inspection.

Jenny Lang (MDEQ-AQD)
Steve Moser (Dow Corning, Assistant General Council)
Mike Gruber (Dow Corning, Air & Water Team Leader)
Rich Rausch (Dow Corning, Senior Manufacturing Consultant)
Jeff Lynch (Dow Corning, Environmental, Power & Utilities Manager)
Ronda Walser (Dow Corning, Global Litigations Specialist)

FGSITEBLOWER

Compliance Status: Compliance

Items noted during the inspection.

1. FGSITEBLOWER is the site vent consolidation and blower system that collects vapor streams from numerous emission units and vents throughout the facility and routes them to either the Dow Corning (DC) Midland Plant thermal oxidizer with heat recovery or to a site-wide water scrubber system. There are two parts to the site vent consolidation and blower system: a dry vent header system for water reactive vents and a wet vent header system for vents that can contain water.

2. Condition no. VI.1 of table FGSITEBLOWER in PTI 91-07D states, DC shall record the time and duration of each bypass episode wherein the vents comprising FGSITEBLOWER are not routed to the THROX. During the inspection, I asked DC for dates and times in 2013 (on both the wet and dry vents) when the THROX was shutdown or tripped off-line. On 11/15/13, DC provided me with this data (see attached). The THROX is usually down for maintenance in September of each year. In September 2013, the THROX was down for maintenance, however, the site scrubber (FGSITESCRUBBERS) was up and running.

FGTHROX

Compliance Status: Compliance

Items noted during the inspection.

1. FGTHROX is the site-wide thermal oxidizer system. The THROX removes VOC, HAPs, PM10, HCl, and other toxic air contaminants from the FGSITEBLOWER consolidated vents system prior to discharge to atmosphere.

2. PTI No. 91-07D covers FGSITEBLOWER, FGTHROX, FGSITESCRUBBERS, FGBULKMOVE, FGHAP2012A2A, and FGFACILITY. This permit was issued on 4/12/13. ROP modification application no.

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201300066 was received by the MDEQ-AQD on 4/18/13. This application covers the addition of PTI 91-07D to ROP No. MI-ROP-A4043-2008. To date, the PTI has not been rolled into the ROP.

3. Condition no. III.2 of table FGTHROX in PTI 91-07D states, within 60 days after permit issuance, DC shall submit to the AQD District Supervisor and Technical Programs Unit Supervisor, for review and approval, a protocol for demonstrating compliance with the PM10 emission limit in SC I.4 for EUTHROX (i.e., 3.5 lb/hr PM10 limit, based on a 720-hour rolling average). According to DC, the attached document entitled "Parametric Monitoring Plan and Verification of IWS Particulate Removal Efficiency from FGTHROX" (see attached) fulfills this requirement. DC stated this plan has been submitted with various test plans and PTI applications and was approved as part of the approval process. I received a copy of this plan in an email from Chris Caswell of DC on 10/31/13. This copy is attached to the report.

4. Condition no. IV.1 of table FGTHROX in PTI 91-07D states, DC shall not route process vents to the THROX unless the burner, quencher, absorber, and two ionizing wet scrubbers (IWS) in series are installed, maintained, and operated in a satisfactory manner. Satisfactory operation includes maintaining the IWS and thermal oxidizer according to the MAP (malfunction abatement plan) and maintaining a minimum THROX combustion chamber temperature of 1800 degrees and maintaining a residence time in the combustion chamber of greater than 1.0 seconds at any time when process vents are routed to the THROX. During the inspection, I observed the following THROX operational parameters in the control room located at building no. 2512 between 2:15 pm and 3:15 pm.

Parameter	Observed Value	Limit	Alarm Set Point	Underlying Applicable Requirement**
1st stage IWS secondary voltage	25.7 kV (hourly avg.)	≥ 10 kV (one hr. avg. period)	≤ 16 kV	SC IV.1, MAP
2nd stage IWS secondary voltage	23.4 kV (hourly avg.)	≥ 15 kV (one hr. avg. period)	≤ 18 kV	SC IV.1, MAP
1st stage IWS secondary current	225 mA (hourly avg.)	≥ 50 mA (one hr. avg. period)	≤ 100 mA	SC IV.1
2nd stage IWS secondary current	246 mA (hourly avg.)	≥ 50 mA (one hr. avg. period)	≤ 100 mA	SC IV.1
1st stage IWS packing recycle rate	545 gpm (hourly avg.)	≥ 324 gpm (one hr. avg. period)	≤ 400 gpm	SC IV.1, MAP
2nd stage IWS packing recycle rate	532 gpm (hourly avg.)	≥ 324 gpm (one hr. avg. period)	≤ 400 gpm	SC IV.1, MAP
1st stage IWS flush cycle	Flush cycle occurring approximately every hour.	NA	This was not requested during the inspection.	NA
2nd stage IWS flush cycle	Flush cycle occurring approximately every 2 hours.	NA	This was not requested during the inspection.	NA
THROX combustion chamber temperature (TT29150A)	1937 degrees F (15 minute avg.)	≥ 1800 degrees F (15 minute avg. period)	≤ 1805 degrees F	SC IV.1, MAP
THROX combustion chamber temperature (TT29150B)	1930 degrees F (15 minute avg.)	≥ 1800 degrees F (15 minute avg. period)	≤ 1805 degrees F	SC IV.1, MAP
THROX combustion chamber residence time	3.3 seconds (avg. time unknown)	> 1.0 second (avg. time not specified in PTI)	This was not requested during the inspection.	SC IV.1
HCl absorber #24425 pH (east probe – scrubber recycle line)	6.43 (avg. period unknown but believed to be instantaneous or 15 minute avg.)	> 5 (24 hour avg. period)	< 5 for 18 hrs.	MAP
HCl absorber #24425 pH (west probe – overflow to sump)	6.27 (avg. period unknown but believed to be instantaneous or 15 minute avg.)	> 5 (24 hour avg. period)	< 5 for 18 hrs.	MAP

**Note: The alarm set point is not a regulated parameter.

5. Condition no. V.1 of table FGTHROX in PTI No. 91-07D requires DC to verify the PM-10, CO and VOC emission rates from the THROX by testing at least once every 12 months. Condition no. V.2 of the same table also requires DC to verify the PM-10 inlet and outlet emission rates of the IWSs and the PM-10 control

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efficiency of the IWSs by testing. A written plan for these tests is required no less than 30 days prior to testing, and the AQD must approve the final plan prior to testing. On 10/4/13, the AQD received the required test plan. The plan also covered a RATA for the THROX CEMS. The AQD approved the plan in a letter dated 11/6/13. Testing is scheduled to begin on 11/18/13.

6. Condition no. VI.1 of table FGTHROX in PTI 91-07D requires DC to install, calibrate, maintain, and operate in a satisfactory manner a device to monitor and record on a continuous basis (i.e., at least once every 15 minutes) the combustion chamber temperature of the THROX. Condition no. VI.9 of the same table requires DC to keep continuous records of the THROX combustion chamber temperature. DC appears to be in compliance with these requirements based upon the discussion in item no. 4 above.

7. Condition no. VI.2 of table FGTHROX in PTI 91-07D requires DC to install, calibrate, maintain and operate in a satisfactory manner a device to monitor and record the NOx emissions from the THROX on a continuous basis. During the inspection at 2:21 pm, I observed the following NOx emissions data in the control room located at building no. 2512. This data is based upon the NOx CEMS located at the THROX.

NOx Calcs.	NOx Ratio (lb/MBTU)	NOx Flow (lb/hr)
Current	0.1004	4.38
Minute Avg.	0.0982	4.31
Hourly Avg.	0.1209	4.92
Daily Avg.	0.1481	5.17
Monthly Avg.	0.1144	3.76

8. Condition no. VI.3 of table FGTHROX in PTI 91-07D requires DC to install, calibrate, maintain and operate in a satisfactory manner a device to monitor and record the flue gas oxygen or carbon dioxide (CO2) concentration for the THROX on a continuous basis and according to the procedures outlined in Appendix A of 40 CFR Part 60.48. The flue gas CO2 and 02 percentages observed during the inspection were 1.6% and 12.7%, respectively. This data was observed at 2:44 pm in the control room for the THROX located at building no. 2512.

9. Condition no. VI.4 of table FGTHROX in PTI 91-07D requires DC to install, calibrate, maintain and operate in a satisfactory manner online GCs to monitor and record the concentration of compounds containing the silicon atom in the wet and dry vent headers to the THROX on a continuous basis (i.e., one measurement every 60 minutes). DC currently maintains and operates two online GCs, located at the dry and wet drop out tanks, to measure the concentrations of silicon containing compounds fed to the THROX. The amount of individual materials in the wet and dry vent headers are measured approximately every 35 minutes. Using the "Verantis Equation", this data in conjunction with air flow rate can be used to determine particulate matter emissions from the THROX. During the inspection at 2:21 pm in the THROX control room, I observed a trichlorosilane dry vent concentration of 691.9 ppmv. Following the inspection on 11/15/13, DC provided me with their hourly and 720-hour rolling average lb/hr particulate matter emission estimates for September 2013 (see attached). These estimates are based on data collected by the GC. Based upon this data, none of the hourly emission estimates exceeded the 3.5 lb/hr PM10 emission limit.

10. Condition no. VI.5 of table FGTHROX in PTI 91-07D requires DC to monitor and record the gas flow rates in the wet and dry vent headers to the THROX on a continuous basis (i.e., at least one data point every 15 minutes). Condition no. VI.6 of the same table requires DC to monitor and record the gas flow rate from the THROX on a continuous basis according to the procedures outlined in Appendix A of the PTI. During the inspection at 2:45 pm, I recorded the following gas flow rates in the THROX control room.

Wet Vent Flow to THROX	Dry Vent Flow to THROX	Stack Flow
395.5 lb/hr	2029 lb/hr	12,501 SCFM

11. Condition no. VI.8 of table FGTHROX in PTI 91-07D requires DC to keep daily, monthly and 12-month rolling time period average fuel use records for the THROX. Daily and monthly records for September 2013 were provided by DC on 11/15/13 (see attached). DC indicated they could also provide 12-month rolling records if necessary.

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12. Condition no. VI.11 of table FGTHROX in PTI 91-07D requires DC to keep records necessary to demonstrate that the THROX is in compliance with the NOx, CO and VOC emission limits specified in condition nos. I.1, I.2 and I.5 of the same PTI. DC provided the following emission estimates during the inspection (see attached). All estimates indicate compliance with the limits.

Pollutant	Limit	Actual Emissions
NOx	36 tpy	14.76 tpy (rolling 12-month through September 2013)
CO	90 tpy	0.74 tpy (rolling 12-month through September 2013)
VOC	6.6 lbs/hr	DC determines compliance with this limit during annual stack testing. The last compliance test was performed on November 27-28, 2012. Test results indicate compliance with the limit (i.e., average THC emission rate was 0.0156 lbs/hr).

13. Condition no. VI.12(e) of table FGTHROX in PTI 91-07D requires DC to calculate the PM10 emission rate in lbs/hr using the Verantis Equation, as described in the "Parametric Monitoring Plan and Verification of IWS Particulate Removal Efficiency from EUTHROX". This data for the month of September 2013 was provided by DC on 11/15/13 (see attached). According to the data, DC was in compliance with the lb/hr PM10 emission limit.

14. Condition no. VI.12(f) of table FGTHROX in PTI 91-07D requires DC to calculate the 720-hour average PM10 emission rate in lb/hr, based on data from emission testing or the online GC, calculated at the end of each hour from the PM10 emitted during the preceding 720 hours and the hours that EUTHORX was combusting vent gas containing silicon during the preceding 720 hours. On 11/15/13, DC provided me with the required data for the month of September 2013 (see attached). According to the data, DC was in compliance with the lb/hr PM10 emission limit.

15. Condition no. VI.12(g) of table FGTHROX in PTI 91-07D requires DC to calculate the PM10 emission rate in lbs/month from the THROX due to venting from EU2703-06, EU2703-07, EU2703-08, EU2703-09 and EU2703-13. On 11/19/13, DC provided me with the 1b/mo PM10 emission rate starting in August 2013 (see attached). According to DC, these emission units did not start venting to the THROX until this time. Based upon the information provided, PM10 emissions from these emission units in August, September and October 2013 were less than 10 lbs/mo total, respectively. Condition no. I.6 of table FGTHROX in PTI 91-07D limits PM10 emissions from these emission units to 100 lbs/mo.

16. Condition no. VI.12(h) of table FGTHROX in PTI 91-07D requires DC to calculate the 12-month rolling time period PM10 emission rate in tons per year (tpy), calculated at the end of each calendar month, from the THROX. According to data provided by DC during the inspection (see attached), DC emitted 4.39 tpy of PM10 from October 2012 through September 2013. Condition no. I.3 of the same table limits PM10 emission to 13.4 tpy, based on a 12-month rolling time period.

17. Condition no. VI.13 of table FGTHROX in PTI 91-07D requires DC to keep records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of the THROX; or any periods during which a continuous monitoring system or monitoring device for the THROX is inoperative. During the inspection, I asked DC for dates and times in 2013 (on both the wet and dry vents) when the THROX was shutdown or tripped off-line. On 11/15/13, DC provided me with this data (see attached). The THROX is usually down for maintenance in September of each year. In September 2013, the THROX was down for maintenance, however, the site scrubber (FGSITESCRUBBERS) was up and running.

18. Condition no. 1 of Appendix A of PTI 91-07D states, within 30 calendar days after commencement of trial operation, DC shall submit two copies of a monitoring plan to the AQD for review and approval. On 2/31/08, DC submitted a monitoring plan to the AQD dated 3/19/08. This plan was approved by the AQD in a letter dated 6/2/08.

19. Condition nos. 7 and 8 of Appendix A of PTI 91-07D states, in part:

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a. Each calendar quarter, DC shall perform the QA procedures of the CEMS set forth in Appendix F of 40 CFR Part 60. Within 30 days following the end of each calendar quarter, the permittee shall submit the results to the AQD.

b. In accordance with 40 CFR 60.7(c) and (d), the permittee shall submit two copies of an excess emission report (EER) and summary report in an acceptable format to the AQD, within 30 days following the end of each calendar quarter.

A report addressing these conditions was received by the AQD on 10/24/13 covering reporting period 7/1/13 through 9/30/13. According to the report, there were no NOx excess emissions during the reporting period.

FGSITESCRUBBERS

Compliance Status: Compliance

Items noted during the inspection.

1. FGSITESCRUBBERS covers the site-wide water scrubber system. FGSITESCRUBBERS removes HCl and chlorosilanes from the FGSITEBLOWER consolidated vents system prior to discharge to atmosphere when the site-wide thermal oxidizer system is not operating properly.

2. Condition no. III.1 of table FGSITESCRUBBERS in PTI 91-07D states DC shall not operate FGSITESCRUBBERS unless the approved Benzene Emissions Management and Monitoring Plan (BEMMP) for demonstrating compliance with the emission limit for FGSITESCRUBERS , or an alternate plan approved by the AQD District Supervisor, is implemented and maintained. During the inspection, DC confirmed that the BEMMP we have on file dated December 2007 is the most recent version of the plan. This plan was reviewed and approved by the AQD in a letter dated 3/3/08. DC staff made the following comments about the BEMMP during my inspection.

   - The BEMMP states, to demonstrate compliance with the benzene limit, DC installed two inline GCs (one on the dry vent stream and one on the wet vent stream), which will continuously measure the feed compositions. DC confirmed during the inspection that these are the same GCs that are used to measure silicon containing compounds in the wet and dry vent streams. However, DC stated the air flow meters are different than those used at FGTHROX.
   - The BEMMP states regular calibration checks will happen on a quarterly or semi-annual basis. However, DC confirmed they are conducting the checks on a monthly basis (similar to what's stated in the MAP for FGTHROX).
   - The BEMMP states that DC will not vent the consolidated vents to FGSITESCRUBBERS for more than 20% of the year. This limitation was stated in PTI 91-07. However, this PTI has been voided, and the 20% limitation does not exist in PTI 91-07D. Therefore, DC is not adhering to the limitation.
   - The BEMMP states that if it is found that DC has reached a benzene rate of 6.8 lbs/hr at any time while venting to FGSITSCRUBBERS, the BEMMP will be reopened and modified. DC was not aware of anytime where the benzene emission rate has triggered reopening of the plan.

3. According to the BEMMP, the GCs grab a vent sample about every ½ hour and once the analysis is completed, it will be loaded onto the DC network where the data will be saved and backed up. Once per month, this data will be complied and the benzene flow rates (on an hourly basis) will be checked for compliance. During the inspection, I asked for the calculated lb/hr benzene emission rate during a THROX shutdown in 2013. In response, on 11/15/13, DC provided me with their calculated lb/hr benzene emission rate for the wet and dry vents on 9/7/13 when the THROX was shutdown for maintenance. The highest hourly benzene emission rate on September 7th was 0.4 lbs/hr. Condition no. I.1 of FGSITESCRUBBERS in PTI 91-07D limits benzene emissions to 7.1 lbs/hr.

4. PTI 91-07D states the following with regard to FGSITESCRUBBERS:

   - Condition no. III.5 - Proper operation of the site-wide scrubber includes the total scrubber water flow rate shall not be less than the minimum flow specified in the MAP.
   - Condition no. VI.1 - Whenever vents comprising FGSITEBLOWER are not routed to EUTHROX, the permittee shall operate a device to monitor the water flow rates for the site-wide scrubbers on a

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continuous basis. For the purpose of this condition, "on a continuous basis" is defined as an instantaneous data point recorded at least once every 15 minutes.
- Condition no. VI.2 – DC shall keep records of scrubber flow rates for the site-wide scrubbers.

According to the MAP for FGSITESCRUBBERS provided by DC on 11/15/13 (dated 5/19/09 and approved by the AQD in a letter dated 6/2/09), the water flow rate to the scrubber shall be greater than 50 gpm to each section (i.e., a spray tower section (upper) and a baffled section (lower)) when handling emissions and greater than 40 gpm total flow when in standby. The MAP states the flow rate is monitored every 15 minutes. During the inspection at 2:21 pm in the control room for the THROX and scrubbers located at building 2512, I observed the following flow rate measurements.

Observed Parameter – 23709 E. Scrubber Clean Water Flow Rate (gpm) – Upper Section	Limit – 23709 E. Scrubber (gpm)	Observed Parameter - 23709 E. Scrubber Recycle Water Flow Rate (gpm) – Lower Section	Limit – 23710 W. Scrubber (gpm)
77.4	> 50	108	> 50

Operating parameters for the west scrubber (no. 23710) were not observed during the inspection as vents were being directed to the east scrubber (no. 23709). The scrubbers can operate in parallel, but typically only one operates at a time. Although the THROX was not down at the time of my inspection, the site scrubber was receiving process vents from FGBULKMOVE. Therefore, the scrubber was not in standby mode. FGBULKMOVE directly vents to the site scrubber.

While I was at the control room for the THROX and site scrubbers located in building 2512, I did validate that they are monitoring the vent flow rate for the scrubber on a lb/hr basis. I also observed a benzene concentration of 418 ppmv in the wet vent at 2:21 pm.

FGBULKMOVE

Compliance Status: Compliance

Items noted during the inspection.

1. FGBULKMOVE includes the trichlorosilane, silicon tetrachloride & dichlorosilane bulk move operations. These operations include the loading and unloading of storage tanks, railcars, and semi-trailers that occur primarily at DC's 502 building. FGBULKMOVE has a direct vent to the side-wide scrubbers.

2. Condition no. II.1 of table FGBULKMOVE in PTI 91-07D states, DC shall not route more than 600 pounds of material per hour, based on a one-hour average, from FGBULKMOVE, specifically from Tank No. 25-103, to the site-wide scrubber system. Further, condition no. VI.1 of the same table in the PTI states DC shall monitor and record when the FGBULKMOVE operations are occurring, the mass flow rate of the vapor going from FGBULKMOVE to the site-wide scrubber system on a continuous basis. For the purposes of this condition, "on a continuous basis" is defined as an instantaneous data point recorded at least once every 15 minutes. During the inspection at 2:21 pm while I was in the control room for the THROX and the site-wide scrubber located at 2512 building, I observed a mass flow rate of vapor going from FGBULKMOVE to the site-wide scrubber system of 332 lbs/hr.

3. Condition no. VI.2 of table FGBULKMOVE in PTI 91-07D states DC, shall calculate the dichlorosilane (DCS) emission rate from FGBULKMOVE using a method acceptable to the AQD District Supervisor. During the inspection, DC informed me that the DCS emissions from FGBULKMOVE in September 2013 were 4.2 lbs/mo. Given the number of hours the process ran, this presumably works out to be less than the limit of 0.1 lbs/hr as stated in condition no. I.1 of the same table.

FGHAP2012A2A

Compliance Status: Compliance

Items noted during the inspection.

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1. This flexible group was established for purposes of keeping records for the actual to projected actual (A2A) PSD applicability determination.

2. Condition no. VI.1 of table FGHAP2012A2A in PTI 91-07D requires DC to calculate and keep records of the annual emissions of VOC and NOx from FGHAP2012A2A described in Appendix B of the PTI, in tons per calendar year. Calculations and recordkeeping shall begin upon issuance of PTI 91-07C (11/19/12) and continue for 10 years.

   Since this record is required on a calendar year basis, I did not request it during the inspection, for the following reasons.

   A. For 2012, the requirement to keep records did not begin until 11/19/12. Given that approximately 1 ½ months remained in the 2012 calendar year, it's unlikely that any of the reporting requirements in condition no. VII.1 of the same table would have been triggered.

   B. For 2013, calendar year records cannot be calculated until 1/1/14.

FGFACILITY

Compliance Status: Compliance

Items noted during the inspection.

1. FGFACILITY covers all process equipment at the stationary source including equipment covered by other permits, grandfathered equipment and exempt equipment.

2. Condition no. III.1 of table FGFACILITY in PTI 91-07D states DC shall not operate any emission units having emission vents tied into FGSITEBLOWER, FGTHROX, and FGSITESCRUBBERS unless a MAP as describe in Rule 911(2), for FGTHROX and FGSITESCRUBBERS has been submitted to the AQD District Supervisor. If at any time the MAP fails to address or inadequately addresses an event that meets the characteristics of a malfunction, the permittee shall amend the MAP within 45 days after such an event occurs. DC shall also amend the MAP within 45 days if new equipment is installed or upon request from the District Supervisor. DC shall submit the MAP and any amendments to the MAP to the AQD District Supervisor for review and approval. If the AQD does not notify DC within 90 days of submittal, the MAP or amended MAP shall be considered approved. Until the amended plan is approved, the permittee shall implement corrective procedures or operational changes to achieve compliance with all applicable emission limits.

On 11/15/13, DC provided me with the latest versions of the MAPs for FGSITESCRUBBERS and FGTHROX. The latest version of the MAP for FGSITESCRUBBERS is dated 5/19/09 (see attached) and it was approved by the AQD in a letter dated 6/2/09. The latest version of the MAP for FGTHROX is dated 4/25/13 (see attached). This MAP was not reviewed and approved by the AQD. However, per condition no. III.1 of table FGFACILITY, it was considered approved as of 7/25/13. During the inspection, DC informed me that the MAP needs to be modified to include a new vent that has been tied into the THROX under AQD Rule 285. A new MAP (dated 11/14/13) was received by the MDEQ-AQD on 11/19/13. This MAP presumably covers the change.

NAME Jenny Fuge DATE 11/25/13 SUPERVISOR C. Hare

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MDEQ-AQD
Dow Corning INTERNAL

FGTHROX Shutdown and Trip Times 2013 YTD

	Wet Vents	Dry Vents	Burner
Start	1/16/13 1:45 PM	1/22/13 7:45 PM	4/12/13 10:30 AM
End	1/16/13 2:15 PM	1/25/13 8:45 AM	4/12/13 5:15 PM
Start	1/18/13 2:15 PM	1/25/13 9:30 AM	4/15/13 1:00 PM
End	1/18/13 2:30 PM	1/26/13 7:15 PM	4/15/13 1:15 PM
Start	1/18/13 5:15 PM	1/30/13 11:30 AM	6/9/13 7:15 PM
End	1/18/13 5:30 PM	1/30/13 1:00 PM	6/10/13 12:30 PM
Start	1/19/13 12:00 PM	3/14/13 10:30 AM	6/11/13 6:00 PM
End	1/19/13 12:15 PM	3/14/13 10:45 AM	6/12/13 5:15 PM
Start	1/19/13 5:45 PM	4/12/13 10:00 AM	9/7/13 5:15 AM
End	1/19/13 6:00 PM	4/13/13 4:45 AM	9/19/13 8:15 AM
Start	1/22/13 7:30 PM	4/14/13 10:15 PM	
End	1/22/13 8:00 PM	4/15/13 7:00 PM	
Start	1/25/13 12:30 PM	5/20/13 3:00 PM	
End	1/25/13 1:30 PM	5/20/13 3:45 PM	
Start	1/26/13 3:45 AM	6/9/13 12:45 PM	
End	1/26/13 5:45 AM	6/13/13 10:45 AM	
Start	1/26/13 9:15 AM	6/26/13 11:30 AM	
End	1/26/13 7:00 PM	6/26/13 4:00 PM	
Start	2/7/13 1:15 PM	7/11/13 10:00 AM	
End	2/7/13 1:30 PM	7/11/13 10:30 AM	
Start	3/14/13 10:30 AM	7/11/13 12:15 PM	
End	3/14/13 10:45 AM	7/11/13 12:30 PM	
Start	4/12/13 10:15 AM	7/11/13 12:45 PM	
End	4/13/13 4:45 AM	7/11/13 1:30 PM	
Start	4/14/13 10:15 PM	9/6/13 12:00 PM	
End	4/15/13 1:45 AM	9/20/13 10:30 AM	
Start	4/15/13 8:15 AM	9/26/13 2:45 PM	
End	4/15/13 9:15 AM	9/26/13 3:15 PM	
Start	4/15/13 12:45 PM		
End	4/15/13 3:45 PM		

November 14, 2013

MDEQ-AQD
Dow Corning INTERNAL

FGTHROX Shutdown and Trip Times 2013 YTD

	Wet Vents	Dry Vents	Burner
Start	4/22/13 7:00 AM		
End	4/22/13 7:15 AM		
Start	5/20/13 1:00 PM		
End	5/20/13 3:30 PM		
Start	5/22/13 3:15 PM		
End	5/22/13 4:00 PM		
Start	5/25/13 9:30 AM		
End	5/25/13 11:15 AM		
Start	6/9/13 12:45 PM		
End	6/13/13 10:00 AM		
Start	6/26/13 11:30 AM		
End	6/26/13 3:45 PM		
Start	7/11/13 10:00 AM		
End	7/11/13 10:30 AM		
Start	9/6/13 12:00 PM		
End	9/20/13 10:30 AM		

November 14, 2013

Parametric Monitoring Plan and Verification of IWS Particulate Removal Efficiency from FGThrox

The particulate emissions from FGThrox, both those larger than PM-10 and those smaller than PM-10, are SiO_2 agglomerations. When compounds containing the Si atom are combusted, SiO_2 agglomerations are formed as a product of combustion. The 12 month rolling total particulate emissions from FGThrox can be determined using (1) the SiO_2 particulate formed in the burner (estimated as described below); (2) the measured flow rate through the Ionizing Wet Scrubber, IWS, and (3) the IWS efficiency, derived from data provided by Verantis, the manufacturer of the IWS. By monitoring and tracking SiO_2 particulate loading, gas flow through the IWS and IWS removal efficiencies (maintained through work practices and verified through stack testing), Dow Corning is readily able to demonstrate compliance with the 13.4 tons per year PM-10 limit on a rolling twelve month basis. This also allows the Midland Plant to maintain production under a variety of operating conditions without the need for a more expansive permit limit.

SiO2 Particulate Loading:

Two online Gas Chromatographs, GCs, located at the dry and wet drop out tanks respectively, are used to measure the concentrations of compounds fed to the throx. The amount of individual materials in the wet and dry vent headers are measured approximately every 35 minutes.

To estimate SiO_2 formed in the burner, we need consider only the chemical concentrations of materials containing the Si atom that are being fed to the combustion chamber. We assume that all Si atoms are converted to SiO_2 in the oxidizer. We are then able to estimate the amount of SiO_2 formed in the FGTHROX combustion chamber using the equations for the wet and dry vent system below. The concentration (Conc.) term in the following equations represents all materials containing the Si Atom or the total Si elemental concentration being fed to throx. For example, in the dry vent stream the concentration of trichlorosilane or ($HSiCl_3$) has to be added to Dichlorosilane (H2SiCl2) and other compounds to calculate the total concentration of SiO2 fed. Note: The concentration of materials such as Octamethylcyclotetrasiloxane or ($H_{24}C_8Si_4O_2$) or (D4) that contain more than one Si atom per molecule needs to be added to the concentrations of trichlorosilane and dichlorosilane. Before they can be added to the chlorosilane concentrations, we must first multiply their GC concentration by the number of Si atoms they contain. In the case of D4, 4 moles of SiO2 will be formed for every mole of D4 combusted.

Equation for Dry vent system:

$$(MF_{dry}) / (MW_{avg}) * (Conc.)/1E6 *(MW_{SiO2.}) = MF_{SiO2dry}$$

Where:

MF_{dry}= The average pound per hour mass flow rate in the dry system vent

MW_{avg}= The average molecular weight of the gases in the dry vent header system

Conc.= The sum of the individual Concentrations in PPMv of all individual components in the dry vent that contain the Si atom. If an individual compound in the dry vent contains more than one Si Atom per molecule the concentration of the molecule must be multiplied by the number of Si atoms it has before it can be added to the sum)
$MW_{SiO2.}$= Molecular weight of SiO_2
$MF_{SiO2dry.}$= pound per hour mass flow rate of SiO_2 formed due to the combustion of the dry vent

Equation for Wet vent system:

$(MF_{wet}) / (MW_{avg}) * (Conc.)/1E6 *(MW_{SiO2.}) = MF_{SiO2wet}$

Where:
MF_{wet}= The average pound per hour mass flow rate in the wet system vent
MW_{avg}= The average molecular weight of the gases in the wet vent header system
Conc.= The sum of the individual Concentrations in PPMv of all individual components in the wet vent that contain the Si atom. If an individual compound in the wet vent contains more than one Si Atom per molecule the concentration of the molecule must be multiplied by the number of Si atoms it has before it can be added to the sum)
$MW_{SiO2.}$= Molecular weight of SiO_2
$MF_{SiO2wet.}$= pound per hour mass flow rate of SiO_2 formed due to the combustion of the wet vent

IWS Volumetric Flow Rate;
The gas flow rate through the IWS is measured after the induced draft fan in the stack to the atmosphere. This flow rate is continuously recorded in PI. This flow rate is also used by the CEMs to calculate NOx emissions.

Verantis IWS Efficiency Data;
Verantis provided efficiency data for its two stage IWS 1000. The efficiencies of the IWS are dependent on flow rate through the IWS and the particulate loading to the IWS. Efficiency of the unit decreases as volumetric flow rate increases. Similarly, efficiency decreases as particulate loading increases. The efficiencies are listed in Table 1.

Table 1 Verantis Efficiency Data for their Two Stage IWS 1000

Si Loading, lb/hr	ACFM	SiO2 grain/min	Inlet gr/ACFM	Eff %	Outlet, gr/ACFM	Outlet lb/hr	Outlet lb/hr based on Verantis Efficiencies, 3 term eq, 0.0 intercept	Error
1	5000	117	0.0233	99.50%	0.0001	0.004	0.075	0.071
1	16000	117	0.0073	95.00%	0.0004	0.055	0.298	0.243
1	35000	117	0.0007	80.00%	0.0007	0.210	0.684	0.474
5	5000	583	0.1167	99.50%	0.0006	0.026	0.116	0.090
5	16000	583	0.0365	95.00%	0.0018	0.247	0.659	0.412
5	35000	583	0.0033	80.00%	0.0033	0.990	1.598	0.608
10	5000	1167	0.2333	99.50%	0.0012	0.051	0.166	0.115
10	16000	1167	0.0729	95.00%	0.0036	0.494	1.110	0.617
10	35000	1167	0.0067	80.00%	0.0067	2.010	2.741	0.731
20	5000	2333	0.4667	99.50%	0.0023	0.099	0.267	0.169
20	16000	2333	0.1458	94.60%	0.0079	1.083	2.012	0.929
20	35000	2333	0.0667	79.30%	0.0138	4.140	5.026	0.886
100	5000	11667	2.3333	99.00%	0.0233	0.999	1.077	0.079
100	16000	11667	0.7292	93.70%	0.0459	6.295	9.229	2.934
100	35000	11667	0.3333	78.62%	0.0713	21.390	23.310	1.920
150	5000	17500	3.5000	98.25%	0.0621	2.661	1.583	-1.078
150	16000	17500	1.0938	91.25%	0.0957	13.125	13.740	0.615
150	35000	17500	0.5000	76.50%	0.1173	35.190	34.738	-0.452

The Verantis data was fitted to an equation that relates SiO_2 particulate emission rate in lb/hr to the ACFM through the IWS and the SiO_2 particulate loading to the IWS. Minitab 16 Statistical software was used to derive this equation:

Verantis Equation

3 Term Eq, 0:0 Intercept

```
Outlet lb/hr=1.30e-005*(ACFM) - 0.0263*(Si Loading, lb/hr) + 7.28e-006*(ACFM)*(Si
Loading, lb/hr)
```

R2(adj)=99.3%

Figure 1 – Plot of Verantis Efficiencies

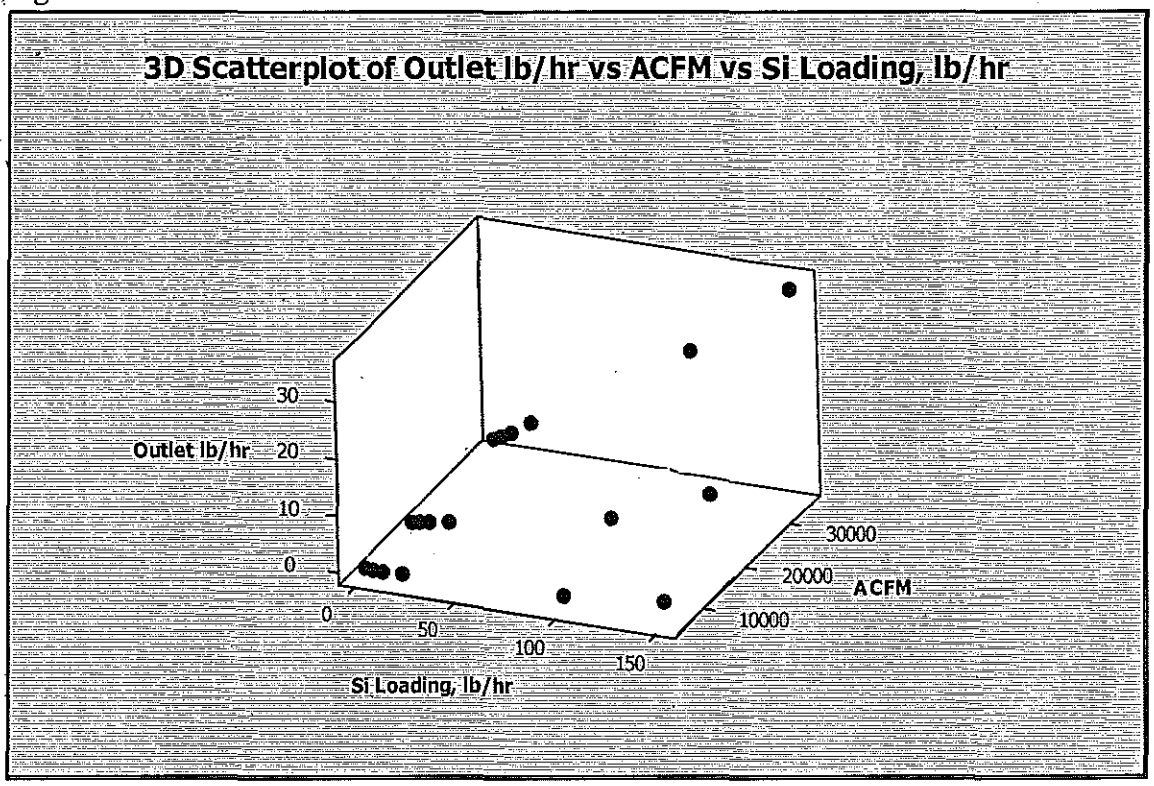
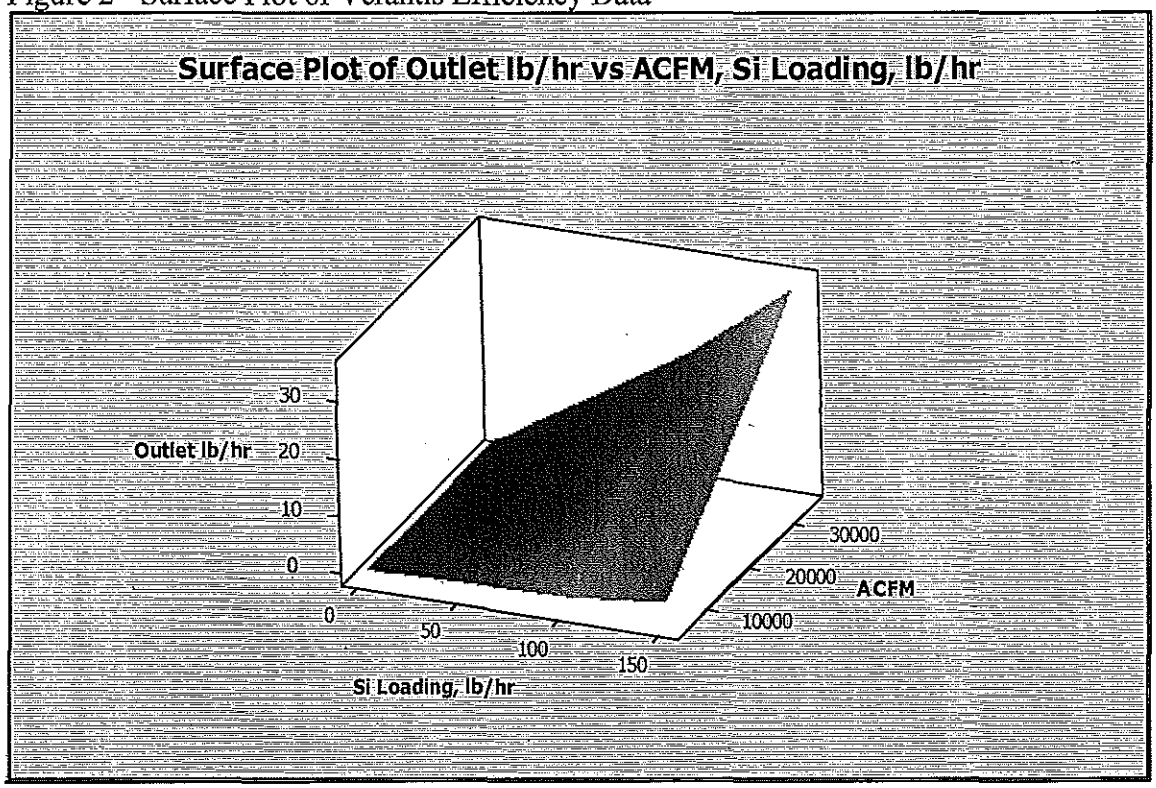


Figure 2 - Surface Plot of Verantis Efficiency Data



Using the "Verantis Equation" above, particulate emissions can be determined using the one hour average stack flow rate recorded in PI and the SiO2 loading from the GC data also recorded in PI. The 12 month rolling emissions can then be calculated at the end of each calendar month using a PI Excel spreadsheet.

IWS Parametric Monitoring Parameters;

To achieve the removal efficiencies provided by Verantis, minimum secondary voltage between the plates and wires, minimum secondary current, minimum water flow rates to the packed sections, and minimum wash frequencies are maintained for each of the two IWS sections.

Table 2;

Parameter	Units	Minimum	Averaging Period
Secondary Voltage	kV	15	1.0 Hour
Secondary Current	mA	50	1.0 Hour
Packing recycle rate/stage	Gpm	324	1.0 Hour
Stage 1 Flush Cycle	hrs	2	NA
Stage 2 Flush Cycle	Hrs	4	NA

Verification of Verantis IWS Efficiencies;

The verification of the IWS removal efficiencies can be done annually via a three hour stack test. During the stack test, the SiO2 loading to the IWS and the ACFM through the IWS will be recorded. Stack test results will be compared to the particulate emissions predicted by the "Verantis Equation". Proper operation of the IWS is determined by the stack test results being less than or equal to the "Verantis Equation" result plus 10% of the "Verantis Equation" result.

Example:

- During a three hour test the average flow is 20,000 ACFM and the particulate loading via the GC's is 20 lb/hr.
- Plugging 20,000 ACFM and 20 lb/hr into the "Verantis Equation" predicts an emission rate of 2.65 lb/hr.

```
Outlet lb/hr=1.30e-005*(20,000)-0.0263*(20) + 7.28e-
006*(20,000)*(20)= 2.65 lb/hr
```

- The result of the stack test is a particulate emission rate of 2.85 lb/hr.
- Verantis Equation Result plus 10% = 2.65lb/hr + (0.10)*2.65 = 2.915 lb/hr
- The stack test emission rate of 2.85 lb/hr is less than the Verantis Equation rate plus 10% of 2.915 lb/hr.
- Conclusion: The Verantis Equation and proper operation of the IWS is verified.

FoxView 18WP03:18WP03 - DATA_CALCS

File 2512BLD Help

System | Process | Nov 13, 2013 02:21 PM

Rcvd by MDEQ-AQD on 11/13/13

Change Env | -1 | Overview | Scrubbers | Wet Vents | Dry Vents | Deaerator | Condensate | Caustic | BlowDown | Oxidizer | Boiler | Quencher | Absorber | IWS | Softeners | Data & Calcs | PEM Unit

2512 BUILDING DATA & CALCS

PREV DISP

HEAT INPUTS

NATURAL GAS	6.0 M.BTU
DRY VENTS	37.7 M.BTU
WET VENTS	0.0 M.BTU
2703 KET VENTS	0.0 M.BTU
TOTAL	43.8 M.BTU

NOX CALCS:	RATIO:	FLOW:
CURRENT	0.1004 #/MBTU	4.38 LB/HR
MINUTE AVG	0.0982 #/MBTU	4.31 LB/HR
HOURLY AVG	0.1209 #/MBTU	4.92 LB/HR
DAILY AVG	0.1481 #/MBTU	5.17 LB/HR
MONTHLY AVG	0.1144 #/MBTU	3.76 LB/HR

DRY VENT HEAT OF COMBUSTION	17419 BTU/LB
DRY VENT MOLECULAR WT	7.064 #/#MOL
DRY VENT DENSITY	0.0183 LB/FT3
DRY VENT TOTAL FLOW (SUM)	2066.2 LB/HR

DRY VENT GC DATA

HYDROCARBONS 11/13/2013 13:26:14		INERTS 11/13/2013 13:26:14	
HCL	157 PPMV	HYDROGEN	81.6 %
PROPENE	8092 PPMV	NITROGEN	19.0 %
HSICL3	691.9 PPMV	OXYGEN	0.00 %

DV GC TOTAL 102.3 %

TOTAL FLOWS DATA

Environmental Critical Data

A	IWS # 1 HOURLY AVG KV	25.7	KV	SPA
C	IWS # 1 HOURLY AVG MA	225	MA	SPA
B	IWS # 2 HOURLY AVG KV	23.4	KV	SPA
C	IWS # 2 HOURLY AVG MA	246	MA	SPA
D	IWS # 1 HOURLY AVG WASH	545	GPM	SPA
D	IWS # 2 HOURLY AVG WASH	532	GPM	SPA
E	AVERAGE RESIDENCE TIME	3.3	SEC	SPA
F	T25-103 HOURLY AVG FLOW	332	LBHR	SPA
	ON-LINE SCRUB C.W. FLOW 23709	77.4	GPM	SPA
	ON-LINE SCRUB REC FLOW 23709	108	GPM	SPA
G	CHAMB TEMP TT29150A AVG:15MIN	1937	DEGF	SPA
G	CHAMB TEMP TT29150B AVG:15MIN	1930	DEGF	SPA

WET VENT TOTAL FLOW (SUM) 424.8 LB/HR

WET VENT GC DATA

HYDROCARBONS 11/13/2013 13:24:47		INERTS 11/13/2013 13:24:47	
TOLUENE	11040 PPMV	ETHANE	0.0 %
METHANOL	5307 PPMV	METHANE	0.0 %
BENZENE	418 PPMV	NITROGEN	96.8 %
		OXYGEN	0.81 %

WV GC TOTAL 100.9 %

/opt/MP/2512BLD/DATA_CALCS.fdf Operator LP35 hst18a Overlays:0

44 to 51

DC 006020

FGTHROX Condition VI.12.f. - 720 hour average PM10 emission rate

	Particulate Emissions		
	Verantis Eq	Particualte Removal	Particulate Emissions 720 hour rolling average
Date	lbs/hr	Efficiency	lb/hr
01-Sep-13 00:00:00	0.5	91.9%	1.63
01-Sep-13 01:00:00	0.9	93.4%	1.63
01-Sep-13 02:00:00	0.9	93.3%	1.63
01-Sep-13 03:00:00	0.8	93.3%	1.63
01-Sep-13 04:00:00	0.6	92.9%	1.63
01-Sep-13 05:00:00	0.5	92.5%	1.63
01-Sep-13 06:00:00	0.4	90.9%	1.62
01-Sep-13 07:00:00	0.4	91.7%	1.62
01-Sep-13 08:00:00	0.8	93.2%	1.62
01-Sep-13 09:00:00	0.7	92.7%	1.62
01-Sep-13 10:00:00	0.7	92.7%	1.62
01-Sep-13 11:00:00	2.6	93.7%	1.62
01-Sep-13 12:00:00	2.9	93.9%	1.62
01-Sep-13 13:00:00	2.2	94.2%	1.62
01-Sep-13 14:00:00	0.7	93.0%	1.62
01-Sep-13 15:00:00	0.6	92.7%	1.62
01-Sep-13 16:00:00	0.5	92.8%	1.62
01-Sep-13 17:00:00	0.6	92.8%	1.62
01-Sep-13 18:00:00	1.3	93.7%	1.62
01-Sep-13 19:00:00	1.5	93.7%	1.62
01-Sep-13 20:00:00	0.5	92.6%	1.62
01-Sep-13 21:00:00	0.4	91.6%	1.62
01-Sep-13 22:00:00	0.4	91.6%	1.61
01-Sep-13 23:00:00	0.4	91.1%	1.61
02-Sep-13 00:00:00	0.5	90.9%	1.61
02-Sep-13 01:00:00	0.4	91.9%	1.61
02-Sep-13 02:00:00	0.5	91.7%	1.61
02-Sep-13 03:00:00	0.5	91.8%	1.61
02-Sep-13 04:00:00	0.4	90.6%	1.61
02-Sep-13 05:00:00	0.4	91.1%	1.61
02-Sep-13 06:00:00	1.1	93.6%	1.61
02-Sep-13 07:00:00	0.8	93.3%	1.61
02-Sep-13 08:00:00	0.5	91.8%	1.61
02-Sep-13 09:00:00	0.5	91.8%	1.61
02-Sep-13 10:00:00	0.9	92.6%	1.61
02-Sep-13 11:00:00	1.2	93.3%	1.60
02-Sep-13 12:00:00	2.9	92.9%	1.61
02-Sep-13 13:00:00	3.2	92.7%	1.61
02-Sep-13 14:00:00	2.3	92.9%	1.61
02-Sep-13 15:00:00	0.6	91.0%	1.61
02-Sep-13 16:00:00	0.5	90.8%	1.61
02-Sep-13 17:00:00	0.5	90.6%	1.61
02-Sep-13 18:00:00	0.5	90.9%	1.61
02-Sep-13 19:00:00	0.5	90.7%	1.61
02-Sep-13 20:00:00	0.5	90.6%	1.61
02-Sep-13 21:00:00	0.5	90.8%	1.61
02-Sep-13 22:00:00	0.5	90.6%	1.61
02-Sep-13 23:00:00	2.9	93.1%	1.61
03-Sep-13 00:00:00	3.7	93.2%	1.62

FGTHROX Condition VI.12.f. - 720 hour average PM10 emission rate

	Particulate Emissions		
	Verantis Eq	Particualte Removal	Particulate Emissions 720 hour rolling average
Date	lbs/hr	Efficiency	lb/hr
03-Sep-13 01:00:00	2.2	92.6%	1.62
03-Sep-13 02:00:00	0.6	90.3%	1.62
03-Sep-13 03:00:00	0.5	90.2%	1.62
03-Sep-13 04:00:00	0.5	90.5%	1.62
03-Sep-13 05:00:00	0.6	90.7%	1.62
03-Sep-13 06:00:00	0.6	91.7%	1.62
03-Sep-13 07:00:00	2.8	93.9%	1.62
03-Sep-13 08:00:00	0.7	92.5%	1.62
03-Sep-13 09:00:00	1.4	93.1%	1.62
03-Sep-13 10:00:00	2.6	94.1%	1.62
03-Sep-13 11:00:00	3.0	92.6%	1.62
03-Sep-13 12:00:00	5.1	92.7%	1.62
03-Sep-13 13:00:00	4.4	92.9%	1.62
03-Sep-13 14:00:00	3.0	92.7%	1.62
03-Sep-13 15:00:00	2.6	92.6%	1.62
03-Sep-13 16:00:00	1.4	93.0%	1.62
03-Sep-13 17:00:00	1.0	92.5%	1.62
03-Sep-13 18:00:00	0.9	91.4%	1.62
03-Sep-13 19:00:00	0.9	91.5%	1.62
03-Sep-13 20:00:00	0.8	90.5%	1.62
03-Sep-13 21:00:00	0.8	91.0%	1.62
03-Sep-13 22:00:00	0.7	91.4%	1.62
03-Sep-13 23:00:00	0.6	90.6%	1.62
04-Sep-13 00:00:00	0.6	90.6%	1.62
04-Sep-13 01:00:00	0.6	91.1%	1.62
04-Sep-13 02:00:00	0.6	90.6%	1.62
04-Sep-13 03:00:00	0.5	90.4%	1.62
04-Sep-13 04:00:00	0.8	91.6%	1.62
04-Sep-13 05:00:00	0.5	89.9%	1.62
04-Sep-13 06:00:00	0.5	91.5%	1.62
04-Sep-13 07:00:00	1.5	92.8%	1.62
04-Sep-13 08:00:00	0.3	93.0%	1.62
04-Sep-13 09:00:00	0.5	93.4%	1.61
04-Sep-13 10:00:00	0.6	93.1%	1.61
04-Sep-13 11:00:00	0.8	92.9%	1.61
04-Sep-13 12:00:00	0.6	92.7%	1.61
04-Sep-13 13:00:00	0.8	92.7%	1.60
04-Sep-13 14:00:00	1.6	94.1%	1.60
04-Sep-13 15:00:00	1.2	94.0%	1.60
04-Sep-13 16:00:00	0.9	93.8%	1.60
04-Sep-13 17:00:00	0.6	93.0%	1.60
04-Sep-13 18:00:00	0.7	93.2%	1.60
04-Sep-13 19:00:00	0.8	91.3%	1.60
04-Sep-13 20:00:00	0.4	91.6%	1.60
04-Sep-13 21:00:00	0.4	91.5%	1.60
04-Sep-13 22:00:00	0.4	91.8%	1.60
04-Sep-13 23:00:00	0.5	92.4%	1.60
05-Sep-13 00:00:00	0.5	92.7%	1.60
05-Sep-13 01:00:00	0.5	92.3%	1.59

FGTHROX Condition VI.12.f. - 720 hour average PM10 emission rate

	Particulate Emissions		
	Verantis Eq	Particualte Removal	Particulate Emissions 720 hour rolling average
Date	lbs/hr	Efficiency	lb/hr
05-Sep-13 02:00:00	0.6	92.1%	1.59
05-Sep-13 03:00:00	0.5	92.4%	1.59
05-Sep-13 04:00:00	0.5	92.0%	1.59
05-Sep-13 05:00:00	0.5	91.4%	1.59
05-Sep-13 06:00:00	0.5	90.7%	1.59
05-Sep-13 07:00:00	0.6	91.2%	1.59
05-Sep-13 08:00:00	0.5	90.1%	1.59
05-Sep-13 09:00:00	0.5	90.2%	1.59
05-Sep-13 10:00:00	0.5	90.7%	1.59
05-Sep-13 11:00:00	0.5	90.5%	1.59
05-Sep-13 12:00:00	0.4	90.9%	1.58
05-Sep-13 13:00:00	0.5	90.8%	1.57
05-Sep-13 14:00:00	0.4	91.5%	1.57
05-Sep-13 15:00:00	0.4	90.0%	1.57
05-Sep-13 16:00:00	0.5	92.6%	1.57
05-Sep-13 17:00:00	0.6	92.7%	1.56
05-Sep-13 18:00:00	0.6	91.4%	1.56
05-Sep-13 19:00:00	0.5	91.3%	1.56
05-Sep-13 20:00:00	0.4	91.0%	1.56
05-Sep-13 21:00:00	0.4	90.1%	1.56
05-Sep-13 22:00:00	0.4	89.9%	1.56
05-Sep-13 23:00:00	0.4	88.8%	1.56
06-Sep-13 00:00:00	0.4	87.5%	1.56
06-Sep-13 01:00:00	0.4	87.2%	1.56
06-Sep-13 02:00:00	0.4	87.6%	1.56
06-Sep-13 03:00:00	0.4	87.8%	1.56
06-Sep-13 04:00:00	0.4	87.7%	1.56
06-Sep-13 05:00:00	0.5	89.6%	1.56
06-Sep-13 06:00:00	0.4	89.5%	1.55
06-Sep-13 07:00:00	0.3	88.9%	1.55
06-Sep-13 08:00:00	0.4	90.1%	1.55
06-Sep-13 09:00:00	0.3	89.3%	1.55
06-Sep-13 10:00:00	0.3	89.1%	1.55
06-Sep-13 11:00:00	0.1	97.0%	1.55
06-Sep-13 12:00:00	0.0	100.0%	1.54
06-Sep-13 13:00:00			Annual Shutdown Started
20-Sep-13 09:00:00			Shutdown Completed
20-Sep-13 10:00:00	0.5	95.1%	1.47
20-Sep-13 11:00:00	0.3	97.1%	1.46
20-Sep-13 12:00:00	0.3	97.6%	1.46
20-Sep-13 13:00:00	0.3	97.0%	1.45
20-Sep-13 14:00:00	0.3	96.8%	1.44
20-Sep-13 15:00:00	0.5	95.8%	1.43
20-Sep-13 16:00:00	0.5	96.9%	1.43
20-Sep-13 17:00:00	0.9	97.2%	1.42
20-Sep-13 18:00:00	0.5	97.7%	1.42
20-Sep-13 19:00:00	0.3	97.0%	1.42
20-Sep-13 20:00:00	0.3	96.7%	1.41
20-Sep-13 21:00:00	0.4	96.5%	1.41

FGTHROX Condition VI.12.f. - 720 hour average PM10 emission rate

	Particulate Emissions		
	Verantis Eq	Particualte Removal	Particulate Emissions 720 hour rolling average
Date	lbs/hr	Efficiency	lb/hr
20-Sep-13 22:00:00	0.3	96.4%	1.41
20-Sep-13 23:00:00	0.4	96.2%	1.41
21-Sep-13 00:00:00	0.4	96.3%	1.41
21-Sep-13 01:00:00	0.4	95.9%	1.41
21-Sep-13 02:00:00	0.4	95.7%	1.41
21-Sep-13 03:00:00	0.6	95.6%	1.41
21-Sep-13 04:00:00	0.4	95.0%	1.41
21-Sep-13 05:00:00	0.4	95.4%	1.41
21-Sep-13 06:00:00	0.4	95.3%	1.41
21-Sep-13 07:00:00	0.5	95.0%	1.41
21-Sep-13 08:00:00	0.5	95.2%	1.40
21-Sep-13 09:00:00	0.5	95.1%	1.40
21-Sep-13 10:00:00	0.5	95.1%	1.40
21-Sep-13 11:00:00	0.5	95.5%	1.40
21-Sep-13 12:00:00	0.5	95.2%	1.40
21-Sep-13 13:00:00	0.6	94.7%	1.40
21-Sep-13 14:00:00	0.7	94.3%	1.39
21-Sep-13 15:00:00	1.5	94.9%	1.38
21-Sep-13 16:00:00	0.6	94.0%	1.37
21-Sep-13 17:00:00	0.6	93.8%	1.35
21-Sep-13 18:00:00	0.6	94.1%	1.34
21-Sep-13 19:00:00	0.6	93.4%	1.34
21-Sep-13 20:00:00	0.7	93.9%	1.33
21-Sep-13 21:00:00	0.6	93.8%	1.32
21-Sep-13 22:00:00	0.6	93.6%	1.32
21-Sep-13 23:00:00	0.6	93.9%	1.32
22-Sep-13 00:00:00	0.6	93.8%	1.32
22-Sep-13 01:00:00	0.6	93.6%	1.31
22-Sep-13 02:00:00	0.6	93.7%	1.31
22-Sep-13 03:00:00	0.5	94.0%	1.31
22-Sep-13 04:00:00	0.7	94.5%	1.31
22-Sep-13 05:00:00	0.5	93.8%	1.31
22-Sep-13 06:00:00	0.5	93.6%	1.31
22-Sep-13 07:00:00	0.5	93.8%	1.30
22-Sep-13 08:00:00	0.5	94.1%	1.30
22-Sep-13 09:00:00	0.6	94.4%	1.30
22-Sep-13 10:00:00	0.5	95.6%	1.30
22-Sep-13 11:00:00	0.5	94.8%	1.30
22-Sep-13 12:00:00	0.6	94.3%	1.30
22-Sep-13 13:00:00	0.7	93.9%	1.29
22-Sep-13 14:00:00	0.6	94.0%	1.28
22-Sep-13 15:00:00	0.6	94.0%	1.27
22-Sep-13 16:00:00	0.6	94.3%	1.26
22-Sep-13 17:00:00	0.6	94.5%	1.26
22-Sep-13 18:00:00	0.6	94.3%	1.25
22-Sep-13 19:00:00	0.7	94.6%	1.25
22-Sep-13 20:00:00	0.8	94.9%	1.25
22-Sep-13 21:00:00	1.2	95.2%	1.25
22-Sep-13 22:00:00	0.7	94.6%	1.25

FGTHROX Condition VI.12.f. - 720 hour average PM10 emission rate

	Particulate Emissions		
	Verantis Eq	Particualte Removal	Particulate Emissions 720 hour rolling average
Date	lbs/hr	Efficiency	lb/hr
22-Sep-13 23:00:00	0.7	94.4%	1.25
23-Sep-13 00:00:00	0.6	94.0%	1.24
23-Sep-13 01:00:00	0.6	93.9%	1.24
23-Sep-13 02:00:00	0.6	94.1%	1.24
23-Sep-13 03:00:00	1.0	94.8%	1.24
23-Sep-13 04:00:00	0.8	94.6%	1.24
23-Sep-13 05:00:00	0.6	93.9%	1.24
23-Sep-13 06:00:00	0.6	93.9%	1.24
23-Sep-13 07:00:00	0.6	93.8%	1.24
23-Sep-13 08:00:00	0.7	94.2%	1.24
23-Sep-13 09:00:00	0.6	94.2%	1.24
23-Sep-13 10:00:00	0.5	93.6%	1.24
23-Sep-13 11:00:00	0.6	94.0%	1.24
23-Sep-13 12:00:00	0.5	93.8%	1.23
23-Sep-13 13:00:00	0.6	94.2%	1.23
23-Sep-13 14:00:00	1.0	95.0%	1.23
23-Sep-13 15:00:00	1.1	94.8%	1.22
23-Sep-13 16:00:00	1.1	94.7%	1.20
23-Sep-13 17:00:00	0.6	94.2%	1.18
23-Sep-13 18:00:00	1.3	95.0%	1.17
23-Sep-13 19:00:00	1.5	94.8%	1.17
23-Sep-13 20:00:00	1.4	94.9%	1.16
23-Sep-13 21:00:00	1.0	94.8%	1.16
23-Sep-13 22:00:00	0.9	94.7%	1.16
23-Sep-13 23:00:00	0.9	94.6%	1.16
24-Sep-13 00:00:00	0.9	94.4%	1.16
24-Sep-13 01:00:00	1.0	94.6%	1.16
24-Sep-13 02:00:00	1.0	94.6%	1.16
24-Sep-13 03:00:00	1.0	94.6%	1.16
24-Sep-13 04:00:00	0.9	94.3%	1.16
24-Sep-13 05:00:00	1.6	94.3%	1.16
24-Sep-13 06:00:00	0.5	93.2%	1.16
24-Sep-13 07:00:00	0.3	91.2%	1.16
24-Sep-13 08:00:00	0.3	91.6%	1.16
24-Sep-13 09:00:00	0.3	91.9%	1.16
24-Sep-13 10:00:00	0.7	93.6%	1.16
24-Sep-13 11:00:00	0.7	93.7%	1.15
24-Sep-13 12:00:00	0.9	93.4%	1.14
24-Sep-13 13:00:00	1.2	93.6%	1.12
24-Sep-13 14:00:00	1.3	93.5%	1.12
24-Sep-13 15:00:00	1.4	93.5%	1.10
24-Sep-13 16:00:00	0.9	93.6%	1.08
24-Sep-13 17:00:00	1.5	93.4%	1.07
24-Sep-13 18:00:00	1.2	94.4%	1.06
24-Sep-13 19:00:00	0.8	94.0%	1.06
24-Sep-13 20:00:00	0.6	92.9%	1.06
24-Sep-13 21:00:00	0.5	92.6%	1.06
24-Sep-13 22:00:00	0.4	91.9%	1.06
24-Sep-13 23:00:00	0.4	91.1%	1.05

FGTHROX Condition VI.12.f. - 720 hour average PM10 emission rate

	Particulate Emissions		
	Verantis Eq	Particualte Removal	Particulate Emissions 720 hour rolling average
Date	lbs/hr	Efficiency	lb/hr
25-Sep-13 00:00:00	0.3	90.6%	1.05
25-Sep-13 01:00:00	0.3	90.2%	1.05
25-Sep-13 02:00:00	0.3	90.6%	1.05
25-Sep-13 03:00:00	0.3	90.0%	1.05
25-Sep-13 04:00:00	0.5	92.3%	1.04
25-Sep-13 05:00:00	0.5	92.1%	1.04
25-Sep-13 06:00:00	0.4	91.0%	1.04
25-Sep-13 07:00:00	0.5	91.5%	1.04
25-Sep-13 08:00:00	0.4	90.0%	1.04
25-Sep-13 09:00:00	0.9	89.2%	1.04
25-Sep-13 10:00:00	0.5	91.3%	1.03
25-Sep-13 11:00:00	0.9	92.3%	1.02
25-Sep-13 12:00:00	1.1	91.8%	1.02
25-Sep-13 13:00:00	0.9	92.4%	1.02
25-Sep-13 14:00:00	0.8	93.3%	1.01
25-Sep-13 15:00:00	0.8	94.0%	1.01
25-Sep-13 16:00:00	0.8	94.1%	1.01
25-Sep-13 17:00:00	0.4	92.9%	1.01
25-Sep-13 18:00:00	0.3	92.4%	1.00
25-Sep-13 19:00:00	0.4	92.3%	1.00
25-Sep-13 20:00:00	0.3	90.8%	1.00
25-Sep-13 21:00:00	0.4	92.7%	1.00
25-Sep-13 22:00:00	0.4	92.2%	1.00
25-Sep-13 23:00:00	0.3	91.8%	1.00
26-Sep-13 00:00:00	0.5	93.0%	0.99
26-Sep-13 01:00:00	0.6	93.3%	0.99
26-Sep-13 02:00:00	0.6	93.6%	0.99
26-Sep-13 03:00:00	0.5	93.2%	0.99
26-Sep-13 04:00:00	0.6	93.2%	0.99
26-Sep-13 05:00:00	0.5	93.0%	0.99
26-Sep-13 06:00:00	0.5	92.9%	0.99
26-Sep-13 07:00:00	0.6	93.3%	0.99
26-Sep-13 08:00:00	0.3	91.8%	0.99
26-Sep-13 09:00:00	0.3	90.5%	0.98
26-Sep-13 10:00:00	0.3	91.9%	0.98
26-Sep-13 11:00:00	0.6	94.1%	0.98
26-Sep-13 12:00:00	1.1	94.4%	0.98
26-Sep-13 13:00:00	0.7	93.9%	0.98
26-Sep-13 14:00:00	0.3	93.4%	0.98
26-Sep-13 15:00:00	0.3	94.3%	0.98
26-Sep-13 16:00:00	0.4	93.6%	0.97
26-Sep-13 17:00:00	0.6	94.1%	0.97
26-Sep-13 18:00:00	0.9	94.0%	0.97
26-Sep-13 19:00:00	0.5	93.6%	0.97
26-Sep-13 20:00:00	0.3	91.5%	0.96
26-Sep-13 21:00:00	0.3	90.7%	0.96
26-Sep-13 22:00:00	0.3	90.2%	0.96
26-Sep-13 23:00:00	0.5	92.6%	0.96
27-Sep-13 00:00:00	0.8	93.8%	0.96

FGTHROX Condition VI.12.f. - 720 hour average PM10 emission rate

	Particulate Emissions		
	Verantis Eq	Particualte Removal	Particulate Emissions 720 hour rolling average
Date	lbs/hr	Efficiency	lb/hr
27-Sep-13 01:00:00	0.8	93.8%	0.96
27-Sep-13 02:00:00	0.5	92.9%	0.96
27-Sep-13 03:00:00	0.5	92.4%	0.95
27-Sep-13 04:00:00	0.4	92.5%	0.95
27-Sep-13 05:00:00	0.6	92.9%	0.94
27-Sep-13 06:00:00	0.6	93.2%	0.94
27-Sep-13 07:00:00	0.5	92.6%	0.93
27-Sep-13 08:00:00	0.3	90.0%	0.93
27-Sep-13 09:00:00	0.3	89.5%	0.93
27-Sep-13 10:00:00	0.3	91.3%	0.93
27-Sep-13 11:00:00	0.4	91.4%	0.93
27-Sep-13 12:00:00	1.0	94.7%	0.93
27-Sep-13 13:00:00	1.3	94.6%	0.93
27-Sep-13 14:00:00	1.0	93.8%	0.92
27-Sep-13 15:00:00	0.7	93.5%	0.91
27-Sep-13 16:00:00	1.6	94.5%	0.91
27-Sep-13 17:00:00	1.0	94.1%	0.90
27-Sep-13 18:00:00	0.5	93.7%	0.90
27-Sep-13 19:00:00	0.3	91.5%	0.89
27-Sep-13 20:00:00	0.3	91.3%	0.89
27-Sep-13 21:00:00	0.3	91.1%	0.89
27-Sep-13 22:00:00	0.3	91.0%	0.89
27-Sep-13 23:00:00	0.6	93.2%	0.88
28-Sep-13 00:00:00	1.0	94.1%	0.88
28-Sep-13 01:00:00	0.8	94.1%	0.88
28-Sep-13 02:00:00	0.8	93.8%	0.88
28-Sep-13 03:00:00	0.9	94.0%	0.88
28-Sep-13 04:00:00	0.8	93.7%	0.88
28-Sep-13 05:00:00	0.6	93.6%	0.88
28-Sep-13 06:00:00	0.7	93.7%	0.87
28-Sep-13 07:00:00	1.0	94.0%	0.87
28-Sep-13 08:00:00	0.8	94.0%	0.87
28-Sep-13 09:00:00	0.4	93.1%	0.87
28-Sep-13 10:00:00	0.5	93.1%	0.87
28-Sep-13 11:00:00	0.8	94.2%	0.87
28-Sep-13 12:00:00	0.4	92.7%	0.87
28-Sep-13 13:00:00	0.4	93.3%	0.86
28-Sep-13 14:00:00	0.7	94.4%	0.84
28-Sep-13 15:00:00	0.9	94.2%	0.83
28-Sep-13 16:00:00	0.7	93.8%	0.83
28-Sep-13 17:00:00	0.5	93.0%	0.83
28-Sep-13 18:00:00	0.5	93.2%	0.83
28-Sep-13 19:00:00	0.6	93.1%	0.82
28-Sep-13 20:00:00	0.4	91.7%	0.81
28-Sep-13 21:00:00	0.5	92.4%	0.81
28-Sep-13 22:00:00	0.7	93.3%	0.81
28-Sep-13 23:00:00	0.7	93.8%	0.81
29-Sep-13 00:00:00	0.6	93.5%	0.81
29-Sep-13 01:00:00	0.6	93.1%	0.81

FGTHROX Condition VI.12.f. - 720 hour average PM10 emission rate

	Particulate Emissions		
	Verantis Eq	Particualte Removal	Particulate Emissions 720 hour rolling average
Date	lbs/hr	Efficiency	lb/hr
29-Sep-13 02:00:00	0.8	93.2%	0.81
29-Sep-13 03:00:00	0.6	92.4%	0.80
29-Sep-13 04:00:00	0.9	92.6%	0.80
29-Sep-13 05:00:00	1.0	93.6%	0.80
29-Sep-13 06:00:00	0.6	93.7%	0.80
29-Sep-13 07:00:00	0.4	92.5%	0.80
29-Sep-13 08:00:00	0.5	91.6%	0.80
29-Sep-13 09:00:00	0.4	92.5%	0.79
29-Sep-13 10:00:00	0.5	92.7%	0.79
29-Sep-13 11:00:00	0.7	93.8%	0.79
29-Sep-13 12:00:00	1.3	94.1%	0.79
29-Sep-13 13:00:00	0.7	94.1%	0.77
29-Sep-13 14:00:00	0.4	93.3%	0.75
29-Sep-13 15:00:00	0.4	91.9%	0.75
29-Sep-13 16:00:00	0.6	93.8%	0.74
29-Sep-13 17:00:00	0.6	93.8%	0.74
29-Sep-13 18:00:00	0.6	93.7%	0.73
29-Sep-13 19:00:00	0.5	93.1%	0.72
29-Sep-13 20:00:00	0.5	92.1%	0.72
29-Sep-13 21:00:00	0.3	90.9%	0.72
29-Sep-13 22:00:00	0.4	91.9%	0.72
29-Sep-13 23:00:00	0.3	90.6%	0.72
30-Sep-13 00:00:00	0.3	91.0%	0.72
30-Sep-13 01:00:00	0.3	91.1%	0.72
30-Sep-13 02:00:00	0.4	91.9%	0.72
30-Sep-13 03:00:00	0.3	91.3%	0.72
30-Sep-13 04:00:00	0.3	91.5%	0.72
30-Sep-13 05:00:00	0.6	93.3%	0.72
30-Sep-13 06:00:00	0.9	93.7%	0.72
30-Sep-13 07:00:00	0.7	93.7%	0.72
30-Sep-13 08:00:00	0.3	91.9%	0.72
30-Sep-13 09:00:00	0.3	91.4%	0.72
30-Sep-13 10:00:00	0.3	91.0%	0.72
30-Sep-13 11:00:00	0.3	91.1%	0.72
30-Sep-13 12:00:00	0.3	92.0%	0.72
30-Sep-13 13:00:00	0.4	92.7%	0.71
30-Sep-13 14:00:00	0.6	93.5%	0.72
30-Sep-13 15:00:00	0.4	94.6%	0.71
30-Sep-13 16:00:00	0.4	92.9%	0.71
30-Sep-13 17:00:00	0.4	93.9%	0.71
30-Sep-13 18:00:00	0.4	93.5%	0.71
30-Sep-13 19:00:00	0.6	93.7%	0.71
30-Sep-13 20:00:00	0.4	92.9%	0.71
30-Sep-13 21:00:00	0.4	92.4%	0.71
30-Sep-13 22:00:00	0.4	92.5%	0.71
30-Sep-13 23:00:00	0.3	92.2%	0.71

FGTHROX Fuel Use:

Daily for Sept 2013

Sep-13	Daily Avg NG Flow SCFM	Daily Total NG Flow SCF
01-Sep-13 00:00:00	102.039111	146936.3205
02-Sep-13 00:00:00	102.054191	146958.0343
03-Sep-13 00:00:00	104.593513	150614.6591
04-Sep-13 00:00:00	106.210545	152943.1843
05-Sep-13 00:00:00	105.182064	151462.1724
06-Sep-13 00:00:00	116.091191	167171.3152
07-Sep-13 00:00:00	19.9914081	28787.62762
08-Sep-13 00:00:00	0.52531219	756.4495522
09-Sep-13 00:00:00	0.67701941	974.9079482
10-Sep-13 00:00:00	0.88237559	1270.620849
11-Sep-13 00:00:00	0.87096651	1254.191777
12-Sep-13 00:00:00	0.54664071	787.1626246
13-Sep-13 00:00:00	0.19213	276.6671968
14-Sep-13 00:00:00	0.37641466	542.0371062
15-Sep-13 00:00:00	0.39070314	562.612524
16-Sep-13 00:00:00	0.22277766	320.7998305
17-Sep-13 00:00:00	0.4588983	660.8135544
18-Sep-13 00:00:00	0.55939356	805.5267287
19-Sep-13 00:00:00	50.7665806	73103.87612
20-Sep-13 00:00:00	188.46003	271382.4434
21-Sep-13 00:00:00	102.037325	146933.7478
22-Sep-13 00:00:00	102.04054	146938.3781
23-Sep-13 00:00:00	102.02927	146922.1483
24-Sep-13 00:00:00	102.174793	147131.702
25-Sep-13 00:00:00	107.461297	154744.2678
26-Sep-13 00:00:00	107.759945	155174.3201
27-Sep-13 00:00:00	107.141702	154284.0513
28-Sep-13 00:00:00	104.406423	150345.2492
29-Sep-13 00:00:00	108.214387	155828.7173
30-Sep-13 00:00:00	103.107947	148475.4435

Monthly for 2013 (YTD)

Month	SCF NG	lbs. NG	Capacity Factor (%)
Jan-13	5,379,342	222,974	7.991382693
Feb-13	4,382,387	181,650	7.20787343
Mar-13	4,741,591	196,539	7.043959799
Apr-13	4,738,967	196,430	7.274730454
May-13	4,617,965	191,415	6.860304129
Jun-13	4,218,204	174,845	6.475312903
Jul-13	5,172,747	214,410	7.684470803
Aug-13	4,780,675	198,159	7.102020734
Sep-13	2,804,349	116,240	4.304922398
Oct-13	4,908,116	203,441	7.291343695
Nov-13			
Dec-13			
2013 total	45,744,343	1,896,103	

November 14, 2013

FGTHROX 12-month Rolling Time Period			
	CO (lbs)	NOx (lbs)	PM10 (lbs)
12-Oct	118.5	3448.8	613
12-Nov	127.4	2054.6	559.6
12-Dec	132.3	2091.7	1035.8
13-Jan	130.5	2088.7	512.9
13-Feb	121	2196.4	465
13-Mar	133.9	2126.1	759.8
13-Apr	124.9	2278.7	696.2
13-May	133.8	3091.6	827
13-Jun	112.1	2583.9	930.7
13-Jul	133.8	2886.1	1318.6
13-Aug	133.9	3337.7	788.4
13-Sep	69.3	1345.1	282.1
Lbs/yr	1471.4	29529.4	8789.1
TPY	0.74	14.76	4.39

Rcvd by MDEQ-AQD on 11/19/13

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FGTHROX Condition VI.12.g. - PM10 emission rate in lb/month due to EU2703-06, EU2703-07, EU2793-08, EU2703-09 and EU2703-13

Emission Unit	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13
EU2703-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1	0	0.3
EU2703-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2	0	0.1
EU2703-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	0
EU2703-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.3	0	0.3
EU2703-13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.6	7.2	2.5

Note 1: Data units are lbs/month.
Note 2: Building 2703 started using the line to Throx in August, 2013.

Benzene fed to Site Scrubbers on September 7, 2013, during Throx Maintenance Shutdown			
	Benzene		
Date	flow (dry) lb/hr	flow (wet) lbs/hr	flow Total lbs/hr
07-Sep-13 00:00:00	0.3	0.0	0.3
07-Sep-13 01:00:00	0.3	0.0	0.3
07-Sep-13 02:00:00	0.3	0.0	0.3
07-Sep-13 03:00:00	0.3	0.0	0.3
07-Sep-13 04:00:00	0.3	0.0	0.3
07-Sep-13 05:00:00	0.3	0.0	0.3
07-Sep-13 06:00:00	0.3	0.0	0.3
07-Sep-13 07:00:00	0.3	0.0	0.3
07-Sep-13 08:00:00	0.3	0.0	0.3
07-Sep-13 09:00:00	0.2	0.0	0.2
07-Sep-13 10:00:00	0.2	0.0	0.2
07-Sep-13 11:00:00	0.2	0.0	0.2
07-Sep-13 12:00:00	0.3	0.0	0.3
07-Sep-13 13:00:00	0.3	0.0	0.3
07-Sep-13 14:00:00	0.3	0.0	0.3
07-Sep-13 15:00:00	0.3	0.0	0.3
07-Sep-13 16:00:00	0.2	0.0	0.2
07-Sep-13 17:00:00	0.4	0.0	0.4
07-Sep-13 18:00:00	0.3	0.0	0.3
07-Sep-13 19:00:00	0.3	0.0	0.3
07-Sep-13 20:00:00	0.3	0.0	0.3
07-Sep-13 21:00:00	0.3	0.0	0.3
07-Sep-13 22:00:00	0.3	0.0	0.3
07-Sep-13 23:00:00	0.3	0.0	0.3

DOW CORNING

May 20, 2009

Certified No: 7007 1490 0003 6775 6273

Mr. Chris Hare
Air Quality Division
Department of Environmental Quality
Saginaw Bay District Headquarters
401 Ketchum St. Suite B
Bay City, MI 48708

Subject: Preventative Maintenance and Malfunction Abatement Plan for FGSITESCRUBBERS

Dear Mr. Hare:

Dow Corning would like to modify the MAP for FGSITESCRUBBERS to have some flexibility in how we run the scrubbers in stand-by. The MAP currently specifies the scrubber to operate with a total flow in stand-by of 40gpm; specifically stating 20gpm to the top spray section and 20gpm to the bottom baffle section. We would like the flexibility, in stand-by, to run the scrubber flow in re-circulate. This would greatly reduce our city water usage while in stand-by operation. We would still achieve the minimum 40gpm, but it would be mostly to the bottom section with recycle water.

I have enclosed the proposed MAP with the changes described above.

If you have any questions, please contact me by e-mail at l.olson-perry@dowcorning.com or by phone at 989-496-5305.

Sincerely,

Leah Olson-Perry

Leah Olson-Perry
Air Quality Engineer
Environmental Services Mail #065
Dow Corning Corporation
P.O. Box 995
Midland, MI 48686

Enclosure

EVS DOCUMENT
Title: MAP SITE SCRUBBER

Document Type:	Midland Plant Guidelines
Document Sub-Class:	EVS Air
Document Number:	0052.GUIDE.EVSAIR.00011
Version Number: (manual entry)	1.1

Preventative Maintenance
and
Malfunction Abatement Plan

Emission Control System
FGSITESCRUBBERS
2514 Building

Dow Corning
Midland, Michigan

October 2007 (Updated January 12, 2009)
(Updated May 19, 2009)

Dow Corning Preventative Maintenance and Malfunction Abatement Plan Site Scrubbers – Back up control equipment

Introduction

Dow Corning recently received a PTI to add a thermal oxidizer as control for numerous on-site processes. This PTI also allow Dow Corning to install backup scrubbers for use when the thermal oxidizer is non-operational. The State has required Dow Corning to generate a Malfunction Abatement Plan to assist Dow Corning in maintaining the operability of the existing emission control system. This plan is described in Rule 911(2) of Section R-336.1910 in the "Michigan Air Pollution Control Commission General Rules."

Preventative Maintenance and Malfunction Abatement Plan Site Scrubbers – Back up control equipment

Air Pollution Control Equipment

Dow Corning is installing a thermal oxidizer that will control various process vents with a minimum destruction efficiency of 98%. When the thermal oxidizer goes down for maintenance or an emergency, the vents are automatically switched over to the site scrubber system. This scrubber system consists of two separate spray towers which can operate individually or together in parallel. The two parallel scrubber systems are 36" in diameter and 36' tall constructed of FRP. The top section of the scrubber contains 12 spray nozzles 1' apart which are fed with fresh city water. The bottom section contains 6 baffle trays about 1' apart and is fed recycled water from an in-ground containment tank. The liquid effluent flows out the bottom of the scrubber to the in-ground containment tank which overflows to the Chemical Sewer. A pump is used to circulate the water from the containment tanks to the baffled section of the scrubber. The total water flow to the scrubber will be a minimum of 100 gpm when venting to the scrubber occurs and 40 gpm when the scrubber is on stand-by. Depending on the vent load and composition, the spray tower section has a minimum flow setting of 50 gpm and the baffle system has a minimum flow setting of 50 gpm. When vents are directed to one of the FGSITESCRUBBERS, the scrubber will obtain the 100 gpm minimum flow rate within 15 minutes of taking vents. Process vents enter the scrubber near the bottom and flow upward against the downflowing water. At the top of the scrubber is a 4'6" x 9' expanded head to slow down the gas velocity to reduce entrainment. The vents exit the top of the scrubber through a 10" carbon steel pipe which reduces down to 6" to increase velocity and improve dispersion. Normally only one scrubber is operational while the other unit is being cleaned or on stand-by. Both the fresh city water and the recycle feeds are monitored using inline flow meters that are on a preventative maintenance schedule to assure proper operation.

These scrubbers have a design removal efficiency of 99.4% for HCl and chlorosilanes. Methanol, Ethanol and IPA have a removal efficiency of 90%.

EVS DOCUMENT
Title: MAP SITE SCRUBBER

Dow Corning Preventive Maintenance and

Malfunction Abatement Plan

Site Scrubbers – Backup control Equipment

Table 1 – Control system summary

Control System No.	Control System Description	Description of Vapor Sources
1	Two identical water spray towers	Consolidated process vents which are taken from wide variety of process units

Table 2 – Pollution Control System Operating Variables

Control System No.	Control Equipment	Operating Variable	Monitoring Method	Frequency	Normal Operating Range	Corrective Procedure or Operational Change in the Event of a Malfunction	Responsible Supervisor
1	Site Scrubbers	Flow rate to both the top and bottom sections	Flow meter	Continuously – every 15 minutes	Greater than 50gpm to each section when handling emissions and greater than 40gpm total flow when on standby	If the flow drops off or the tower begins to plug then the back-up scrubber needs to be brought online. If both of them go down the buildings need to revert back to their old control schemes.	The Site Scrubber / Throx supervisor

Table 3 – Preventative Maintenance Summary

Control System No.	Device Description	Equipment No. or Name	Preventative Maintenance Task	Frequency	Responsible Supervisory Personnel
1	East Site Scrubber	23709	Calibrate Flow meters FE/FT-24095 FE/FT-24096	Annually	The Site Scrubber / Throx supervisor
2	West Site Scrubber	23710	Calibrate Flow meters FE/FT-24105 FE/FT-24106	Annually	The Site Scrubber / Throx supervisor

Table 4 – Maintenance Spare Parts Summary

Control System No.	Spare Parts
1	Scrubber spray nozzles, CW pump parts, Sump pump parts
2	Scrubber spray nozzles, CW pump parts, Sump pump parts

EVS DOCUMENTS
Title: THROX MAP PLAN

Document Type:	Midland Plant Guidelines
Document Sub-Class:	EVS Air
Document Number:	0052.GUIDE.EVSAIR.00010
Version Number: (manual entry)	1.1

Preventative Maintenance
and
Malfunction Abatement Plan

Emission Control System
FGTHROX
2512/2514 Building

Dow Corning
Midland, Michigan

April 2009-
(Updated April 25, 2013)

Dow Corning Preventative Maintenance and Malfunction Abatement Plan THROX – Primary control equipment

Introduction

In 2008, Dow Corning received a PTI to add a thermal oxidizer as control for numerous on-site processes. This PTI also allowed Dow Corning to install backup scrubbers for use when the thermal oxidizer is non-operational. Dow Corning currently operates the thermal oxidizer and backup scrubbers under a renewable air operating permit number A4043-2008. The State has required Dow Corning to generate a Malfunction Abatement Plan to assist Dow Corning in maintaining the operability of the existing emission control system. This plan is described in Rule 911(2) of Section R-336.1911 in the "Michigan Air Pollution Control Commission General Rules."

Preventative Maintenance and Malfunction Abatement Plan FGTHROX

Air Pollution Control Equipment

Dow Corning installed, under Permit 91-07B, a thermal oxidizer and a site wide scrubber system. The thermal oxidizer controls various process vents with a minimum VOC destruction efficiency of 98%. This air permit allows chemical processes, which vent emissions to FGTHROX or FGSITESCRUBBER, to either bypass or operate their primary control devices outside of the ranges specified in their individual EU and FG tables when the FGTHROX or FGSCRUBBER is operating properly. This section of the malfunction abatement plan (MAP) specifies what should happen to the emissions from the vents routed to the thermal oxidizer when the thermal oxidizer goes down for maintenance or an emergency. During FGTHROX shutdown, most of the vents are automatically switched over to the one of the two scrubbers that make-up the FGSITESCRUBBER system. This plan also addresses what happens if both the FGTHROX and FGSITESCRUBBERS systems are down at the same time. Below are detailed descriptions of what will happen to each individual vent that make up FGSITEBLOWER when the FGTHROX goes down and what happens when both the FGTHROX and the FGSITESCRUBBER systems are not operational.

(SV2703-011)

When FGTHROX is down, emissions from vent SV2703-011 will be routed to the listed control device operating as allowed in ROP Table EU2703-03. The emissions will then be vented directly to the atmosphere or the process will be shut down. Emissions from the SV2703-11 vent will not be sent to FGSITESCRUBBERS.

(SV2703-002, -004, -005, -006, -007, -039, -052)

When FGTHROX is down, emissions from vents originating from the following processes: EU2703-06, EU2703-07, EU2703-09, EU2703-13, will be routed to building specific control equipment identified in the Rule 290 documentation, and then to the atmosphere or the process will be shutdown.

(SV303-050)

When FGTHROX is down, emissions from vent SV303-050 will be routed to the listed control devices operating as allowed in ROP Table EU303-06. The emissions will then be vented directly to the atmosphere or the EU303-06 process will be shut down. Emissions from the SV303-050 vent will not be sent to the FGSITESCRUBBERS.

(SV303-046)

When FGTHROX is down, emissions from vent (SV303-046) will be routed to the ROP control equipment listed in its building specific emission unit tables while the building specific control equipment is operating per its building specific ROP requirements and then to FGSITESCRUBBERS before entering the atmosphere. When FGSITESCRUBBERS are down, emissions from vent SV303-046 will be routed to the listed control device operating as allowed in ROP Table EU303-06. The emissions will then be vented directly to the atmosphere or the process will be shutdown.

(SV337-001 and 002)

When FGTHROX is down, emissions from vents (SV337-001 and -002) originating from the following processes: EU303-001, EU304-02, EU304-03, EU308-02, EU324-03, EU325-01, EU502-01, EU502-02, EU502-07, EU502-08, and EU508-01, will be routed through an interchanger and condenser that make up FG304VENTRECOVERY while this unit is operating as allowed by ROP TABLE FG304VENTRECOVERY. After exiting the 304VENTRECOVERY, emissions will not normally go to FG337SRUBBERS. They will instead go through the equivalent FGSITESCRUBBERS while operating properly and then to the atmosphere. If for any reason, both scrubbers at FGSITESCRUBBERS and FGTHROX are shutdown, emissions from FG304VENTRECOVERY will then be routed through one of the two scrubbers that make up FG337SCRUBBERS while operating properly. The emissions will then be vented directly to the atmosphere or the processes will be shutdown.

(SV303-024 and 038)

When FGTHROX is down, emissions from vents (SV303-024 and 038) will be routed to ROP control equipment listed in its building specific emission unit tables while the building specific control equipment is operating per its building specific ROP requirements and then to FGSITESCRUBBERS before entering the

atmosphere. If the FGSITESCRUBBERS are down, vents (SV303-024 and 038) will be routed to the listed control devices operating as allowed by ROP Table EU303-01. The emissions will then be vented directly to the atmosphere or the process will be shutdown.

(SV303-039 and 023)

When FGTHROX is down, emissions from vents (SV303-039 and 023) will be routed to the FGSITESCRUBBERS. If the FGSITESCRUBBERS are down, vents (SV303-039 and 023) will be routed to the atmosphere or the EU303-01 process will be shutdown. (Note: these two vents are from tanks and no building control exists on the tanks other than nitrogen blanket.)

(SV303-001)

NOTE: SV303-001 is a vent that takes emissions from two different emission units EU303-02 and EU303-06, respectively. Each emission unit is equipped with an air pollution control device which can reduce emissions before the two vents combine to form SV303-001.

When FGTHROX is down, emissions from vent SV303-001 will be routed to ROP control equipment listed in its building specific emission unit tables while the building specific control equipment is operating per its building specific ROP requirements and then to FGSITESCRUBBERS before entering the atmosphere. If the FGSITESCRUBBERS are down, vent SV303-001 emissions will be routed to the listed control devices operating as allowed by ROP Table EU303-02 and EU303-06. The emissions will then be vented directly to the atmosphere or the processes will be shutdown.

(SV303-013 and 015)

When FGTHROX is down, emissions from vents (SV303-013 and 015) will be routed to the FGSITESCRUBBERS. If the FGSITESCRUBBERS are down, vents (SV303-013 and 015) emissions will be routed to the atmosphere or the EU303-02 process will be shutdown. (Note: these two vents are from tanks and no building control exists on the tanks other than nitrogen blanket.)

(SV303-016, 017, 019, and 046)

During normal operation, emissions from vents (SV303-016, 017, 019, and 046) are routed to ROP control equipment listed in its building specific emission unit tables while the building specific control equipment is operating per its building specific ROP requirements and then to FGTHROX and FGSITESCRUBBERS before entering the atmosphere. If the THROX is down, emissions will continue to vent through the FGSITESCRUBBERS. If the FGTHROX and FGSITESCRUBBERS are down, vents (SV303-016, 017, 019, and 046) emissions will continue to be routed to the listed control devices operating as allowed by ROP Table EU303-07. The emissions will then be vented directly to the atmosphere or the process will be shutdown.

(SV303-002))

When FGTHROX is down, emissions from vent (SV303-002) will be routed to the ROP control equipment listed in its building specific emission unit tables while the building specific control equipment is operating per

its building specific ROP requirements and then to FGSITESCRUBBERS before entering the atmosphere. If the FGSITESCRUBBERS are down, vent (SV303-002) emissions will be routed to the listed control device operating as allowed by ROP Table EU 303-09. The emissions will then be vented directly to the atmosphere or the process will be shutdown.

(SV303-004 and 007)

When FGTHROX is down, emissions from vents (SV303-004 and 007) will be routed to the FGSITESCRUBBERS. If the FGSITESCRUBBERS are down, vent (SV303-004 and 007) emissions will be routed to the atmosphere. (Note: these two vents are from tanks and no building control exists on the tanks other than nitrogen blanket.)

(SV303-025)

When FGTHROX is down, emissions from vents (SV303-025) will be routed to the FGSITESCRUBBERS before entering the atmosphere. If the FGSITESCRUBBERS are down, vent (SV303-025) directly to the atmosphere or the process will be shutdown. Note: this vent is from a tank and no building control exists on the tanks other than nitrogen blanket.

(SV303-042)

When FGTHORX is down, emissions from vents (SV303-042) will be routed to the FGSITESCRUBBERS. If the FGSITESCRUBBERS are down, vent (SV303-042) emissions will be routed to the atmosphere or the EU303-11 process will be shutdown. Note: this vent is from a tank and no building control exists on the tanks other than nitrogen blanket.)

(SV321-006, 007, 008, 009, 018, 062and 049) (NEW 40x storage tank vents: 066, 067are being added.

When FGTHROX is down, emissions from vents (SV321-006, 007, 008, 009, and 049) will be routed to the FGSITESCRUBBERS. If the FGSITESCRUBBERS are down, vent (SV321-006, 007, 008, 009, and 049) emissions will be routed to the atmosphere. (Note: these vents are from tanks and no building control exists on the tanks other than nitrogen blanket.)

(SV321-021) (NOTE these emission groups are all 290 processes)

When FGTHROX is down, emissions from vents (SV321-021) will be routed to ROP control equipment listed in its building specific emission unit tables while the building specific control equipment is operating per its building specific ROP requirements and then to FGSITESCRUBBERS before entering the atmosphere. If the FGSITESCRUBBERS are down, vent (SV321-021) emissions will be routed to the listed control devices operating as allowed by ROP Table EU321-02, EU321-05.The emissions will then be vented directly to the atmosphere or the process will be shutdown.

(SV321-024)

When FGTHROX is down, emissions from vents (SV321-024) will be routed to ROP control equipment listed in its building specific emission unit tables while the building specific control equipment is operating per its

building specific ROP requirements and then to FGSITESCRUBBERS before entering the atmosphere. If the FGSITESCRUBBERS are down, vent (SV321-024) emissions will be routed to the listed control devices operating as allowed by ROP Table EU 321-05.The emissions will then be vented directly to the atmosphere or the process will be shutdown.

(SV321-027) (NOTE this emission group is a 290 process)

When FGTHROX is down, emissions from vents (SV321-027) will be routed to ROP control equipment listed in its building specific emission unit tables while the building specific control equipment is operating per its building specific ROP requirements and then to FGSITESCRUBBERS before entering the atmosphere. If the FGSITESCRUBBERS are down, vent (SV321-027) emissions will be routed to the listed control devices operating as allowed by ROP Table EU 321-07. The emissions will then be vented directly to the atmosphere or the process will be shutdown.

(SV321-031) (NOTE these emission groups are all 290 processes)

When FGTHROX is down, emissions from vents (SV321-031) will be routed to ROP control equipment listed in its building specific emission unit tables while the building specific control equipment is operating per its building specific ROP requirements and then to FGSITESCRUBBERS before entering the atmosphere. If the FGSITESCRUBBERS are down, vent (SV321-031) emissions will be routed to the listed control devices operating as allowed by ROP Table EU 321-02, EU321-06, EU321-09, EU321-11, EU321-12, EU321-14.The emissions will then be vented directly to the atmosphere or the process will be shutdown.

(SV321-040) (NOTE these emission groups are all 290 processes)

When FGTHROX is down, emissions from vents (SV321-040) will be routed to ROP control equipment listed in its building specific emission unit tables while the building specific control equipment is operating per its building specific ROP requirements and then to FGSITESCRUBBERS before entering the atmosphere. If the FGSITESCRUBBERS are down, vent (SV321-040) emissions will be routed to the listed control devices operating as allowed by ROP Table EU 321-07, EU321-10, and EU321-14. The emissions will then be vented directly to the atmosphere or the process will be shutdown.

(SV321-045)

When FGTHROX is down, emissions from vents (SV321-045) will be routed to the FGSITESCRUBBERS. If the FGSITESCRUBBERS are down, vent (SV321-045) emissions will be routed to the atmosphere or the EU321-05 process will be shutdown.

(Note: this vent is from a tank and no building control exists on the tanks other than nitrogen blanket.)

(SV322-005)

When FGTHROX is down, emissions from vents (SV322-005) will be routed to FGSITESCRUBBERS before entering the atmosphere. If the FGSITESCRUBBERS are not operating, vent (SV322-005) emissions will then be vented directly to the atmosphere or the process will be shutdown.

(Note: this vent is from a tank and no building control exists on the tanks other than nitrogen blanket.)

(SV505-001, -002,-008, -016)

When FGTHROX is down, emissions from vents (SV505-001. -002, -008, -016) will be routed to ROP control equipment listed in its building specific emission unit tables while the building specific control equipment is operating per its building specific ROP requirements and then to the atmosphere. If the FGSITESCRUBBERS are down, vent (SV505-001, -002, -008, -016) emissions will be routed to the listed control devices operating as allowed by ROP Table EU 505-01.The emissions will then be vented directly to the atmosphere or the process will be shutdown

(SV515-001 and 003)

When FGTHROX is down, emissions from vents (SV515-001 and 003) will be routed to ROP control equipment listed in its building specific emission unit tables while the building specific control equipment is operating per its building specific ROP requirements and then to FGSITESCRUBBERS before entering the atmosphere. If the FGSITESCRUBBERS are not operating, vent (SV515-001 and 003) emissions will be routed to the listed control devices operating as allowed by ROP Table EU515-01.The emissions will then be vented directly to the atmosphere or the process will be shutdown.

During all times when FGTHROX is operating, one of the two scrubbers at FGSITESCRUBBERS is operating at the levels required in the FGSITESCRUBBERS MAP plan. Therefore, when FGTHROX goes down, one of the scrubbers in FGSITESCRUBBERS is immediately ready to handle vent emissions.

If FGTHROX goes down, all affected buildings will be notified. Two buildings (303 and 2703) have vents that cannot go to FGSITESCRUBBERS. All building control equipment will need to operate within the parameter limits (e.g. pressure, temperature, flow) allowed by the ROP when FGTHROX is down. After FGTRHOX goes down, all building specific control equipment will have 1 hour to get its parameter into the ROP required range.

If the FGSITESCRUBBERS go down, a site-wide announcement will be made.

Dow Corning Preventive Maintenance and

Malfunction Abatement Plan

Site Scrubbers – Backup control Equipment

Table 1 – Control system summary

Control System No.	Control System Description	Description of Vapor Sources
1	Thermal Oxidizer	Consolidated process vents which are taken from wide variety of process units
2	HCL Absorber	Consolidated process vents which are taken from wide variety of process units
3	Ionizing Wet Scrubbers	Consolidated process vents which are taken from wide variety of process units

Table 2 – Pollution Control System Operating Variables

Control System No.	Control Equipment	Operating Variable	Monitoring Method	Frequency	Permitted Operating Range	Corrective Procedure or Operational Change in the Event of a Malfunction	Responsible Supervisor
1	Vent Collection System	Silicon Atom	Gas Chromatograph	Continuously – every 60 minutes	No more than 3.5 lb/hr PM-10, 720 hour rolling avg.	See note 1 below:	The Site Scrubber / Throx supervisor
2	Thermal Oxidizer Chamber	Temperature	Thermocouple	Continuously – every 15 minutes	Greater than 1800 degrees Fahrenheit	If the temperature drops below 1800 degrees F for longer than 15 minutes vents will then be routed to some other back-up control or shutdown	The Site Scrubber / Throx supervisor
3	HCL Absorber	pH	pH Probe	Continuously – every 15 minutes	Greater than 5 pH	If the pH drops below 5 for longer than 24 hours vents will then be routed to some other back-up control or shutdown	The Site Scrubber / Throx supervisor

4	Ionizing Wet Scrubbers 1 & 2	Voltage	Voltage meters	Continuously – every 30 minutes	Greater than 15KV	If voltage of either two wet ionizing scrubber drops below 15KV for a period of 30 continuous minutes vents will then be routed to some other back-up control or shutdown.	The Site Scrubber / Throx supervisor
5	Ionizing Wet Scrubbers 1 & 2	Water Flow	Flow meters	Continuously – every 15 minutes	Greater than 0gpm	If water flow to the ionizing wet scrubbers is lost vents will be routed to some other -p control or shutdown	The Site Scrubber / Throx supervisor

Note 1: There are two alarms on the two GC systems: One is for total composition that alarms low and high set points. This alarm checks that the constituents making up the feed stream when added equal approximately 100% or 1,000,000 parts per million by volume. The second alarm makes sure that the GC is continuously updating by looking for periods when constituent compositions do not change.

If either of these alarms indicate an issue, then troubleshooting of the GC system will be initiated.

As required by the permit to install, the GC systems will be operated in a satisfactory manner. A satisfactory manner is defined as 90% uptime. Normal verification, calibration and preventive maintenance do not count as downtime. Troubleshooting, as allowed in air permit # MI_ROP_A4043, Section 1, FGTHROX, Paragraph VI Monitoring and Recordkeeping, subpart 4, using the GCs is also not included in downtime.

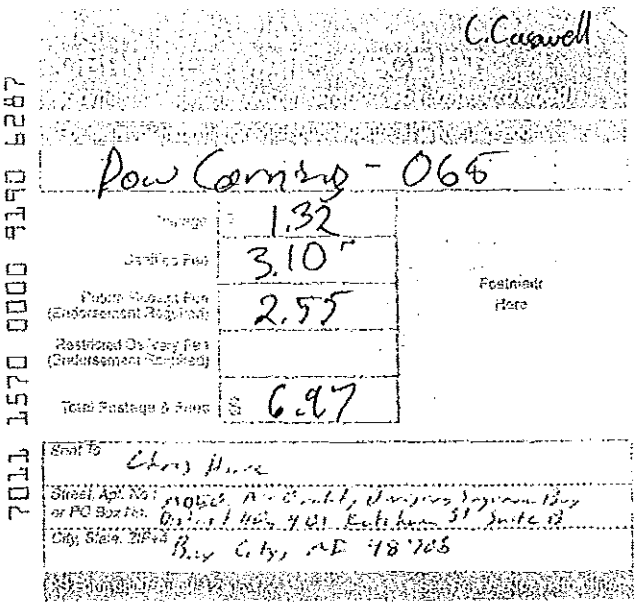
Table 3 – Preventative Maintenance Summary

Control System No.	Device Description	Equipment No. or Name	Preventative Maintenance Task	Frequency	Responsible Supervisory Personnel
1	Thermal Oxidizer Chamber	24422	Calibrate thermocouples TT29150A, TT29150B	Annually	The Site Scrubber / Throx supervisor
1	Thermal Oxidizer Chamber	24422	Calibrate 2 GCs	Monthly	" " "
1	Thermal Oxidizer Chamber	24422	Routine maintenance of GCs	Weekly	" " "
1	Thermal Oxidizer Chamber	24422	Preventive maintenance of GCs	Semi-annually	" " "

2	HCL Absorber	24425	Calibrate pH probes AT29247 & AT29248	Annually	The Site Scrubber / Throx supervisor
3	Ionizing Wet Scrubbers 1 & 2	24427 & 24428	Annual Visual Inspection	Annually	The Site Scrubber / Throx supervisor
3	Ionizing Wet Scrubbers 1 & 2	24427 & 24428	Visual Inspection of both IWS units to confirm there is water flow which will demonstrate that flow meters functioning properly	Annually	The Site Scrubber / Throx supervisor

Table 4 – Maintenance Spare Parts Summary

Control System No.	Spare Parts
1	Thermocouples, 1 set of GC columns, GC rotameter, GC gold seals, GC liner O-rigs, GC chemtraps, GC Hoke stone filters, GC large Parker filter, GC 6 port valve, GC vacuum pump rebuild kit, GC vacuum pump, GC septums
2	Caustic Pump
3	Electrode Wires, Plates



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1. Article Addressed to:

Mr. Chris Hare
MDEQ Air Quality Division
Saginaw Bay District Headquarters
401 Ketchum St. Suite B
Bay City, MI 48708

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Shawn Howell ☐ Agent ☐ Addressee

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