

EMISSIONS MALFUNCTION ABATEMENT/CONTINGENCY PLAN

1.0 **PURPOSE**

To define the responsibilities and requirements for the detection, prevention, and correction of malfunctions or equipment failures associated with the potential to result in operation outside of applicable air emission limits or permit conditions.

2.0 **SCOPE**

This procedure applies to the Midland Cogeneration Facility gas turbine Units 3 through 14 (EU-T03 – EUT14) and respective duct burners installed within units 9 through 14 HRSGs (EU-DUCTBURNER09 – EU-DUCTBURNER14), natural gas fired boilers Units 16 through 21 (EUBOILER1 – EUBOILER6).

3.0 **REFERENCE**

- 3.1 MCV Environmental Compliance Manual Procedure AQ-001 Renewable Operating Permit Program.
- 3.2 MCV Environmental Compliance Manual Procedure AQ-100 Air Quality Requirements.
- 3.3 Michigan Department of Environmental Quality-Air Quality Division Act 451 of 1994, as amended and Air Pollution Control Rules, Part 9; Rule 911.
- 3.4 Michigan Department of Environmental Quality Permit to Install 351-07.
- 3.5 Tabware (Computerized Maintenance Management System).
- 3.6 MCV Continuous Emissions Monitoring Systems Quality Assurance/Quality Control Plan.

4.0 **RESPONSIBILITIES AND REQUIREMENTS; GENERAL**

- 4.1 The Control Room Operator shall:
 - 4.1.1 For GTs -- Load/Deload Units at adequate rate to minimize emissions during startup and shutdowns (typically 1.0 to 8.0 MW/min.).
 - 4.1.1.1 For Boilers -- Length of warm start-up shall not exceed two (2) hours.
 - 4.1.1.2 For Boilers -- Length of cold start-up shall not exceed four (4) hours.

4.1.1.3 For Boilers -- Length of a shutdown shall not exceed one (1) hour.

4.1.2 **For GTs** -- When a Continuous Emission Monitoring System (CEMS) is available; verify on an ongoing basis that NO_x levels are within permit limits for the respective units:

Units 3-11, 13 & 14 - 159 lbs/hr

Unit 12 - 98 lbs/hr

NO_x Emission Limits with Respective Duct Burner Operating:

Units 9, 10, 11, 13, & 14 With Duct Burner ON – 183 lbs/hr

Unit 12 With Duct Burner ON – 122 lbs/hr

For Boilers -- When a Continuous Emission Monitoring System (CEMS) is available; verify on an ongoing basis that NO_x and CO levels are less than the permit limits for the respective units:

NO_x Limit – 0.037 lb/mmBtu

CO Limit – 0.059 lb/mmBtu

Heat Input Limit – 370 mmBtu/hr

4.1.3 Immediately report any condition of inadequate deNO_x steam flow to the Operations Shift Supervisor.

4.1.4 **For GTs** -- In the event a CEMS is unavailable for a steam-injected unit, verify via the DCS (Distributed Control System) that deNO_x steam injection is operating properly on Units 3 through 11, 13 and 14 and following the DeNO_x Steam Flowrate v. Load curve (Attachment A).

For Boilers -- In the event a CEMS is unavailable, verify via the Distributed Control System (DCS) that the Flue Gas Recirculation (FGR) Damper is operating properly on Units 16 through 21 and following the FGR Damper Position v. Heat Input curve (Attachment B).

4.1.5 In the event a CEMS is unavailable for the dry-low NO_x unit, verify Unit 12 is operating properly and is at base load or maximum allowable output. This is accomplished by monitoring:

4.1.5.a. Turbine Inlet Temperature (TIT) (actual) (TI12202) is within 5°F of TIT (setpoint) (TI12200).

4.1.5.b. Variable Inlet Guide Vanes are greater than –0.5° (ZA12211).

4.1.6 Implement corrective action(s) per Section 8.0.

4.2 The Operations Shift Supervisor shall:

4.2.1 **For GTs** -- Assure that Units 3 through 11, 13 and 14 operate with adequate deNOx steam flow to meet their respective NOx and CO permitted limits.

For Boilers -- Assure that the boilers operate with adequate FGR to meet their NOx and CO permitted limits.

4.2.1.1 **For GTs** -- Sufficient deNOx steam shall be injected into the unit to operate below the NOx permit limits listed in Section 4.1.2 as indicated by the CEMS.

For Boilers -- Sufficient FGR into the unit to operate below the NOx and CO permit limits listed in Section 4.1.2 as indicated by the CEMS.

4.2.1.2 **For GTs** -- If a CEMS is unavailable, assure that steam flow is per the Steam Flowrate v. Load curve (Attachment A).

For Boilers -- If a CEMS is unavailable, assure that the FGR Damper is operating properly and following the FGR Damper Position v. Heat Input curve (Attachment B).

4.2.2 Assure that Units 3 through 11, 13 and 14 operate greater than 50% of baseload (or a value approved by the Environmental, Health and Safety Manager or their designee based upon most recent performance test that verifies compliance with NOx and CO emissions limits).

4.2.3 Assure Unit 12 operates greater than or equal to 76% of baseload to meet its NOx, CO, and opacity requirements. (Visible emissions shall not exceed a six-minute average of 10 percent opacity, except for uncombined water vapor).

4.2.4 Request assistance from other plant departments during, or outside, of normal working hours to correct situations affecting emissions compliance.

4.2.5 Order the Control Room Operator to shutdown affected non-compliant Unit(s) if troubleshooting or repairs will require more than two (2) hours duration.

5.0 NO_x COMPLIANCE MONITORING

5.1 **For GTs** -- Control Room Operators continuously monitor NO_x production rate (lbs/hr), DeNO_x Steam Flow (kpph), GTG load (MW) and Fuel Gas Flow (mmBtu/hr) to the Duct Burners for compliance to emission limits via the DCS.

For Boilers -- Control Room Operators continuously monitor NO_x production rate (lbs/mmBtu), Boiler load (kpph) and Fuel Gas Flow (mmBtu/hr) to the Boilers for compliance to emission limits via the DCS.

5.1.1 Continuous Emission Monitoring Systems (CEMS) are primarily used to verify that NO_x levels are within Renewable Operating Permit (ROP) limits for the respective units.

Units 3-11, 13 & 14 - 159 lbs/hr

Unit 12 - 98 lbs/hr

NO_x Emission Limits with Respective Duct Burner Operating

Units 9, 10, 11, 13, & 14 With Duct Burner ON – 183 lbs/hr

Unit 12 With Duct Burner ON – 122 lbs/hr

For Boilers -- NO_x Limit - 0.037 lb/mmBtu (13.7 lbs/hr)

5.1.2 **For GTs** -- Steam Flowrate vs. Load Curve (Attachment A) is utilized for secondary verification of compliance in the event a CEMS is unavailable.

For Boilers -- Flue Gas Recirculation Damper position (Attachment B) is utilized for secondary verification of compliance in the event a CEMS is unavailable.

5.1.2.a **For GTs** -- Respond to the DCS alarm indicating deNO_x steam flowrate is less than normal operating curve.

5.1.2.b **For GTs** -- Respond to DCS alarm indicating Unit 12 not at baseload.

5.1.2.c **For Boilers** -- Verify indicating FGR Damper position is per Attachment B curve.

5.1.3 The Fuel Gas Flow to each Duct Burner is monitored not to exceed a corrected heat input flow rate of 249 mmBtu/hr.

5.2 **For GTs** -- The Daily NOx Emission Report compiles 1-hour averages of:

(a)	CEMS NOx [lbs/hr]	CEMS_XX_HRLY_NOX
(b)	GTG Load [MWh]	JIXX200
(c)	GTG Fuel Use [SCFM]	FIXX204
(d)	Duct Burner Firing Rate [mmBtu]	FIXX102X (Units 9-14)

XX = Unit Number

Above summarized average values are calculated by taking the arithmetic average for each subject 1-hour period.

For Boilers -- The Daily NOx Emission Report compiles operating hour calendar day averages:

(a)	CEMS NOx [lbs/mmBtu]	XXNOXRTMX
(b)	CEMS NOx [lbs/hr]	XXNOXLBSMX
(c)	Boiler Load [klbs/hr]	XXSTM-FLOW
(d)	Daily Maximum - Fuel Flow [mmBtu/hr]	XXHTIPMX

XX = Unit Number

Above summarized average values are based on the average of all operating hours in a calendar day including the operation during startup, shutdown, and malfunction – applied on a per unit basis.

- 5.2.1 The Daily NOx Emission Report is automatically printed out at 0100 hours and picked up by the Environmental, Health and Safety Manager or their designee by 0830 hours of the same day for each workday.
- 5.2.2 For each day that units are operating the Environmental, Health and Safety Manager or their designee shall prepare a Daily NOx Excess Emission Report from information taken from the Daily NOx Emission Report.
- 5.2.3 **For GTs** -- Any loss of indication due to Historical Storage and Retrieval (HSR) system failure, printer malfunction, etc., will require the Control Room Operators to hourly trend the Units that are operating for CEMS NOx Rate - CEMS_XX_HRLY_NOX, DeNOx Steam Flow - FIXX205, Fuel Gas Flow - FIXX204, GTG (MW) Load - JIXX200, and Duct Burner Firing Rate – FTXX102X (Units 9-14).

For Boilers –

5.2.3.1 Verify the CEMS local DAHS is recording and operating properly,

5.2.3.2 Or hourly trend the Units that are operating for CEMS NOx Rate – XXNOXRTMX, XXNOXLBSMX, XXSTM-FLOW, XXHTIPMX.

5.2.4 **For GTs --** For a loss of signal to the DCS of CEMS NOx Rate – CEMS_XX_HRLY_NOX, Control Room Operators shall monitor and verify record of data used to compile the Daily DeNOx Fired & Unfired Emission Report as described in Section 5.3.

For Boilers -- For a loss of data signal to the DCS from the CEMS, Control Room Operators shall observe and record locally using the boiler Combustion Management System. This manual surveillance will be performed, and logged, in one-hour increments or as directed by the Operations Shift Supervisor.

5.2.5 **For GTs --** Verify Unit 12 is at baseload if DCS signal is lost by local observation of the GTG Egatrol System.

For Boilers -- In the event Combustion Management signal is lost, verification of the operation of FGR shall be by local observation of the physical equipment in one-hour increments by Plant Operators who report results to the Control Room Operators or as directed by the Operations Shift Supervisor and logged.

5.3 The Daily DeNOx Fired & Unfired Emission Report compiles hour ending averages of:

- | | | |
|-----|---------------------------------|-----------------------|
| (a) | DeNOx Steam Flow [kpph] | FIXX205 |
| (b) | GTG Fuel Use [SCFM] | FIXX204 |
| (c) | GTG Load [MWh] | JIXX200 |
| (d) | Duct Burner Firing Rate [mmBtu] | FTXX102X (Units 9-14) |

XX = Unit Number

5.3.1 The Daily DeNOx Fired & Unfired Emission Report is automatically printed out at 0100 hours and picked up by the Environmental, Health, and Safety Manager or their designee by 0830 hours of the same day for each workday.

- 5.3.2 For each day that Units are operating the Environmental, Health and Safety Manager or their designee shall prepare a daily Excess Emission Report from information taken from the daily DeNOx Fired & Unfired Emission Report.
- 5.3.3 Any Loss of indication due to Historical Storage and Retrieval (HSR) system failure, printer malfunction, etc., will require the Control Room Operators to hourly trend the Units that are operating for same data listed in Section 5.2.3.
- 5.3.4 For a loss of signal to the DCS of DeNOx Steam Flow FIXX205 and GTG (MW) Load - JIXX200 Control Room Operators shall observe and record locally using the GTG Egatrol System. This manual surveillance will be performed, and logged, in one-hour increments or as directed by the Operations Shift Supervisor.
- 5.3.5 In the event deNOx steam flow signal is lost, verification of the operation of deNOx steam injection shall be by local observation of the deNOx control valve in one-hour increments by Plant Operators who report results to the Control Room Operators or as directed by the Operations Shift Supervisor and logged.
- 5.3.6 Verify Unit 12 is at baseload if DCS signal is lost by local observation of the GTG Egatrol System.

6.0 CO COMPLIANCE MONITORING

- 6.1 **For GTs** -- Control Room Operators continuously monitor Fuel Gas Flow (mmBtu/hr) to the Duct Burners for compliance to emission limits via the DCS.

For Boilers -- Control Room Operators continuously monitor CO production rate (lbs/mmBtu), Boiler load (kpph) and Fuel Gas Flow (mmBtu/hr) to the Boilers for compliance to emission limits via the DCS.

- 6.1.1 **For GTs** -- The fuel flow to each duct burner (EU-DUCTBURNER09 through EU-DUCTBURNER14) is monitored to not exceed a corrected heat input rate of 249 mmBtu/hr or other individual unit maximum value as determined by the Environmental, Health and Safety Manager or their designate in section 6.2.3.

For Boilers -- Continuous Emission Monitoring Systems (CEMS) are primarily used to verify that CO levels are within ROP limits for the respective units. [CO Limit – 0.037 lbs/mmBtu (21.8 lb/hr)]

6.1.2 **For GTs** -- Any loss of indication due to Historical Storage and Retrieval (HSR) system failure, printer malfunction, etc., will require the Control Room Operators to hourly trend the Units that are operating for Fuel Gas Flow - FIXX204, GTG (MW) Load - JIXX200, and Duct Burner Firing Rate – FTXX102X (Units 9-14).

For Boilers -- Flue Gas Recirculation Damper position is utilized for secondary verification of compliance in the event a CEMS is unavailable.

6.1.2.1. **For Boilers** -- Verify indicating FGR Damper position is per (Attachment B) curve.

6.1.3 For a loss of signal to the DCS of data points listed in Section 8.2.4, Control Room Operators shall observe and record locally using the GTG Egatrol System and Duct Burner Skid. This manual surveillance will be performed, and logged, in one-hour increments or as directed by the Operations Shift Supervisor.

6.2 **For GTs** -- The Monthly CO Emission Report compiles previous month total tons and 12-month rolling time period tons per year of CO emissions for each turbine and duct burner set included in FG-SITURB/DB and FG-TURB/DB12.

6.2.1 The Monthly CO Emission Report is prepared by the Environmental, Health and Safety Manager or their designee within 7 working days of the end of each calendar month.

6.2.2 The Environmental, Health and Safety Manager or their designee will verify monthly and 12-month rolling time period compliance to the specified permit limits for each turbine and duct burner set from this report.

6.2.3 The Environmental, Health and Safety Manager or their designee will determine if the maximum corrected heat input rate of 249 mmBtu/hr may be maintained or must be lowered to ensure individual turbine and duct burner set compliance with both the hourly and 12-month rolling time period permit limits.

6.2.3.1 Any revision to the maximum allowable duct burner corrected heat input flow rate monitored in section 6.1.1 shall be submitted in writing to the Operations Manager and each Operations Shift Supervisor

6.2.3.2 Upon notification of a revision to the maximum allowable duct burner corrected heat input rate, the Operations Shift Supervisor will verify the appropriate value(s) are entered into

the duct burner capacity fields on the Capacity Calculation Screen (DCS Diagram No. 2804)

6.3 For Boilers -- The Daily CO Emission Report compiles operating hour calendar day averages:

(a)	CEMS CO [ppmv]	XXCOM_X
(b)	CEMS CO [lbs/hr]	XXCOMASSMX
(c)	Boiler Load [klbs/hr]	XXSTM-FLOW
(d)	Daily Maximum - Fuel Flow [mmBtu/hr]	XXHTIPMX

XX = Unit Number

Above summarized average values are based on the average of all operating hours in a calendar day including the operation during startup, shutdown, and malfunction – applied on a per unit basis.

- 6.3.1 The Daily CO Emission Report is automatically printed out at 0000 hours and picked up by the Environmental, Health and Safety Manager or their designee by 0830 hours of the same day for each workday.
- 6.3.2 For each day that units are operating the Environmental, Health and Safety Manager or their designee shall prepare a Daily CO Excess Emission Report as required from information taken from the Daily CO Emission Report.
- 6.3.3 Any loss of indication due to Historical Storage and Retrieval (HSR) system failure, printer malfunction, etc., will require the Control Room Operators to:
 - 6.3.3.1 Verify the CEMS local DAHS is recording and operating properly,
 - 6.3.3.2 Or hourly trend the Units that are operating for CEMS CO Rate – XXCOM_X, XXCOMASSMX, XXSTM-FLOW, XXHTIPMX.
- 6.3.4 For a loss of data signal to the DCS from the CEMS, Control Room Operators shall observe and record locally using the boiler Combustion Management System. This manual surveillance will be performed, and

logged, in one-hour increments or as directed by the Operations Shift Supervisor.

6.3.5 In the event Combustion Management signal is lost, verification of the operation of FGR shall be by local observation of the physical equipment in one-hour increments by Plant Operators who report results to the Control Room Operators or as directed by the Operations Shift Supervisor and logged.

6.4 **For GTs** -- No extraordinary compliance monitoring is required for CO when duct burners are not operating. Annual ROP testing has shown that CO emissions strictly from the gas turbine units are less than 5 ppmv, and therefore well under ROP compliance requirements.

7.0 VE COMPLIANCE MONITORING

7.1 The Environmental, Health and Safety Manager or their designee shall schedule certified visible emissions (VE) readings (i.e. Federal Reference Method 9) for each emission unit (EU-T03 through EU-T14 and EU-DUCTBURNER09 through EU-DUCTBURNER14), and unit 16 through 21 (EUBOILER1 – EUBOILER6) at least once every six months during normal unit operation.

7.1.1 All visible emissions readings will be kept on file for a period of at least five years and made available to the MDEQ upon request.

7.1.2 Visible emissions readings are not to exceed a six minute average of 10% Opacity during normal unit operation.

8.0 NOx & CO EMISSIONS ABATEMENT

8.1 For GTs -- Control Room Operators Shall:

8.1.1 **For GTs** -- Report any NOx emission rate (CEMS_XX_NOXLBS) or total hourly pounds of NOx (CEMS_XX_HRLY_NOX) exceeding the following limits for the respective units to the Shift Operations Supervisor: Units 3-11, 13 & 14 - 159 lbs/hr and Unit 12 - 98 lbs/hr. NOx emission limits with respective duct burner operating: Units 9, 10, 11, 13, and 14 with Duct Burner On – 183 lbs/hr. Unit 12 with Duct Burner On – 122 lbs/hr.

For Boilers -- Report any NOx emission rate (XXNOXRTMX) or CO emission rate (XXCORTMX) exceeding the following limits for the respective units to the Shift Operations Supervisor: Units 16 - 21 – 0.037 lbs/mmBtu NOx and 0.037 lbs/mmBtu CO.

8.1.2 In the event CEMS is unavailable,

For GTs -- Report any deNOx steam flow less than the normal operating level or actual loss of deNOx steam flow to the Shift Operations Supervisor.

Computer Alarms:

- (1) MBU 20 DU501 Common Alarm Steam Injection System
- (2) MBU 20 DU502 DeNOx Steam Injection < Min.

For Boilers -- Report any FGR Damper malfunction or deviation from the FGR Damper Position v. Heat Input curve (Attachment A), to the Shift Operations Supervisor.

8.1.3 **For GTs --** Verify the following operating conditions as required:

8.1.3.a Temperature and pressure of deNOx steam injection is within operating limits.

Computer Alarms:

- (1) MBU 20 CT001 Temperature Steam Injection < Min. > Max.
- (2) MBU 20 CP001 Pressure Steam Injection < Min.
- (3) MBU 20 CL001 DeNOx Condensate Trap Level >Max.

8.1.3.b DeNOx steam superheat exit temperature and pressure is within operating limits.

8.1.3.c Temperature After Turbine (TAT) for increase in temperature due to deNOx steam injection flow decrease or loss.

Computer Alarms:

- (1) MBU 20 DU502 Alarm Steam Injection
- (2) MBU 20 EA000 Field Group (FG) Steam Injection Standards Disturbed

- 8.1.3 **For Boilers** -- Report any heat input rate (XXHTIPMX) exceeding the permit limit of 370 mmBtu/hr.
- 8.1.4 **For GTs** -- Report any heat input rate (FTXX102X) exceeding the permit limits or as determined in section 6.2.3 for the respective duct burners to the Operations Shift Supervisor.

For Boilers -- Log the probable causes (i.e. flue gas recirculation damper), duration of event, and remedial action taken. As required compare the following measured operating parameters against historical trends and identify any deviations:

8.1.4.1.1 Fuel supply flow rate and operating pressure (PISG)

8.1.4.1.2 Combustion air supply temperature and humidity

8.1.4.1.3 CMS and/or A/F System equipment operation and function

- 8.1.5 Log the probable causes (i.e. loss of adequate deNOx steam flow), duration of event, and remedial action taken.

8.2 The Operations Shift Supervisor shall:

- 8.2.1 **For GTs** -- Determine the cause of NOx emission rate (CEMS_XX_NOXLBS) or total hourly pounds of NOx (CEMS_XX_HRLY_NOX), exceeding the permit limits for the affected unit (GT Only; Units 3-11, 13 & 14 - 159 lbs/hr, Unit 12 - 98 lbs/hr, GT+Duct Operating; Units 9, 10, 11, 13, & 14 – 183 lbs/hr, Unit 12 –122 lbs/hr) and assess whether:

For boilers -- Determine the cause of NOx emission rate (XXNOXRTMX) or CO emission rate (XXCORTMX), and assess whether:

8.2.1.a **For GTs** -- Reducing load on the unit will reduce NOx lb/hr production less than the permit limit;

For Boilers -- Reducing or raising load on the unit will reduce NOx/CO lb/hr production less than the permit limit.

8.2.1.b **For GTs** -- Reducing load on the unit(s) is not anticipated to reduce NOx lb/hr production, and troubleshooting or repairs will require more than 1 hour.

For Boilers -- Reducing or raising load on the unit(s) is not anticipated to reduce NOx/CO lb/hr production, and

troubleshooting or repairs will require more than one (1) hour duration from the time it initially exceeded the respective limit.

- 8.2.2 In the event 8.2.1.b occurs the following shall be done:
 - 8.2.2.a Reduce load on the unit(s) to take advantage of any available deNOx steam and minimize NOx emissions.
 - 8.2.2.b Maintain contact with the Supervisor-in-Charge of the troubleshooting or repair work and determine if the duration of repair is estimated to exceed one (1) hour.
 - 8.2.2.c Shutdown the affected unit(s) if troubleshooting or repairs will require over two (2) hours of work prior to re-establishing operation within ROP limits.
- 8.2.3 In the event a unit's CEMS is unavailable the following shall be done:
 - 8.2.3.a Verify the unit is operated per the DeNOx Steam Flowrate vs. Load curve (Attachment A) given the unit(s) load.
 - 8.2.3b **For Boilers** -- Review and verify the unit operating parameters per 8.1.4.
 - 8.2.3c **For GTs** -- Adjust the unit(s) load or shut the unit(s) down (within 2 hours as required) if proper deNOx steam flowrate cannot be attained.

For Boilers -- Adjust the unit(s) load or shut the unit(s) down (within 2 hours as required) if proper FGR cannot be attained.
- 8.2.4 Order the unit(s) duct burner fuel flow to be reduced, or stopped completely, if the heat input rate (FTXX102X) exceeds the permit limits for the respective duct burners as established in section 6.2.3.
- 8.2.5 Notify the Environmental, Health and Safety Manager or their designee if NOx/CO emission limits are exceeded, or deNOx steam flow is inadequate, for more than two (2) hours duration so the proper contingency plans may be determined and/or notifications can be made.

9.0 NOx PREVENTATIVE MAINTENANCE PROGRAM

- 9.1 The Environmental, Health and Safety Manager or their delegate shall:
 - 9.1.1 Calibrate and maintain continuous emissions monitoring systems for the monitoring and measurement of NOx and CO production per the MCV

Continuous Emissions Monitoring Systems Quality Assurance/Quality Control Plan (MCV CEMS QA/QC Plan).

- 9.1.2 Perform preventative maintenance on the equipment associated with the CEMS in accordance with the MCV CEMS QA/QC Plan that gives the frequency and details of periodic inspections performed by the Engineering Department.
- 9.1.3 Verify and maintain an inventory of major replacement parts identified in the MCV CEMS QA/QC Plan.
- 9.2 The Instrument & Controls Supervisor or their delegate shall:
 - 9.2.1 Calibrate and maintain continuous monitoring systems for the measurement and control of deNOx steam injection to load ratio.
 - 9.2.2 Calibrate and maintain continuous monitoring systems for the measurement heat input rate into the gas turbine and its associated duct burner (if equipped).
 - 9.2.3 Perform preventative maintenance on the equipment associated with the deNOx steam injection and fuel delivery systems of all the steam injected units (Units 3 through 11, 13, & 14) in accordance with Tabware (Computerized Maintenance Management System), which gives the frequency and details of periodic inspections performed by the Instrument and Controls Department. Tabware meets the requirements of AQD rule 336.1911 (2)(a).
 - 9.2.4 Perform preventative maintenance on the equipment associated with the dry low NOx fuel delivery system of Unit 12 in accordance with Tabware (Computerized Maintenance Management System), which gives the frequency and details of periodic inspections performed by the Instrument and Controls Department. Tabware meets the requirements of AQD rule 336.1911 (2)(a).

10.0 DENOX HEADER MALFUNCTION CONTINGENCY PLAN

Malfunction or failure causing loss of adequate steam to the deNOx steam header has the potential to result in inadequate deNOx injection steam to all operating gas turbines except Unit 12 which has a dry low NOx burner. In the unlikely event of loss of plant-wide deNOx steam, this contingency plan will be implemented to minimize emissions while providing timely restoration of deNOx steam supply and/or orderly shutdown and switchover to the backup steam supply.

- 10.1 During a total loss of steam to the deNOx header because of a major malfunction due to:
 - 10.1.1 DeNOx letdown from main steam failure.
 - 10.1.2 DeNOx desuperheater water spray pumps A&B failure.
 - 10.1.3 A break or rupture in the deNOx header pipe or in a non-isolatable branch associated with the deNOx header.
 - 10.1.4 Failure or repair work on the deNOx header relief valves.
- 10.2 The Following action(s) will be executed:
 - 10.2.1 Operate the minimum number of gas turbines required to consume enough letdown steam for proper deNOx steam injection if the deNOx header becomes available, and prior to termination of process steam flow.
 - 10.2.2 If the deNOx header is not available reduce load on the operating gas turbines to approximately 75% load and raise main steam pressure to maximize HRSG deNOx section production and align valves to isolate the units from the deNOx header and route HRSG deNOx section output directly to each gas turbine. Steam injection in this condition will be approximately 1/2 of the amount required per Attachment A.
 - 10.2.3 If the deNOx header is expected to be unavailable for an extended period which results in plant shutdown, The Dow Chemical Company, Dow Corning, and/or other steam customer shall be contacted to initiate operation of their backup steam supply facility.
- 10.3 The Responsible Official (President and CEO) or their designee is responsible for decisions required during a major malfunction event to minimize emissions.
- 10.4 The Operations Manager is responsible for implementing the actions required during a major malfunction event.

11.0 ATTACHMENTS

- 11.1 Attachment A – Steam Flowrate vs. Load.
- 11.2 Attachment B – FGR Damper Position for NOx and CO Control.



