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REGENERATIVE THERMAL OXIDIZER INTEGRATED PLAN
OPERATIONS & MAINTENANCE (O&M)
INSPECTIONS
PREVENTATIVE MAINTENANCE PLAN (PMP)
OPERATING LIMIT PARAMETERS
CORRECTIVE ACTION PLAN (CAP)
MALFUNCTION ABATEMENT PLAN (MAP)
STARTUP, SHUTDOWN, AND MALFUNCTION (SSM)

BREMBO NORTH AMERICA FOUNDRY
HOMER, MICHIGAN

PREPARED BY

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1.0 INTRODUCTION

The Brembo North America, Inc. foundry, located in Homer, Michigan (Homer Foundry), will operate and maintain the facility, including air pollution control and monitoring systems, in a manner consistent with good air pollution control practices for minimizing emissions as presented in this integrated plan. [40 CFR §63.6(e)(1)(i)]

1.1 Applicability

[Permit to Install (PTI), §63.6, §63.7710, and R336.1911]

This integrated plan has been prepared to comply with the applicable requirements of:

- Permit to Install (PTI) No. 199-14A
- National Emission Standards for Hazardous Air Pollutants (NESHAP) for Source Categories
    - 40 CFR Part 63 Subpart A General Provisions
    - 40 CFR Part 63 Subpart EEEEE (NESHAP 5E) for Iron and Steel Foundries
- Michigan Department of Environmental Quality (MDEQ) Rules (R336.1911-1912)

The applicable sections and plan location are presented on Table 1.

Table 1: Regulatory Applicability and Plan Location

Citation	Regulations	Plan Location	
40 CFR Part	**NESHAP Subpart EEEEE (5E) Description**	**Section**	**Appendix**
§63.6	Applicable sections referenced throughout plan	[1]	[1]
§63.6(e)(3)	Startup, Shutdown, Malfunction (SSM)	6.0	C
§63.8	Monitoring requirements as applicable to monitor	4.0	-
§63.10	Monitor recordkeeping requirements; SSM reporting requirements	7.0	B, C
§63.7710(b)	Written Operation and Maintenance plan	[2]	[2]
§63.7710(b)(1)	Monthly inspections	3.3	-
§63.7710(b)(3)	Preventative Maintenance Plan (PMP)	3.0	A
§63.7710(b)(6)	Ignition source to mold vents	[2]	-
§63.7720(c)	Startup, Shutdown, Malfunction Plan (SSM) per 63.6(e)(3)	6.0	C
§63.7734(a)(10)	Initial compliance with emissions limitations	4.0	-
§63.7743(a)(10)	Continuous compliance with emissions limitations	4.0	D
§63.7746	Deviations and reporting	7.0	C,D
§63.7751-52	Reports and Records	7.0	B,C,D
MDEQ R336	**Emission Limitations and Prohibitions - Misc.**	**Section**	**Appendix**
R336.1911(1)	MAP prepared to prevent, detect, correct malfunctions or equipment failures	[1]	-
R336.1911(2)(a)	PMP prepared and updated Inspection performed List of replacement parts maintained and inventory	3.0	A,B
R336.1911(2)(b)	Operating variables to be monitored to detect malfunctions; normal range; monitoring program	4	-
R336.1911(2)(c)	Description of corrective action or operation changes in event of malfunction or failure to achieve compliance	5.0	C
R336.1911(3)	MAP submitted for review and approval	[1]	-
R336.1911(4)	MAP implemented	[1]	-
R336.1912	Excess Emissions Evaluation	7.0	D

[1] General applicability

[2] Prepared under separate document

2.0 SOURCE DESCRIPTION

The emission sources, air pollution control equipment, and affected emissions from the facility are detailed within the PTI No. 199-14A and include:

Table 2: Emission Unit Description and Pollutants

Emission Unit (EU) ID	Description	NESHAP 5E Limits[1]
EUCOOLING	Molds are conveyed to the cooling house after pouring. The cooling house is a fully enclosed system. Emissions from the cooling house are controlled by the Cooling Baghouse and RTO. The CEMS monitors VOHAP emissions at the stack.	**VOHAP:** 20 ppmv

[1]Limit for Cooling and Shakeout lines

2.1 Emission Unit, Control System, and Monitor Description

After the molds are poured they are conveyed to the cooling house. Exhaust air from the cooling house vents to the cooling baghouse system which is then drawn to the oxidizer. The cooling house and exhaust are a closed system. All emissions are contained within the cooling house so there is no capture and/or collection system associated with this process. The RTO control program consists of proportional, integral, and derivative (PID) loops that are used by the Programmable Logic Controller (PLC) to control the operation of the oxidizer. The PLC receives inputs from the touch screens as well as the sensors. The control program evaluates the inputs and sends appropriate outputs, via the PLC, to the control circuits that operate the components. This ensures the oxidizer is operating at the specified set points. The cooling baghouse operates under a MAP prepared under separate cover.

A Horiba Model ENDA-5100 Total Hydrocarbon (THC) Continuous Emissions Monitoring System (CEMS) is installed on the stack outlet for THC measurement. Measurement values will be output on the PLC according to required measurements presented in Section 4.3. The system includes a flame ionization detector (FID) that measures THC as a surrogate for volatile organic compounds (VOCs). The VOC concentration is a worst-case approximation of volatile organic hazardous air pollutants (VOHAP).

It is important to note that natural gas (methane) is injection upstream from and used in the RTO system. Because methane is a hydrocarbon it solicits a response by the FID;

however, it is not a VOC. One bag sample of RTO exhaust gas has indicated that methane constitutes 22% of hydrocarbons measured by the FID. Therefore, the measured THC concentrations are biased high as a surrogate for VOC.

The performance test results at the RTO exhaust were measured as total gaseous organic compounds (TGOC, ppmv C (as hexane)) per US EPA Method 25A. The TGOC concentration has been correlated to the CEMS for compliance monitoring as outlined in Section 4.3.4.

3.0 PREVENTATIVE MAINTENANCE PROGRAM

This preventative maintenance program identifies the personnel responsible for the program, equipment inspections, and preventative maintenance.

3.1 Responsible Personnel

[R336.1911(2)(a)]

The personnel responsible for this integrated plan are listed in Table 3.

Table 3: Personnel Responsible for Integrated Plan

Position	Responsibility
Plant Manager or equivalent	Overall Operations and Maintenance
Maintenance / Engineering Manager or equivalent	Training, maintaining plan
Health, Safety & Environmental Manager or equivalent	Reporting to the MDEQ, verifying requirements
Maintenance technician or equivalent	Preventative maintenance inspections, repairs, and spare part inventory

3.2 Equipment Operations

Proper equipment operation must be verified and maintained on a regular basis in an effort to meet emission requirements. Equipment shall not be operated without meeting the following criteria:

- Oxidizer in start mode
- Minimum flow switch is satisfied
- Exhaust fan alternating current (AC) drive is running
- No AC drive faults exist
- Poppet valves are cycling
- Fresh air damper is open

3.3 Equipment Inspections and Maintenance

[§63.8(c), §63.7710(b)(1) and (3), §63.7740(c), R336.1911(2)(a)]

Preventative maintenance is a key component to ensuring the reliability, availability, efficiency, and production at the facility. Routine maintenance and inspection of the equipment will be conducted in accordance with the manufacturer's written maintenance

instructions and maintenance schedule, and applicable regulatory requirements, as presented in Table 4, below. All maintenance work performed will be documented in either hard copy or electronic format and kept for a minimum of five (5) years from the date of the maintenance activity. Maintenance includes equipment inspections, scheduled replacement of parts, and maintaining an inventory of critical spare parts.

A summary of the equipment inspection and preventative maintenance schedule for critical equipment relating to the emission control unit and monitoring systems is presented in Table 4. Portions of the quarterly, semi-annual and annual inspections and maintenance for the RTO and CEMS are conducted by subcontractors. Not all tasks completed by the contractors are included on the table. The frequency and scope of these inspections depend on manufacturer recommendations. The maintenance department maintains an electronic version of the up-to-date and most accurate inspection and preventative maintenance requirements.

Table 4: Equipment Inspection and Maintenance Schedule

Item	Control System and CEMS	Weekly	Month	Quarter	Bi-Annual	Annual
	RTO					
1	Check air flow screens and ducting for debris	x				
2	Check all guard and protection device are installed	x				
3	Check that compressed air is flowing to burners	x				
4	Check for leaks in the fuel train	x				
5	observe the burner flame through sight port for stability	x				
6	Adjust air line regulator	x				
7	Check supply line for leaks	x				
8	Clean the inline air filter		x			
9	Check all dampers and valves for correct settings and tightness		x			
10	Check all piping for leaks		x			
11	Lubricate exhaust fan and combustion blower with 1299 grease		x			
12	Check valves for correct setting and tightness		x			
13	Visually inspect all components, including all electrical and mechanical connections		x			
14	Check the exhaust fan coupling for correct alignment			x		
15	Check exhaust fan's wheels, inlet cone, and housing for wear and corrosion			x		
16	Check the exhaust fan's foundation bolts, bearings, wheel bolts, and set screw for the correct torque			x		
17	Check all E-Stops for correct operation			x		
18	Check all control cabinet doors for correct operation and for correct sealing			x		
19	Check the fuel oil filter, if present			x		
20	Check the spark ignitor				x	
21	Check and clean the exterior of the oxidizer and its related equipment				x	
22	With electrical power OFF, and locked out, Tighten all AC electrical connections				x	
23	Check the condition of the internal insulation. Check for signs of hot spots or leakage.				x	
24	Check that the high duct negative pressure switch operates correctly				x	
25	Check proof of flow pressure switch operates correctly				x	
26	Check that proof of flow differential pressure transmitter is calibrated				x	
27	Check that the compressed air pressure switch operates correctly				x	
28	Check the NGI flow switch probes, clean if needed				x	
29	Check that the duct negative and positive pressure transmitters are calibrated				x	
30	Perform a bake out				x	
31	Visual inspections of heat exchanger internal				x	
32	Conduct flow sensor calibration check				x	
33	Check the fan and motor shafts (Refer to Section 5.6)					x
34	Check all gaskets and seals. Replace any that are broken, brittle, or leaking.					x
35	Shut down and lockout the main electrical power. Torque the bus bars in the motor control cabinet according to the manufacturer's specifications					x
36	Check the ceramic heat exchange media for excessive breakage or plugging by inorganic material. Contact B&W MEGTEC Service					x[1]
37	Check all external surfaces of the oxidizer for rust or corrosion. Repairs with primer and paint as necessary					x
38	Check the internal surfaces of the oxidizer, especially the cold face support for corrosion					x
39	Check poppet valve disks/seats for sealing					x
40	Check strainer/filter on gas train for debris					x
41	Check the burner block for cracks for damage					x
42	B&W MEGTEC Annual Oxidizer System Maintenance and Calibration					x[1]

Table 4: Equipment Inspection and Maintenance Schedule (Continued)

Item	Control System and CEMS	Weekly	Month	Quarter	Bi-Annual	Annual
	Horiba CEMS					
41	Zero gas and span gas calibration	x[2]				
42	Confirm the flow amount supplied to the analyzer during calibration	x				
43	Confirm that the protective filter at the opening for the analyzer is not clogged				x[1]	
44	Confirm if there is residue in the sampling pipes				x[1]	
45	Silica gel replacement					x[1]
46	Replace air filter					x[1]
47	Horiba contract calibration, inspection, and maintenance				x[1]	

[1]Conducted by Subcontractors
[2]Daily

3.4 Equipment Spare Parts

[§63.8(c)(1)(ii), R336.1911 (2)(a)]

The ability to quickly replace components which malfunction during operations largely depends on three factors:

- The availability of off-site sources for replacement parts,
- The willingness of the source to shut down while waiting for such parts, and
- The ability to replace parts without the necessity of a shutdown.

In an effort to minimize potential equipment downtime, an inventory of spare parts for the RTO and Horiba CEMS are maintained onsite. A summary of the spare parts maintained onsite as recommended by the manufacturer is included in Appendix A. A comprehensive up-to-date list is maintained in electronic format in the maintenance department.

4.0 OPERATING VARIABLES TO BE MONITORED

Routine monitoring and collection of operating data is an integral part of equipment operation and necessary to maintaining the equipment. The operating variables for the RTO and Horiba CEMS. The requirements for a Continuous Parameter Monitoring Systems (CPMS) for the capture system do not apply since all emissions are contained in the cooling house. The duct work from the cooling house is directed to the cooling baghouse then RTO.

4.1 RTO - Operating Variables

During normal operations, the following data will be monitored. Operations equipped with alarms or set points are noted below.

- Fresh air damper – provides necessary air flow through the oxidizer during the operating modes when the process exhaust is isolated from the oxidizer. When the oxidizer is in run mode, the fresh air damper is closed.
- Variable speed AC drive – controls the volume of air flow through the oxidizer by controlling the speed at which the exhaust fan operates.
- Air/gas ratio control (AGRC) – basic combustion air control system sets the air to fuel ratio at the maximum and minimum firing rates.
- Poppet valves – these valves change position periodically so that one heat recovery column is in inlet mode while the other column is in outlet mode. The control program controls the positioning of the valves.
- Media thermocouples – monitor the temperature of the air as it passes through the ceramic media. If any sensor measures a temperature that equals or exceeds the high temperature set point, the oxidizer shuts down.
- Natural gas injection (NGI) system – the NGI system injects fuel into the process exhaust air at the oxidizer inlet.
- Pressure differential transmitter – monitors the difference in the pressure between the air entering the oxidizer and the air exiting the oxidizer. If the differential pressure between the inlet and outlet decreases below the minimum flow set point, or increases too high above the maximum set point, a message is displayed and the oxidizer shuts down.

Generally the systems will be monitored at the Distributed Control System (DCS) and available to the operator at all times. The list of information to be monitored should be considered as a minimum and is subject to expansion at a later date.

4.1.1 High Temperature Shutdown Switch

[PTI FGCOOL IV, PTI FGMACTEEEEE VI]

A high temperature shutdown switch is the primary CPMS for the RTO and used to measure and record the combustion zone temperature, as required by the PTI permit condition. The high temperature shutdown switches are a hardwired safety device that shuts down the burner if the temperature in the combustion chamber or oxidizer exhaust increases above a maximum set point.

- Normal range is from 1400ºF to 1800ºF with default set at 1950ºF.
- The temperature monitoring device is calibrated, maintained and operated according to manufacturer specifications and will record temperature data on a continuous basis.
- The temperature is monitored on the DCS.

4.2 Capture System

[PTI FGMACTEEEEE VI, §63.7690(b)(1)]

The molds are cooled in the cooling house which is a totally enclosed capture system. Emissions are contained by the cooling house; therefore, there are no parameters to monitor. The duct work from the cooling room vents directly to the Cooling baghouse and RTO. The design and operation of the cooling house is believed to meet good engineering standards as referenced in 63.7690(b)(1)(i).

4.3 Horiba CEMS – Monitoring

[§63.7740(h), §63.7741(g), §63.8]

The CEMS monitoring is conducted according to the following requirements, per §63.7741(g).

- The CEMS must be installed, operated, and maintained according to Performance Specification 8 in 40 CFR Part 60, Appendix B.
- A performance evaluation of the CEMS was conducted according to §63.8 and Performance Specification 8.
- The CEMS must complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period. [§63.8(c)(4)(ii)]
- CEMS data must comply with §63.8(g)(2) which states that data be reduced to one hour averages computed from four or more data points equally spaced over each 1-hour period, except during periods when calibration, quality assurance, or maintenance activities are being performed. During these periods, a valid hourly average shall consist of at least two data points with each representing a 15-minute period. Alternatively an arithmetic or integrated 1-hour average of CEMS data may be used. [§63.8(g)(2)]

- The CEMS must determine and record the 3-hour average emissions using all the hourly averages collected for periods during which the CEMS is not out-of-control. Note: the CEMS and/or the PLC and SCADA are used to generate averages and data collection.
- Inspections, calibration, and validation checks are recorded.

4.3.1 Zero and High Level Check

[§63.8(c)(6)]

- The zero (low-level) and high-level calibration drifts are checked at least once daily.
- The zero (low-level) and high-level calibration drifts are adjusted, at a minimum, whenever the 24-hour zero drift exceeds two times the limits of the applicable performance specification standard. [Performance Specification 8 includes standard of 2.5% drift; therefore, adjustment applies at 5% span value.]
- The system allows the amount of excess zero (low-level) and high-level drift measured at the 24-hour internal checks to be recorded and quantified whenever specified.

4.3.2 Out of Control

[§63.8(c)(7)]

- The zero (low-level), mid-level (if applicable), or high-level calibration drift (CD) is out of control if the level exceeds two times the applicable CD specification in the applicable performance specification or relevant standard; or
- The CEMS fails a performance test audit (e.g. cylinder gas audit), relative accuracy audit, relative accuracy test.

4.3.3 Horiba CEMS Quality Control Measures

[§63.8(d)]

Quality control measures for the Horiba CEMS include the following criteria, as required by §63.8(d):

- Initial and any subsequent calibration,
- Determination and adjustment of the calibration drift,
- Preventative maintenance of the system, including parts inventory,
- Data recording, calculations, and reporting,
- Accuracy audit procedures, including sampling and analysis methods, and
- Program of corrective action for malfunctions.

4.3.4 Initial and Continuous Compliance for VOHAP Emissions
[§63.7734(10), §63.7743(a)(10)]

Initial compliance consists of:

- CEMS data reduced to 3-hour averages according to the performance test procedures in §63.7732(f)(1) or (2); and
- The 3-hour flow-weighted average VOHAP concentration, measured according to the performance test procedures in §63.7332(f)(1) or (2), and compliance will be achieved if emissions do not exceed 20 ppmv for the Cooling and Shakeout exhaust concentrations averaged.

Continuous compliance will consist of:

- Maintaining the 3-hour flow-weighted average VOHAP concentration in the Cooling and Shakeout exhaust streams at or below 20 ppmv,
- Inspecting and maintaining the CEMS according to the requirements of §63.7741(g) and recording all information needed to document conformance with these requirements, and
- Collecting and reducing monitoring data in accordance with §63.7741(g) and recording all information needed to document conformance with these requirements.

4.3.5 Compliance for VOC and CO Emissions [PTI EUCOOLING]

The PTI does not require VOC and CO emissions to be tracked on an hourly basis. Performance testing will provide a production based emission factor that will be used to maintain required recordkeeping. Therefore, the CEMS will not be used to support compliance with VOC and CO emission limits.

5.0 CORRECTIVE ACTION PROCEDURES

Troubleshooting procedures shall be well-documented prior to equipment activation to increase the likelihood of timely and effective repairs. Thorough completion of the troubleshooting procedures also reduces the risks of adverse operating conditions which can lead to the discharge of excess emissions. In addition, training of personnel in the typical operations and troubleshooting/repair of the equipment is essential to minimize emissions and maximize operational time.

5.1 Corrective Action Procedures

[R336.1911(2)(c)]

This section presents the actions to be taken to correct (e.g., repair) the malfunctioning process, air pollution control, and air pollution monitoring equipment as soon as practical after the malfunctions happens to minimize emissions. Refer to equipment manuals for specific step-by-step instructions as needed.

5.1.1 Loss of Electrical Power Supply

The following corrective action procedures are used when there is a malfunction when there is no electrical power that can result in excess emissions.

A. Check circuit breaker.
B. Identify if link to power supply path not operational.
C. Restore power.

5.1.2 Loss of Instrument / Plant Air Supply

The loss of instrument or compressed plant air supply impacts the dampers:

A. Check regulator setting or if the regulator is faulty.

5.1.3 Physical / Mechanical Internal Equipment Failure

Corrective actions for physical / mechanical internal equipment failure that can result in excess emissions include:

A. Mechanism malfunction- make adjustments to the alignment or tension of fan components.
B. Fan settings – adjust fan settings, correct damper settings, or modify control settings.

5.2 Corrective Action Responsibilities

[§63.7710(b)(5), §63.6(e), and MDEQ Rule 336.1911(2)(c)]

In the event a CEMS alarm is triggered, the following procedures will be followed. The response times presented below are based on regulatory guidance for baghouse systems under §63.7710(b)(5) since RTO specific response times were not identified in the regulations.

A. Maintenance Technician

1. Contact Maintenance / Engineering Manager upon discovery of any malfunction, alarm, or abnormal startup or shutdown.
2. Determine the cause of any alarm or malfunction within 1 hour. [§63.7710(b)(5)]
3. Determine if there has been an exceedance of any emission or operating limit, see Appendix D – Excess Emissions Evaluation,
4. Initiate corrective action to correct the cause of any problem within 24 hours of the alarm or malfunction. [§63.7710(b)(5)]
5. Complete the corrective action as soon as practicable. [§63.7710(b)(5)]
6. Complete startup, shutdown, or malfunction recordkeeping per Table 7 and form in Appendix C.

B. Maintenance / Engineering Manager

1. Contact HS&E Manager upon discovery of any malfunction, alarm, or abnormal startup or shutdown.
2. Verify the cause of any alarm or malfunction within 1 hour.
3. Determine if there has been an exceedance of any emission or operating limit, see Appendix D
4. Verify that corrective action to correct the cause of any problem within 24 hours of the alarm or malfunction.
5. Complete the corrective action as soon as practicable.
6. Complete startup, shutdown, or malfunction recordkeeping per Table 7.

C. HS&E Manager

1. Determine if there has been an exceedance of any emission or operating limit.
2. Determine if there has been a malfunction that is not included in the corrective action procedures, **Section 5.1**. **If a malfunction occurs that is not consistent with the listed corrective action procedures, then the problem will be logged and reported to the agency as an Immediate SSM Report, (Section 7.4.3.B.).**
3. Verify that corrective actions are taken within 1 hour of alarm or malfunction and within 24 hours to correct any problem.
4. Complete the corrective action as soon as practicable.
5. Verify all recordkeeping procedures are followed.
6. Follow Startup, Shutdown, Malfunction Reporting procedures, as required.

6.0 STARTUP, SHUTDOWN AND MALFUNCTION

The startup, shutdown, and malfunction requirements are presented under regulations including: PTI General Conditions (GC) 7, §63.7710(a), 63.7720(b), 63.6(e)(3), MDEQ Rule 336.1911.

6.1 Definitions

[40 CFR §63.2]

- **Startup** - the "setting in operation of an affected source or portion of an affected source for any purpose".
- **Shutdown** - "the cessation of operation of an affected source or portion of an affected source for any purpose".
- **Malfunction** - "any sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner which causes, or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions".

6.2 Startup, Shutdown, and Malfunction (SSM)

[PTI GC 7, 40 CFR 63.7720(b), 63.6(e)(3), MDEQ Rule 336.1911]

This startup, shutdown, and malfunction has been prepared to describe the procedures for operating and maintaining the source during periods of startup, shutdown, and malfunction; and a program of corrective action for malfunctioning process, air pollution control, and monitoring equipment used to comply with the relevant standard. This SSM does not address any scenario that would not cause the source to exceed an applicable emission limitation presented in the PTI or NESHAP 5E. The purpose of the SSM plan is to:

- Provide procedures for operating and maintaining the control system and monitoring equipment during periods of startup, shutdown, and malfunction consistent with safety and good air pollution control practices to minimize emissions;
- Ensure actions to correct malfunctions are taken as soon as practicable after their occurrence in order to minimize excess emissions; and
- Reduce the reporting burden with periods of startup, shutdown, and malfunction.

During these periods of startup, shutdown, and malfunction the control system and monitoring equipment will be operated consistent with the procedures and corrective actions of this SSM.

6.3 Typical Startup and Shutdown Procedures

[40 CFR §63.6(e)(3)]

Typical startup and shutdown will be conducted in accordance with manufacturer specifications such that excess emissions are minimized during the event. The following steps are followed during startup and shutdown of the control system.

Table 5: Typical Startup and Shutdown Procedures

Item	Start-up
1	Start RTO system and monitors according to manufacturer instructions before initiating production
	Verify RTO system operating parameters are within range (e.g. flow rate, pre-coat, fan amperage, differential pressure)
2	Initiate Horiba CEMS monitor per manufacturer specification and verify readings are within operating range
3	Monitor operating parameters during production startup
4	Report abnormal conditions immediately
Item	**Shutdown**
1	After production has stopped, shutdown RTO system according to manufacturer specifications

6.4 Malfunctions

[40 CFR §63.6(e)(3)]

This list can periodically be revised as necessary to reflect operations without prior approval. However, each change must be reported in the semi-annual report. If the SSM fails to address or inadequately addresses a malfunction event, the plan must be revised within 45 days of the event to correct the deficiency. A written notice must be provided to the agency if the revision 'alters the scope or the activities at the source which are deemed to be startup, shutdown, or malfunctions'.

If a malfunction occurs that is not listed below with corresponding corrective actions, then the problem will be logged and reported to the agency as an Immediate SSM Report.

Table 6: Possible Malfunctions

Item	Potential Malfunctions	Typical Corrective Actions See Manufacturer Corrective Action Procedures
1	Loss of electrical power supply	●Inspect and correct mechanical / electric problems ●Check and correct plugging / physical failure of lines ●Check and correct physical / electrical failure of instrumentation ●Check for mechanical/electrical failure of actuated valves/dampers ●Check and correct physical / electrical failure of control system ●Check and correct failure of utility supply ●Inspect and correct physical / mechanical internal equipment problems ●Check and correct electrical components ●Restart, replace tank, follow calibration procedures
2	Loss of instrument / Plant air supply	
3	Loss of natural gas pressure / flow to burner	
4	Loss of combustion air pressure / flow	
5	Burner pilot failure	
6	Loss of temperature control	
7	Flame failure	
8	Physical / mechanical internal equipment failure	
9	Monitoring and Recording system failure	
10	Control System / CMS malfunction	
11	CMS malfunction	
12	ID fan failure	
13	CPU Failure and associated components (e.g. IO cards)	
14	Loss of fuel	

7.0 PLAN MAINTENANCE, RECORDKEEPING AND REPORTING

7.1 Initial Plan Requirements

[PTI Condition III, R336.1911]

- The integrated plan has been submitted to the Air Quality District (AQD) for review and approval in accordance with the PTI and applicable regulations.

7.2 Plan Revisions

[PTI Condition III, R336.1911(3) and (4)]

- If at any time the SSM fails to address or inadequately addresses an event that meets the characteristics of the malfunction, the SSM / MAP shall be amended within 45 days after such an event occurs.
- The plan must be revised within 45 days, if new equipment is installed.
- The plan must be revised upon request from the AQD.
- The permittee shall submit the plan and any amendments to the plan to the AQD District Supervisor for review and approval. If the AQD does not notify the permittee within 90 days of the submittal, the MAP or amended MAP shall be considered approved. Until amended plan is approved, the permittee shall implement corrective procedures or operational changes to achieve compliance with all applicable emission limits.
- Revisions must be logged on form in Appendix B.

7.3 Record Keeping

[PTI Condition VI, §63.6, §63.8, §63.10]

The facility must maintain a copy of the initial notification as well as performance tests and evaluations. [§63.7752, §63.10(b)(2)(xiv) and (viii)]. Recordkeeping requirements to support ongoing compliance are listed in Table 7.

7.3.1 Recordkeeping Management

[PTI Condition VI, §63.7753, §63.10(b)(1)]

Records must be maintained in a form suitable and readily available for expeditious review.

- All information necessary to demonstrate compliance with each plan requirement will be kept on-site for a period of at least 5 years. [§63.6(e)(3)]
- Records will be maintained for 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. [63.7753, 63.10(b)(1)]

Table 7: Recordkeeping Requirements

Recordkeeping Requirements [40 CFR §63.6 and §63.10]	
Files must be maintained for 5 years following the date of each occurrence, measurement, maintenance, corrective action, report or record; in form suitable and readily available for expeditious inspection and review.	
§63.10(b)	**General Recordkeeping Requirements**
(2)(i)	● Occurrence and duration of each startup or shutdown when the event causes the source to exceed limits
(2)(ii)	● Occurrence and duration of each malfunction of operation of the required control and monitoring equipment
(2)(iii)	● All required maintenance performed on the air pollution control and monitoring equipment
(2)(iv)	● Actions taken during periods of startup, shutdown or malfunction when the source exceeded applicable emission limitations in a relevant standard and when the actions taken are different from the procedures of the SSM (see 63.6(e)(3)
(2)(v)	● All information necessary, including actions taken, to demonstrate conformance with the affected source's SSMP when all actions taken during periods of startup or shutdown and malfunction are consistent with the procedures specified in the SSM
(2)(vi)	● Each period during which a CEMS is malfunctioning or inoperative (Including out-of-control periods)
(2)(vii)	● All required measurements needed to demonstrate compliance with the relevant standard
(2)(viii)	●All results of performance tests, CEMS performance evaluations, and opacity and visible emission observations
(2)(ix)	●All measurements as may be necessary to determine the conditions of performance tests and performance evaluations
(2)(x)	●All CEMS calibration checks
(2)(xi)	●All adjustments and maintenance performed on CEMS
(2)(xii)	●All emission levels relative to the criterion for obtaining permission to use an alternative to the relative accuracy test, if the source has been granted such permission under §63.8(f)(6)
(2)(xiv)	●All documentation supporting initial notifications and notifications of compliance status under §63.9.
§63.10(c)	**CEMS Recordkeeping requirements**
(1)	● All required CEMS measurements (including monitoring data recorded during unavoidable CEMS breakdowns and out-of-control periods)
(5)	● The date and time identifying each period during which the CEMS was inoperative except for zero (low-level) and high-level checks
(6)	● The date and time identifying each period during which the CEMS was out of control, as defined in §63.8(c)(7)
(10)	● The nature and cause of any malfunction (if known)
(11)	● The corrective action taken or preventive measures adopted
(12)	● The nature of the repairs or adjustments to the CEMS that was inoperative or out of control
(13)	● The total process operating time during the reporting period
(14)	● All procedures that are part of a quality control program developed and implemented for CEMS under §63.8(d)
(15)	● In order to satisfy the requirements of paragraphs (c)(10) through (c)(12) of this section and to avoid duplicative recordkeeping efforts, the owner or operator may use the affected source's SSM or records kept to satisfy the recordkeeping requirements of the SSM specified in §63.6(e), provided that such plan and records adequately address the requirements of paragraphs (c)(10) through (c)(12)
§63.6(e)	**CEMS Recordkeeping requirements**
(1)	● All required CEMS measurements (including monitoring data recorded during unavoidable CEMS breakdowns and out-of-control periods)
(5)	● The date and time identifying each period during which the CEMS was inoperative except for zero (low-level) and high-level checks
(6)	● The date and time identifying each period during which the CEMS was out of control, as defined in §63.8(c)(7)

7.4 Malfunction Reporting Requirements

[PTI GC 7, §63.6(e)(3), R336.1912]

- Include any emission exceedance or deviation from operating requirements on semi-annual monitoring and deviation report and annual report. [40 CFR §63.10(d)(5) and MDEQ Rule 336.1213(3)]

7.4.1 Excess Emissions Reporting Requirements

[40 CFR §63.6(e)(3), MDEQ Rule 336.1912(3)]

Excess emissions reporting requirements according to the NESHAP Supbart 5E and MDEQ are summarized in Table 8 below.

Table 8: Regulatory Excess Emissions Reporting Requirements

Citation	VOC, CO Excess Emission Duration[2]	VOHAP Excess Emission Duration[3]	Verbal Report	Written Report
	Hours	Hours	Days	Days
NESHAP 5E §63.6(e)(3)	Any (not consistent with SSM or did not follow SSM)		2	7
MDEQ R336.1912	2	1	2	10[1]

[1]Written report, if required, filed within 10 days after startup or shutdown occurred, within 10 days after abnormal conditions or malfunction corrected, or within 30 days of discovery of the abnormal condition or malfunction, whichever is first.

[2]See Appendix D for Excess Emissions Evaluation.

[3]Exceedance of the 3-hr flow-weighted average VOHAP concentration of 20ppmV will be considered a reportable excess emissions event.

7.4.2 MDEQ - Excess Emissions Reporting

[PTI, MDEQ Rule 336.1912(3), (4), and (5)]

A. Excess Emissions HAPs

Rule 336.1912(2) defines excess emissions as any abnormal condition, start-up, shutdown, or a malfunction that results in emissions of **HAPs** continuing for more than **1 hour** in excess of a standard or limitation established by the PTI. The emissions data collection for the Cooling and Shakeout CEMS will comply with NESHAP 5E requirements for 3-hour

flow-weighted averaging for both Cooling and Shakeout, as discussed in Section 4.3.4. An exceedance of the 3-hour flow-weighted average VOHAP limit of 20 ppmv will be considered a reportable excess emissions event.

Reporting requirements are summarized in Table 9.

B. Excess Emissions CO, VOCs

Excess emissions reporting is required for the RTO for any abnormal condition, start-up, shutdown, or a malfunction that results in emissions of **CO, VOCs** continuing for more than **2 hours** in excess of a standard or limitation established by the PTI. Since hourly data is not required to be maintained, in the event of such conditions occurring, excess emissions for CO and VOCs will be manually calculated and reviewed when emissions of VOHAPs exceed limits. The hourly emissions will be based on data obtained during performance testing, see Appendix D.

Reporting requirements are summarized in Table 9.

7.4.3 NESHAP Subpart 5E - Excess Emissions Reporting VOHAP

[PTI, 40 CFR §63.6(e)(3), §63.10(d) and (e), §63.7751]

Excess emissions reporting under NESHAP Subpart 5E is dependent on whether it is a result of actions taken that are consistent with the SSM. Records must be maintained as follows and are only required where the RTO exceeds the **VOHAP** emission standard or limit established in the PTI or NESHAP Subpart 5E. Excess emissions evaluation will be conducted as described in Section 7.4.2
Reporting requirements are summarized in Table 9 and listed below.

A. Excess Emissions Consistent with SSM

[§63.6(e)(5)(i)]

For actions taken during startup or shutdown (and the startup or shutdown causes the source to exceed any applicable emission limitation), or malfunction (including actions taken to correct a malfunction) that are **consistent** with the procedures specified in the SSM.

- **Records** must reflect that SSM was followed; as well as including records of occurrence and duration, see list below.
  - Date and time of the startup and duration
  - Date and time of the shutdown and duration
  - Date and time of the malfunction and duration
  - Description of the malfunctioning equipment or condition

- Cause of the malfunctions
- Actions taken to minimize emissions or correct malfunction
- Determination of whether plan was followed

o **Reporting** of event must be included in semi-annual and annual report. Include any emission exceedance on semi-annual monitoring and deviation report and annual report [§63.10(d)(5) and R 336.1213(3)].

B. Excess Emissions Not Consistent with SSM – Immediate Report [§63.6(e)(5)(ii)]

For actions taken during startup, shutdown, or malfunction (including action taken to correct a malfunction) that are **not consistent** with the procedures of the SSM, or the SSM was not followed, and the source exceeds the applicable emission limits.

- **Records** must reflect actions taken for that event and must report such actions according to the following:
- **Reporting** of event is subject to the most stringent reporting requirement listed in Table 9.
    - o For each deviation from an emissions limitation (including an operating limit) or work practice standard occurring at the facility using a continuous monitoring system to comply with the emissions limitation or work practice standard, the monitoring requirements listed on Table 9 will be provided.
    - o For all emissions from RTO the worst-case regulatory reporting criteria is followed.
- **Reporting** of event must be included in semi-annual and annual report. Include any emission exceedance on semi-annual monitoring and deviation report and annual report [40 CFR §63.10(d)(5) and MDEQ Rule 336.1213(3)].

Table 9: Excess Emissions Reporting Requirements

Requirement	MDEQ [MDEQ Rule 226.1912]	NESHAP Subpart EEEEE [§63.10(d)(5)(i and ii) and §63.7751]
Criteria	**HAP - Excess Emissions Reporting** [R 336.1912(2)] **See Appendix D - Excess Emissions Evaluation**	**VOHAP - Excess Emissions Reporting** [§63.10(c)(5)(ii) Immediate Reporting **See Appendix D - Excess Emissions Evaluation**
	VOC or CO - Excess Emissions Reporting [R 226.1912(3)] **See Appendix D - Excess Emissions Evaluation**	Follow reporting below for actions taken during SSM (including action taken to correct a malfunction) that is **NOT** consistent with the procedures of the SSM (See Section 7.4.3 For actions taken during SSM consistent with the procedures of the SSM)
Initial Notification	**Excess Emissions HAP, VOC, CO [MDEQ Rule 226.1912(4)]**	**Excess Emissions VOHAPs [§63.10(d)(5)(ii)]**
Timing	As soon as reasonable but not more than two (2) business days after discovery	Within two (2) working days after commencing action inconsistent with the SSM
Method	Any reasonable means, including electronic, telephone call, or oral communication	Telephone call or facsimile transmission
Requirements [40 CFR §63.10(d)(5)(ii)]	**Verbal or Other Acceptable Report to Include:**	
	● Name, title, and signature of responsible official certifying accuracy of report	
	● Explain circumstances of the event	
	● Reason for not following SSM, describing all excess emissions and/or parameter monitoring exceedances which are believed to have occurred (or could have occurred in the case of malfunctions)	
	● Description of the malfunctioning equipment or condition	
	● Corrective action taken	
	● Other actions taken to minimize emissions in conformance with 63.(e)(1)(i)	
Written Report	**Excess Emissions Any Contaminant [40 CFR §63.7751(b)(8) and MDEQ Rule 226.1912(5)]**	
Timing	Whichever is first: ● Within 10 days after start-up or shutdown occurred; ● Within 10 days after abnormal conditions or malfunction has been corrected; or ● Within 30 days of discovery of the abnormal conditions or malfunction.	● Letter delivered or postmarked within 7 working days after the end of the event
Method	● Written Report - Requires Certification by Responsible Official (using ROP Cert Form):	● Letter - Name, title, signature - Certified by Responsible Official
Process and Control System Requirements [Per MDEQ 336.1912 and 40 CFR §63.10(5)(ii)]	**Written Report or Letter to Include:**	
	● The time and date, the probable causes or reasons for, and the duration of the abnormal conditions, start-up, shutdown, or malfunction.	
	● An identification of the source, process, or process equipment that experienced abnormal conditions, was started up or shut down, or which malfunctioned and all other affected process or process equipment that have emissions in excess of an applicable requirement, including a description of the type and, where known or where it is reasonably possible to estimate, the quantity or magnitude of emissions in excess of applicable requirements.	
	● Information describing the measures taken and air pollution control practices followed to minimize emissions.	
	● For abnormal conditions and malfunctions, the report shall also include a summary of the actions taken to correct and to prevent a reoccurrence of the abnormal conditions or malfunction and the time taken to correct the malfunction.	
	● Reason for not following the SSM	
Monitoring Reporting Requirements [§63.7751(b)(8)]	● The date and time that each malfunction started and stopped.	
	● The date and time that each continuous monitoring system was inoperative, except for zero (low-level) and high-level checks.	
	● The date, time, and duration that each continuous monitoring system was out-of-control.	
	● The date and time that each deviation started and stopped, and whether each deviation occurred during a period of startup, shutdown, or malfunction or during another period.	
	● A summary of the total duration of the deviations during the reporting period and the total duration as a percent of the total source operating time during that reporting period.	
	● A breakdown of the total duration of the deviations during the reporting period into those that are due to startup, shutdown, control equipment problems, process problems, other known causes, and unknown causes.	
	● A summary of the total duration of continuous monitoring system downtime during the reporting period and the total duration of continuous monitoring system downtime as a percent of the total source operating time during the reporting	
	● A brief description of the process units.	
	● A brief description of the continuous monitoring system.	
	● The date of the latest continuous monitoring system certification or audit.	
	● A description of any changes in continuous monitoring systems, processes, or controls since the last reporting period.	
Additional Reporting	See PTI for Semi-annual an Annual reporting	See Section 7.4.3 for Semi-annual an Annual reporting [§63.10(d)(5)(i)]

Appendix A: Example Spare Parts

Homer Foundry

Appendix A - Summary of Possible Manufacturer Recommended Sprare Parts - Comprehensive and Up-to-Date List In Maintenance Department

RTO Spare Parts

Equipment Supplier	B&W M
B&W MEGTEC	
Machine Name	
Millennium RTO	RT
Serial number	
Project # 10028045	201
Unit # ML1141	

	Part Description	Item # on drawing	Bre
Poppet valve assembly DWG PVML1141-0510	DISK-POPPET,P & O,1600 DIA,1524 POPPET,NO BOLTS	1	
	SHAFT-POPPET,CS,50.8 DIA,1616 L,M36 X 2.0,PLATED,MIL-2060	7	
	BEARING-PL CYL,MN BRZ,2.000 ID,2.500 OD,1.500 L,HIGH TEMPERA	11	
	SENSOR-PROXIMITY,SHIELDED,4 WIRE,DC,PEPPERL & FUCHS, NBB15-U4-A2-T	14	
	CYLINDER-AIR,200 BORE,405 STROKE,STD CUSHION,FESTO,W/FLG MOUNT,DSBG-200-405-PA-N3R3T1	24	
	COUPLING-LINEAR,ALIGNMENT,M36X 2.0,BIMBA,EN/ACH-1250XX,PLD	43	
PEML1141-0511 DIAGRAM-PIPING,COMPRESSED AIR,FESTO CYL,AAA SOLENOID,MIL-2000,4 VALVE	VALVE-SOLENOID,AAA,0.75 NPT,24 VDC,391V-24VDC	29	
	VALVE-CHECK,.500 NPT,SMC AK4000-N04	6	
	REGULATOR/FILTER,COMPRESSED AIR,GRAINGER 6B312, B18-04-FK00 (RoHS)	7	
	GAUGE-PRESSURE,0-7 BAR,0-100 PSI,LIQUID FILLED	16	
	SWITCH-PRESSURE,0-100 PSI,ASHCROFT,B4-24B100 PSI	18	
	VALVE-AIR,SAFETY,ASME,.25 NPT 150 CFM,#ST25-150,STOCK #5A709	26	
	GAUGE-PRESSURE,0-7 BAR,0-100 PSI,LIQUID FILLED,REAR CENTER MOUNT	27	
FAML1141-0504 SHOP/FIELD ASSEMBLY, MIL-2060, BREMBO	BLOWER-PRESSURE,NYB,2108A15,BH,CW,ARR 4,15.0 HP,TEFC,WEG MOTOR	20	
	COMBUSTION BLOWER WHEEL,NYF,2108A,CW,ALUM	20	
	CB MOTOR,WEG,15HP,TEFC,MFG 301536ET3E254T-W22	20	
	BURNER,KINEMAX 6,SERIES G,MAXON,RFRC BLOCK,14.25L,W/SPECIAL GUIDE TUBE	22	
	IGNITOR-SPARK,KINEMAXBURNER,SIZE 6,MAXON 37160	22	
	FAN SHAFT AND WHEEL ASSEMBLY	23	
	FAN BEARINGS	23	
	JOINT-EXP,FAN INLET BOX,FLEXCOM	25	
	JOINT-EXP,FAN OUTLET,FLEXCOM	26	
	ACTUATOR-ELEC,1200 LBS-IN,90 DEG,4-20 MA,JORDAN	28	
	MOTOR,450 HP,1800 RPM,L447/9T-IP55,TEFC	24	
	SEALANT-JOINT,TEADIT,.125,.500,CONTINUOUS,PTFE,SELF-ADHESIVE	42	
	ADHESIVE/SEALANT,CLEAR,-60 TO 650 DEG F,SUREBOND SB-188	44	
	BATTEN-INSUL BLKT,CER FBR,300.00,6.00,1.00,2300 DEG F,6 PCF,CERABLANKET	45	
	AIR CONDITIONER/HEATER,6.0 TON, 9.0 KW,BARD W70A2-CO9XPXXJ	10	
GSML1141-1990 DIAGRAM-PIPING,GAS,W/ NGI	HEAT SEAL ASSY,UV SCANNER,STAINLESS STEEL,1.00 NPT	2	
	SCANNER-UV,SELF CHECKING,HONEYWELL C7061A1012	3	
	ACTUATOR,ROTORK PROCESS CONTROLS,SM-1020-D-1-0.7/350-90-X040,W/RELAY,WITH GEARBOX	5	
	VALVE 1 1/2" DIRECT ACTING,WITH BRACKET AND LINKAGENORTH AMERICAN COMBUSTION	6	
	VALVE 6" BUTTERFLYWITH BRACKET AND LINKAGENORTH AMERICAN COMBUSTION	7	
	VALVE-SOLENOID,0.75 NPT,120V,NC,CLS SW,ASCO 8043B038	8	
	VALVE-IND GAS,SHUT-OFF,2.00 NPT,120VAC/60HZ,6 SEC,NEMA 4X TRIM,MAXON 200SMA11-AA11-BB23B0	9	
	SNUBBER,WEISS PSN-B-G-25, BRASS,0.25NPT,AIR OR OTHER(RoHS)	10	
	REGULATOR-PRESS,0.50 NPT,17.0-30.0 WC,SELF,BRYAN DONKIN 260R	11	
	SWITCH-PRESS,GAS/AIR,100-500MBAR,40-200WC,SCHRODER,DG 500T.	12	
	GAUGE-PRESSURE,0-10PSI,0.25NPT,MARSHALL,SERIES 83K,G22699	14	
	GAUGE-PRESSURE,0-200 WC,0.25NPT,MARSHALLTOWN,SER 83K,G22696	15	
	GAUGE-PRESSURE,0-60 WC,0.25 NPT,MARSHALLTOWN G22705	16	
	VALVE-FLOW CONTROL,BRS,.375 NPTF,ALKON JF3	18	
	PLATE,ORIFICE-METERING,8697P-3-2970,NORTH AMERICAN	19	
	ORIFICE-METERING,2.50" NPT,NORTH AMERICAN 8697-5-A3450	20	
	SWITCH-PRESSURE,DIFF,0-60" WC,ASHCROFT,D4-24BXBPFMG5-60"H20	30	
	VALVE-SOLENOID,2.00 NPT,120V,NC,-40 RATED,NEMA 3R,ASCO R8214280	38	
	METER-GAS,INSERTION STYLE,REMOTE MOUNT DISPLAY,ONICON F5100-1120-1NG	39	
EBML1141-0980DIAGRAM,COMPONENT LOCATION	THERMOCOUPLE UNGROUNDED,DUAL,TYPE K,12LG,MGO,PYRO KK43U-012-00-8HN31 (RoHS)	1	
	TRANSMITTER-PRESSURE,ENDRESS HAUSER PMD70-AAC7D4DAUA	2	
	SWITCH,FLOW,VELOCITYFLUID COMPONENTS,FLT93F-1B1A207C4AA0000	5	
	LAMP,FLUORESCENT,48.00 INCH,F32T8/TL741,PHILIPS	13	
	SWITCH-PRESS,GAS/AIR,1-10MBAR,.4-4"WC,KROMSCHRODER DG 10T,84447812	26	
ML1141-0961	LAYOUT-PANEL,ELEC ENCL,CONTROL,MIL-2060-97,BREMBO,MEGTEC JOB 10028045		
	POWER SUPPLY,MODULE,24 VDC,5A,120/230VAC,SIEMENS 6ES73071EA010AA0 (RoHS)	1	

Homer Foundry

Appendix A - Summary of Manufacturer Recommended Sprare Parts - Comprehensive and Up-to-Date List In Maintenance Department

Horiba CEMS Spare Parts

Qty.	Horiba Part No.	Description
1	320343	Silica Gel; 500 gram bottle
1	F022562900	Catalyst HP-1002; 40 grams
1	352653	Air Filter; 0.30 micron
1	384893	Charcoal; 10 grams
2	251904-1	Glass Wool
4	384275	Filter Element; SO2 55
6	303002	Mist Catcher; MC-050
4	592530	Diaphragm Assembly; HP-55
2	320050	Filter Element; SO2 55
2	G0226360	Chopper Motor Assembly
2	503447	Filter, Cabinet Louver, Air, Glass Fiber
5	384270-1	Primary Filter Element; 5 pieces/set
1	384272	Holder Cap; 10 pieces/set
1	384273	Element Cap; 10 pieces/set
5	F020032900	O-ring; 5 pieces
1	320343	Silica Gel; 500 gram bottle

Horiba Formal ENDA-5100 Factory Acceptance Testing

Appendix B – Plan Revisions

Homer Foundry
Appendix B
Plan Revisions

Revision Date	Revision No.	Reviewer	Summary of Changes
Jan-19	Rev 1	JConard	Table 1 - Revise Section references Table 4 - Change calibration to daily Table 6 - Additions to list Section 4.3.1 - Include reference to PS8 and adjustment value

Appendix C – **Startup, Shutdown, Malfunction Report**

Homer Foundry
Appendix C
Startup, Shutdown, Malfunction Report

Information	Description
Date	
Type of Malfunction	
Provide detailed explanation of the circumstances of event	
Provide description of corrective actions taken	
Describe the reasons the Integrated Plan was not followed.	
Describe any proposed revisions to the Integrated Plan and list revisions in table in Appendix B.	
Name	
Title	

Appendix D – Excess Emissions Evaluation

Homer Foundry
Appendix D
Excess Emissions Evaluation

[placeholder]