Startup, Shutdown, and Malfunction Plan

Cadillac Castings, Inc.
Cadillac, Michigan

April 2007

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150 NORTH PATRICK BLVD, SUITE 180, BROOKFIELD, WI 53045, ● 262.879.1212 PHONE ● 262.879.1220 FAX ●
WWW.TRCSOLUTIONS.COM

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Executive Summary

Cadillac Castings, Inc. (CCI) is subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Iron and Steel Foundries (40 CFR 63 Subpart EEEEE) commonly known as the Foundry MACT. Because the facility is subject to the Foundry MACT, a Startup, Shutdown, and Malfunction (SSM) plan is required by 40 CFR 63.6(e)(3) of the NESHAP General Provisions (40 CFR 63 Subpart A) and must be developed by the source's compliance date.

The SSM Plan is to describe 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. The purpose of the SSM Plan is to:

- Ensure that each affected source, including associated air pollution control and monitoring equipment, is operated in a manner that satisfies the general duty to minimize emissions;
- Ensure preparations have been made to correct malfunctions as soon as practicable after their occurrence in order to minimize excess emissions of hazardous air pollutants; and
- Reduce the reporting burden associated with periods of startup, shutdown, and malfunction.

This document defines the period and procedures for the startup and shutdown of the cupola, and A-Line pouring station as well as corrective actions to be taken by CCI when an equipment, associated air pollution control device and/or monitoring system malfunction occurs.

Section 1
Introduction

Cadillac Castings, Inc. (CCI) is subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Iron and Steel Foundries (40 CFR 63 Subpart EEEEE) commonly known as the Foundry MACT. Because the facility is subject to the Foundry MACT, a Startup, Shutdown, and Malfunction (SSM) Plan is required by 40 CFR 63.6(e)(3) of the NESHAP General Provisions which are included in 40 CFR 63 Subpart A must be developed by the source's compliance date.

This document defines periods of startup/shutdown of the cupola, and A-Line pouring station and malfunctions indicated by deviations from operating ranges of the associated continuous monitoring system.

The plan identifies the procedures CCI must take, in accordance with the regulations, to correct malfunctions as soon as practicable in order to minimize excess emissions of hazardous air pollutants (HAPs). In addition, the SSM Plan provides instruction on how and when to keep the appropriate records for compliance purposes. By keeping the appropriate records, the burden of reporting associated with periods of startup, shutdown, and malfunction is reduced and can minimize the duration of noncompliance situations.

1.1 Purpose

The purpose of the SSM Plan is to:

- Ensure that each affected source, including associated air pollution control and monitoring equipment, is operated in a manner that satisfies the general duty to minimize emissions;
- Ensure preparations have been made to correct malfunctions as soon as practicable after their occurrence in order to minimize excess emissions of hazardous air pollutants; and
- Reduce the reporting burden associated with periods of startup, shutdown, and malfunction.

To satisfy the requirements of this section to develop a SSM Plan, the facility can use the affected source's standard operating procedures (SOP), Preventative Maintenance (PM) plan, or an Occupational Safety and Health Administration (OSHA) or other plan, provided the alternative plans meet all the requirements of this section and are made available for inspection or submitted when requested by the Administrator.

1.2 SSM Plan Requirements

The SSM Plan is to describe 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.

In addition to the above, the SSM Plan is to address the following items included in the sections below.

1.2.1 Actions Consistent with the SSM Plan

When actions during a startup or shutdown and the startup or shutdown causes the source to exceed any applicable emission limitation in the relevant emission standards, or malfunction including actions taken to correct a malfunction are consistent with the procedures specified in the affected source's SSM Plan, the owner or operator must keep records for that event which demonstrate that the procedures specified in the plan were followed. The records of these events must be kept (per 40 CFR 63.10(b)), including records of the occurrence and duration of each startup or shutdown (if the startup or shutdown causes the source to exceed any applicable emission limitation in the relevant emission standards), or malfunction of operation and each malfunction of the air pollution control and monitoring equipment.

1.2.2 Semi-Annual Reporting – Actions Consistent with the SSM Plan

CCI shall confirm that actions taken during the relevant reporting period during periods of startup, shutdown, and malfunction were consistent with the affected source's SSM Plan in the semiannual (or more frequent) startup, shutdown, and malfunction report required in 40 CFR **§63.10(d)(5)**.

1.2.3 Reporting – Actions Inconsistent with the SSM Plan

40 CFR §63.10(d)(5) requires that if an action taken during a startup, shutdown, or malfunction is not consistent with the procedures specified in the SSM Plan and the source exceeds any applicable emission limitation, the owner or operator must record the actions taken for that event and must report such actions within 2 working days after commencing actions inconsistent with the plan, followed by a letter within 7 working days after the end of the event.

1.2.4 Plan Availability

The SSM Plan must be maintained on site and available for inspection for the life of the affected source at the site and will be made available upon request for inspection and copying by either the United States Environmental Protection Agency (USEPA) and/or the Michigan Department of Environmental Quality (MDEQ).

1.2.5 Document Control

If the SSM Plan is subsequently revised, CCI will maintain at the facility each previous version of the SSM Plan and will make each such previous version available for inspection and copying by the Administrator for a period of 5 years after revision of the SSM Plan.

1.2.6 Rule Applicability and Closure

If at any time after adoption of the SSM Plan the facility ceases operation or is otherwise no longer subject to the provisions of this part, a copy of the most recent SSM Plan shall be maintained for 5 years from the date the source ceases operation or is no longer subject to this part and must make the SSM Plan available upon request for inspection and copying by the USEPA and/or the MDEQ.

1.2.7 State and Federal Copy Request

The MDEQ and/or the USEPA may at any time request in writing that the owner or operator submit a copy of the SSM Plan. Upon receipt of such a request, a copy of a requested SSM Plan must be promptly submitted. CCI may elect to submit the required copy of any SSM Plan in an electronic format. Should CCI claim that any portion of the SSM Plan is confidential business information entitled to protection from disclosure, the material claimed as confidential must be clearly designated in the submission.

1.2.8 Plan Revisions

The facility may periodically revise the SSM Plan for the affected source as necessary to satisfy the requirements of this part or to reflect changes in equipment or procedures at the affected source. Unless the permitting authority provides otherwise, the owner or operator may make such revisions to the SSM Plan without prior approval by the Administrator or the permitting authority. However, each such revision to a SSM Plan must be reported in the semiannual report required by 40 CFR §63.10(d)(5).

If the SSM Plan fails to address or inadequately addresses an event that meets the characteristics of a malfunction, but was not included in the SSM Plan at the time the

facility developed the plan, the facility must revise the SSM Plan within 45 days after the event to include detailed procedures for operating and maintaining the source during similar malfunction events and a program of corrective action for similar malfunctions of process or air pollution control and monitoring equipment. In the event that the facility makes any revision to the SSM Plan which alters the scope of the activities at the source which are deemed to be a startup, shutdown, or malfunction, or otherwise modifies the applicability of any emission limit, work practice requirement, or other requirement in a standard established under this part, the revised plan shall not take effect until after the owner or operator has provided a written notice describing the revision to the permitting authority.

1.2.9 Plan Interaction with Title V Permit

The Title V (ROP) permit for an affected source must require that the owner or operator develop a SSM Plan which conforms to the Foundry MACT Rule, but may do so by citing to the relevant subpart or subparagraphs of paragraph §63.6(e) of this section. However, any revisions made to the SSM Plan in accordance with the procedures established by the Foundry MACT Rule requirement shall not be deemed to constitute permit revisions under Part 70 or Part 71 and the elements of the SSM Plan shall not be considered an applicable requirement as defined in §70.2 and §71.2. Moreover, none of the procedures specified by the SSM Plan shall be deemed to fall within the permit shield provision in Section 504(f) of the Act.

1.3 Deviations and Violations During the SSM Plan

It is important to recognize the difference between deviations and violations in the context of periods of startup, shutdown and malfunction. CCI will report each instance in which an applicable emissions limitation and/or operating limit was not met including during periods of startup, shutdown and malfunction. Similarly, CCI will report each instance in which the facility did not meet each work practice standard and each operation and maintenance requirements.

During periods of startup, shutdown, and malfunction, CCI will operate in accordance with the SSM Plan. During these periods, if CCI demonstrates to USEPA's satisfaction that the foundry was operating in accordance with the SSM Plan, the deviation is not a violation.

Section 2
Process Description

2.1 Background

The CCI foundry manufactures iron castings. For purposes of the Foundry MACT, the CCI foundry is an existing iron foundry.

Emission sources subject to a Foundry MACT emissions limit at the CCI facility include the cupola melt furnace which utilizes an afterburner for carbon monoxide and volatile organic compound (VOC) control and a venturi scrubber for particulate control and the A-Line pouring station which utilizes a regenerative thermal oxidizer for VOC and particulate control.

2.2 Cupola Furnace

The cupola is a cylindrical steel shell with cooling water cascading down the exterior wall. A charge, includes metallics, flux, and fuel, is conveyed into the cupola through the charge door. Metallic raw materials may include pig iron, filter casings, iron and steel scrap, and foundry returns. Flux is generally limestone. The fuel is coke.

A "coke bed" at the bottom of the cupola shell is combusted with the help of blast air that is supplied to this area through tuyeres. The hot combustion gases move up inside the cupola shell and pre-heat the charge materials in the upper part of the cupola. The exhaust gases are then withdrawn from the cupola and ducted to an air pollution control system where the gases are cooled and cleaned before being discharged to the atmosphere. Melting occurs in the "melt zone" above the coke bed near the bottom of the cupola shell where the molten metal is collected in a reservoir. As the melt proceeds, new charges are added at the top. The flux combines with nonmetallic impurities in the iron to form slag, which can be removed. Both the molten iron and the slag are removed through openings at the bottom of the cupola.

Exhaust gases are withdrawn from the cupola above the charge door (above charge door take-off) and pass through an afterburner and venture scrubber used to clean the exhaust gases. Afterburners are located above the charge door and remove carbon monoxide (CO), volatile organic compounds (VOCs), and organic HAPs from the exhaust gases. After the exhaust gases exit the combustion zone, they are cooled and then sent to the venturi scrubber system.

Per Subpart EEEEE, the cupola scrubber is subject to a particulate matter (PM) limit of 0.006 gr/dscf (or 0.005 gr/dscf total metal HAP) or a limit of 0.10 lb PM per ton of metal melted (or 0.008 lb total metal HAP per ton of metal melted). Volatile organic hazardous air pollutant

(VOHAP) emissions are limited to 20 ppm as hexane at 10 percent oxygen. However, the cupola MACT compliance date has been extended until April 23, 2008. Therefore, this SSMP is not effective for the cupola until that date or until the compliance demonstration for the cupola has taken place, whichever is earlier.

2.3 Pouring Operations

Following the production of molten metal at the cupola, the metal is transferred via ladles to either the SPO or the A-Line molding and casting production lines where molten metal is poured into the finished mold and core assemblies. Only the A-Line discharges emissions through a conveyance and thus is an affected source and included in this SSMP.

The A-Line pouring station exhausts to a regenerative thermal oxidizer (RTO) for VOC and particulate control. Per Subpart EEEEE, the A-Line pouring exhaust is subject to a particulate matter (PM) limit of 0.010 gr/dscf or 0.0008 gr/dscf total metal HAP.

Section 3
Compliance Demonstration

3.1 Regulatory Compliance Requirements

The following presents a brief compliance demonstration discussion for each affected source.

3.1.1 Cupola

The cupola is controlled by several air pollution control (APC) devices in series. The first control device is an afterburner. The Iron and Steel Foundries MACT requires the afterburner to operate at a minimum temperature of 1,300°F. A volatile organic hazardous air pollutant (VOHAP) emission limit of 20 ppm as hexane at 10 percent oxygen is also imposed by the Foundry MACT.

A quencher are used to cool the gas stream. The gas stream then passes through a fan and into the venturi scrubber. After the venturi, the exhaust gases pass though a demister and then to atmosphere via an exhaust stack. The cupola is subject to a particulate matter (PM) limit of 0.006 gr/dscf (or 0.005 gr/dscf total metal HAP) or a limit of 0.10 lb PM per ton of metal melted (or 0.008 lb total metal HAP per ton of metal melted).

The initial performance test (IPT) for the cupola system will validate the control equipment that the facility selected to maintain compliance with the MACT standard. It will also validate the operating limits selected for the capture system.

To determine compliance with the PM emission limits for the cupola, a minimum of three valid test runs must be conducted. Each run must collect at least 60 gr/dscf of gas. The United States Environmental Protection Agency (USEPA) Reference Methods 1 or 1A; 2, 2A, 2B, 2C, 2D, 2F, or 2G; 3, 3A, or 3B; 4; and 5D will be used. During each test run, you must sample only while the cupola is on blast. During this test, the charge door pressure transducer and the afterburner temperature must be monitored.

The VOHAP emissions from the afterburner will be determined using Reference Methods 1 or 1A; 2, 2A, 2B, 2C, 2D, 2F, or 2G; 3, 3A, or 3B; 4; and 25A. The average VOHAP from the afterburner must use a minimum of three valid tests runs, with each test run including at least 60 continuous operating minutes.

3.1.2 Pouring Station

The A-Line pouring station is controlled by an RTO. The Iron and Steel Foundries MACT limits the pouring station PM emissions to less than 0.010 gr/dscf or a total metal HAP limit of 0.0008 gr/dscf.

To determine compliance with the PM emission limits for the pouring station, a minimum of three valid test runs must be conducted. Each run must collect at least 60 dscf of gas. The USEPA Reference Methods 1 or 1A; 2, 2A, 2B, 2C, 2D, 2F, or 2G; 3, 3A, or 3B; 4; and 5D will be used. During this test, appropriate operating parameters identified as parametric emission indicators must be continuously monitored.

3.2 Continuous Monitoring System

Continuous Monitoring System (CMS) is a comprehensive term that may incorporate, but is not limited to, the following: continuous emission monitoring instruments, continuous parametric monitoring systems, or other manual or automatic monitoring devices that are used to demonstrate compliance with an applicable regulation on a continuous basis, as defined by the regulation.

CCI uses the following parametric monitoring systems to demonstrate compliance with the MACT requirements.

3.2.1 Cupola

Process operating parameters for the cupola, as required by the Iron and Steel Foundries MACT standard include:

- venturi scrubber water flow rate
- pressure drop across the venturi scrubber
- temperature of the afterburner

Scrubber Water Flow Rate

Per 40 CFR 63.7740(d), for each wet scrubber, the scrubber water flow rate will be monitored to ensure it is within normal range. The water flow rate readings are recorded continuously to determine a 3-hour average flow rate.

Pressure Drop Across Scrubber

Per 40 CFR 63.7740(d), for each wet scrubber, the pressure drop will be monitored to ensure it is within normal range. The pressure drop readings are recorded continuously to determine a 3-hour average pressure drop.

Afterburner Temperature

Per 40 CFR 63.7740(3), for each combustion device, the temperature will be monitored to ensure it is within normal range and above 1,300°F. The afterburner temperature is recorded continuously to determine a 15-minute average combustion zone temperature.

3.2.2 A-Line Pouring

Process operating parameters for the A-Line pouring, as required by the Iron and Steel Foundries MACT standard include:

– temperature of the RTO

Temperature of the RTO

As the particulate matter emitted from the A-Line pouring is almost all organic particulate, the combustion zone temperature of the RTO is an adequate indicator that complete combustion and reduction of particulate is occurring. The RTO combustion bed temperature will be monitored to continuously as required by the current ROP and to ensure it is within normal range and above the level required in the ROP. The RTO is not subject to the same combustion device CPMS and temperature monitoring requirements as the cupola afterburner. Rather, it is subject to the general operating parameter requirements of 40 CFR 63.7690(c).

3.3 Cupola Compliance

This section provides definitions of “operating” versus “non-operating”, and “controlling” versus “excess emissions” for the cupola operations. Definitions of startup, shutdown and malfunction are found in Section 4.

3.3.1 Operation vs. Non-Operation

CCI deems the cupola to be “operational” when metal is melting in the cupola. When the cupola is in “operational” mode, the SSM Plan must be followed, or equivalent

actions taken to minimize emissions during periods of startup, shutdown, or malfunction.

CCI deems the cupola to be "non-operational" when not melting in the cupola. When the cupola is in "non-operational" mode, the SSM Plan does not need to be followed.

Records will be kept when melting is taking place via computerized data collection.

3.3.2 Controlled Emissions vs. Excess Emissions

Regarding the cupola, CCI is considered to be in compliance with all emissions when the process operating parameters identified as compliance parameters are within the established operating ranges. Operational personnel will verify that the cupola and its control equipment are operating at acceptable emissions levels.

3.4 A-Line Pouring Station Compliance

This section provides definitions of "operating" versus "non-operating" and "controlling" versus "excess emissions" for the A-Line pouring station. Definitions of startup, shutdown, and malfunction are found in Section 4.

3.4.1 Operation vs. Non-Operation

CCI deems the pouring station to be "operational" when iron is being poured from a ladle into a mold. When the pouring station is in "operational" mode, the SSM Plan must be followed, or equivalent actions taken to minimize emissions during periods of startup, shutdown, or malfunction.

CCI deems the pouring station to be "non-operational" when there is no iron being poured from a ladle into a mold. When the pouring station is in "non-operational" mode, the SSM Plan does not need to be followed.

3.4.2 Controlled Emissions vs. Excess Emissions

The A-Line pouring station is considered to be in compliance with all emission limits when the RTO temperature is within the established operating ranges as determined during emission testing and as specified in the ROP.

Section 4
Emission Classification

The NESHAP regulations allow for excess emissions during startup, shutdown, and malfunction periods. CCI intends to minimize excess emissions whenever possible, even during these periods. In order to document compliance with the NESHAPs general provisions during startup, shutdown, and malfunction, CCI has classified what constitutes the startup, shutdown, and malfunction. These classifications are described below. The procedures followed by CCI during a startup, shutdown, or malfunction event are located in this section. A fourth excess emission classification is referred to as "non-classified excess emissions" and is described in the Subsection 4.4.

4.1 Startup

Startup is defined as the setting in operation of an affected source for any purpose. During the startup period, there is a potential that emissions could exceed the regulatory limitations.

4.1.1 Cupola Startup Procedures

The following constitute cupola startup:

Begin of workweek startup:

1. Start the venturi scrubber fan and water pump
2. Start the afterburners
3. Start the tuyere blower

The detailed CCI cupola startup procedure is described in Work Instruction No._____ .

Startup following "off-blast":

Cupola operations are determined to be normal following startup if all systems are ready and the blast air comes on when restarted.

When the cupola goes through a startup event, the procedures must be consistent with the procedures listed above. Should an excess emission event occur during startup, then the flow diagram in Appendix B should be consulted. If an excess emission occurs and the procedures in Appendix B are not followed, the instructions in Subsection 6.1.2 "Category 2" should be followed. These instructions are:

- the change in the procedures and duration of the event should be recorded in the Excess Emission Report (Appendix A)
- for malfunctions, the corrective action plan outlined in the Operations and Maintenance plan and Subsection 4.3.1 must be followed
- a report of the event must be communicated to the permitting agency within two working days after commencing actions inconsistent with the SSM Plan
- a follow-up letter explaining the situation must be sent to the permitting agency within 7 working days of the end of the event

CCI's environmental department will initiate a review of each of these events and will determine if procedures need to be modified. A discussion of these events will be included in the semi-annual report.

4.1.2 Pouring RTO Startup Procedures

1. Start the RTO exhaust fan
2. Start the RTO burners

Commence pouring molds when RTO is up to temperature and line is operational.

When the pouring station goes through a startup event, the procedures must be consistent with the procedures listed above. Should an excess emission event occur during startup, then the process flow diagram in Appendix B should be consulted. If an excess emission occurs and the startup procedures above are not followed, then the following instructions in Subsection 6.1.2: "Category 2" should be followed. These instructions include:

- the change in the procedures and duration of the event should be recorded in the Excess Emission Report (Appendix A);
- for malfunctions, the corrective action plan outlined in the Operations and Maintenance plan and Subsection 5 must be followed;
- a report of the event must be communicated to the permitting agency by the next working day after commencing actions inconsistent with the SSM Plan; and
- a follow-up letter explaining the situation must be sent to the permitting agency within 7 working days of the end of the event.

CCI will review these events and will determine if procedures need to be modified. A discussion of these events will be included for each deviation noted in the semi-annual compliance report

4.2 Shutdown

Shutdown is defined as the cessation of operation of an affected source or portion of an affected source for any purpose. During the shutdown period, there is little potential for excess PM emissions since metal is not being charged into the cupola.

When the cupola or A line pouring station go through a shutdown event, the procedures must be consistent with the procedures listed above. Should an excess emission event occur during startup, then the process flow diagram in Appendix B should be consulted. If an excess emission occurs and the startup procedures above are not followed, then the following instructions in Subsection 6.1.2: "Category 2" should be followed. These instructions include:

- the change in the procedures and duration of the event should be recorded in the Excess Emission Report (Appendix A);
- for malfunctions, the corrective action plan outlined in the Operations and Maintenance plan and Subsection 5 must be followed;
- a report of the event must be communicated to the permitting agency by the next working day after commencing actions inconsistent with the SSM Plan; and
- a follow-up letter explaining the situation must be sent to the permitting agency within 7 working days of the end of the event.

CCI will review these events and will determine if procedures need to be modified. A discussion of these events will be included for each deviation noted in the semi-annual compliance report.

4.2.1 Cupola Shutdown Procedures

To shutdown the cupola, the following normal procedures will be followed:

1. Stop the tuyere blower
2. Stop the afterburner
3. Stop the venturi scrubber fan and water pump.

The Work Instruction No. _____describes the procedure in detail.

To go on off-blast the blast air is turned off.

4.2.2 Pouring RTO Shutdown Procedures

1. Stop the RTO burners
2. Stop the RTO exhaust fan.

The Work Instruction No. _____describes the procedure in detail.

4.3 Malfunction

Malfunction is defined as a sudden or infrequent failure, or failure that is not reasonably preventable, or an event that causes the process to not operate in a normal or usual manner which is *not* caused in part by poor maintenance or careless operation.

Each potential malfunction that can reasonably be foreseen is listed in Table 1, including some potential causes of failure and examples. When a malfunction occurs, the checklist located in Appendix A will be completed.

Table 1
List of Reasonably Foreseeable Malfunctions and Definitions

	DEFINITIONS
Supervisory Control and Data Acquisition (SCADA) System Failure	The total equipment required to meet the data acquisition and control requirements, such as PLCs, data loggers, chart recorders, and operator logs. Failures would include such things as a PLC card that goes bad, loss of instrument transmitter input signal, loss of operator logs, and computer system crashes.
Instrument Failure	Instruments include all CMSs such as magnahelic gauges. Failures would include such things as shorting of electrical wiring or elements, loss of transmitter output signal, plugged tubing, and corrosion.
Equipment Failure	Any process units or control devices that would effect emissions such as blowers, scrubbers, afterburners, dampers, and screws. Failures would include such things as jamming of rotating equipment, loss of structural integrity, loss of belts or chain drives, misaligned or worn parts, and plugging of equipment.
Capture System Failure	This includes all ductwork, dampers, and other parts of the capture system between the cupola and the scrubber and the A-Line pouring and the RTO.
Utility Supply Failure	Utilities include electrical, compressed air, nitrogen, and natural gas. Failures would include such things as interruption of electrical or natural gas supply from the local utility company, blown fuses or transformers, and mechanical or electrical lines damaged.
Continuous Parameter Monitoring System (CPMS) Excursion (Outside of Range)	Excursions would include such things as when the cupola scrubber pressure drop, scrubber water flow rate, or afterburner temperature is out of range.
Acts of God	Would include such things as lighting strikes, tornadoes, high winds, floods, and earth quakes.

4.3.1 Malfunction Corrective Action Procedure

In the case of an event resulting from a malfunction, the equipment or instrumentation must be repaired or replaced as soon as practicable. Corrective actions must be initiated when a process parameter deviates from the value or range listed in the Operation and Maintenance plan.

Follow-up actions should be taken to return operating parameters to levels listed in the Operation and Maintenance plan. Follow-up actions should also include measures to prevent the recurrence of deviations from operating parameter values or ranges and a system to record the actions taken to correct the malfunction. The cause of the malfunction, the actions taken during the malfunction, as well as the time the malfunction began and ended, will be recorded on the Excess Emission Report provided in Appendix A.

When the operation has a malfunction, the corrective action procedures must be consistent with the procedures listed in Section 5 of the Operation and Maintenance plan. Should an excess emission event occur during a malfunction and the procedures are properly followed and documented, then *no violation has occurred.* Follow the procedures outlined in Subsection 6.1.1, "Category 1." that include:

- Documentation should be maintained during cupola and A-Line pouring station startup and shutdown, and in the event of a system malfunction for the duration of that event.
- Records of each event should be maintained to verify that the SSM Plan was followed. The means to document the startup, shutdown, and malfunction event is completion of the Excess Emission Report (Appendix A).
- The corrective action plan outlined in Subsection 5 must be followed for malfunction excess emissions.
- For each semi-annual period, the records will be aggregated and a summary report will be completed. The amount of time in which excess emissions occurred for startup, shutdown, and malfunction will be reported.

If an excess emission occurs and the procedures are not followed, the instructions in Subsection 6.1.2: "Category 2" should be followed. These instructions include:

- the change in the procedures and duration of the event should be recorded in the Excess Emission Report (Appendix A);
- for malfunctions, the corrective action plan outlined in Section 5 of the Operations and Maintenance plan and Subsection 5 must be followed;
- a report of the event must be communicated to the permitting agency within two working days after commencing actions inconsistent with the SSM Plan; and
- a follow-up letter explaining the situation must be sent to the permitting agency within 7 working days of the end of the event.

CCI will review these events and will determine if procedures need to be modified. A discussion of these events will be included for each deviation noted in the semi-annual compliance report.

Failure to follow documented procedures is not a violation, as long as the actions taken are documented and demonstrate that they were at least as effective at minimizing excess emissions during the malfunction.

4.3.2 Unidentified Malfunctions

Should a malfunction occur that is not identified in the SSM Plan, then *no violation has occurred* as long as the plan is updated within 45 days. The procedures outlined in Subsection 6.1.3 "Category 3" should be followed. These procedures include:

- Ensure the event meets the definition of a malfunction – A malfunction is a sudden or infrequent failure, or failure that is not reasonably preventable, or an event that causes the process to not operate in a normal or usual manner which is *not* caused in part by poor maintenance or careless operation.
- The procedures followed during such an event should be recorded by completing the Excess Emission Report (Appendix A).
- A report of the event must be communicated to the permitting agency within two working days after commencing actions inconsistent with the SSM Plan.
- A follow-up letter explaining the situation must be sent to the permitting agency within 7 working days of the end of the event.
- CCI will initiate a review of each of these events and will update this SSM Plan within 45 days.
- A discussion of these events will be included in the semi-annual report.

Note: These must be true malfunctions in that they are sudden, infrequent, not reasonably preventable, and not the result of poor maintenance or improper operation.

4.4 Non-Classified Excess Emissions

Excess emissions recorded during cupola or A-Line pouring operations that are not the result of a system startup, shutdown, and malfunction, as defined above, are considered to be non-classified excess emissions. Such excess emissions may be the result of operator or maintenance staff failing to follow procedures outlined in this SSM Plan and/or the Operations and Maintenance plan, or may be attributed to improper system operation or improper preventive maintenance. Non-classified excess emissions are categorized as follows:

- Excess emission events due to operator error or improper maintenance.
- Excess emission events not identified in the SSM Plan.

4.4.1 Excess Emissions Due to Operator Error or Poor Preventive Maintenance

Excess emissions due in part to operator error or poor preventive maintenance are by definition not considered malfunctions. If an excess emission is found to be an error by the operator or poor maintenance, *a violation has occurred.* The procedures listed under Subsection 6.1.4 "Category 4" should be followed. These procedures include:

- Report events considered to be non-classified emissions to the permitting agency according to the state requirements listed in Section 6.1.
- Follow the corrective action plan (Subsection 4.3.1).
- Include a discussion of the events in the semi-annual report.

4.4.2 Excess Emission Due to Events Not Identified in the SSM Plan

When an excess emission event occurs that is not a malfunction and the event is not identified in this SSM Plan, then *a violation has occurred.* The procedures listed under Subsection 6.1.4 "Category 4" should be followed. These procedures include:

- Report events considered to be non-classified emissions to the permitting agency according to the state requirements listed in Section 6.1.
- Follow the corrective action plan (Subsection 4.3.1).
- Include a discussion of the events in the semi-annual report.

Section 5
Continuous Monitoring System Downtime Determination

For CCI's cupola system, afterburner combustion zone temperature, and venturi scrubber pressure differential and water flow rate are monitored. For the RTO, combustion zone temperature is monitored. The instrumentation used for CMS must be properly maintained and calibrated. In the event of CMS failure, the CMS must be corrected prior to melting with the cupola. Additional record keeping and reporting requirements are outlined in Subsection 6.3 "Record Retention."

5.1 Continuous Monitoring System Performance

The SSM Plan must contain the performance indicators, frequency of monitoring, the technique used, and the averaging period. Table 2 summarizes these parameters.

Table 2
Cupola Continuous Monitoring System Requirements

EQUIPMENT	PERFORMANCE INDICATOR	MEASUREMENT TECHNIQUES	MONITORING FREQUENCY	AVERAGING PERIODS
Afterburner temperature: thermocouple, display,	Temperature above 1,300°F	Temperature	2.5 minutes	15 minutes (from 63.7690(b)(3))
Venturi scrubber pressure differential	Pressure differential < 42 inches water gage	Static pressure	15 minutes	15 minutes
Venturi scrubber water flow rate	Water flow rate <115 gallons per minute	Water flow rate	15 minutes	15 minutes

Table 3
RTO Continuous Monitoring System Requirements

EQUIPMENT	PERFORMANCE INDICATOR	MEASUREMENT TECHNIQUES	MONITORING FREQUENCY	AVERAGING PERIODS
Combustion zone temperature: thermocouple, display	Temperature above minimum identified is stack test or ROP	Temperature	2.5 minutes	1 hour

5.2 Maintenance

Preventive maintenance is routinely scheduled for critical equipment and instrumentation in the facility and is included in the Operation and Maintenance (O&M) plan. The instrumentation associated with the CMS is included in the O&M plan. This program involves regular checks of equipment and completion of work orders. The maintenance department records the completion of the work orders in their computerized maintenance program.

5.3 Spare Parts

The facility maintains a spare parts inventory for routine and critical equipment and instrumentation. Spare parts and replacement instruments are kept in the maintenance crib. However, if the appropriate parts are not available, the system will not restart until the equipment is properly repaired.

5.4 Malfunctions

There are a number of predictable malfunctions associated with the CMS instrumentation. Table 3 identifies these malfunctions. During this time period, compliance with emission requirements is unknown, which triggers specific requirements. When these malfunctions occur, the instrumentation will be either repaired or replaced immediately as required by the NESHAPs general provisions, and reporting will be completed as outlined in Subsection 6.1.5 "Category 5." These include the following:

Table 4
Continuous Monitoring System Malfunctions

EQUIPMENT	POTENTIAL MALFUNCTION
Cupola afterburner temperature monitoring system	Out of calibration Data logger failure PLC failure Thermocouple failure Transmitter failure Utility supply failure
Venturi scrubber pressure differential monitoring system	Out of calibration Data logger failure PLC failure Instrument failure Utility supply failure
Venturi scrubber water flow rate monitoring system	Out of calibration Data logger failure PLC failure Instrument failure Utility supply failure
RTO combustion zone temperature monitoring system	Out of calibration Data logger failure PLC failure Thermocouple failure Transmitter failure Utility supply failure

5.5 Calibrations

The CMS instrumentation must be properly calibrated to provide accurate readings. The CMS instrumentation is inspected and calibrated, according the schedule in CMMS. If an instrument is repeatedly out of calibration, it is replaced. Documentation is maintained of the inspection, the condition of the instrument as found, and the condition of the instrument after inspection and/or calibration.

Section 6
Recordkeeping/Reporting

The NESHAP regulations require that records be kept for each startup, shutdown, and malfunction event that occurs at an affected source. These occurrences are defined in Section 4. The records will illustrate that the procedures followed were consistent with the procedures outlined in the SSM Plan. If the procedures in the plan were not followed, the records will explain the alternative procedure followed in order to minimize emissions. The records for excess emission events are kept by using the checklist format in Appendix A. Appendix B provides a flow chart for excess emission recordkeeping and reporting requirements.

6.1 Recordkeeping for an Excess Emission Event

When a startup, shutdown, and malfunction event occurs at the plant, records will be kept of each event. The procedures listed in Section 4 define an event. The recordkeeping and reporting requirements are described below. For recordkeeping and reporting purposes, five categories have been identified.

- **Category 1** – Excess emissions associated with a startup or shutdown event, or any malfunction event, identified in the SSM Plan and the procedures in the plan have been followed (63.6(e)(3)(iii))
- **Category 2** – Excess emissions associated with a startup, shutdown, and malfunction event identified in the SSM Plan and the procedures in the SSM Plan have *not* been followed (63.6(e)(3)(iv))(NOTE: Effective April 20, 2006, this is no longer considered a violation of the SSM Plan requirements)
- **Category 3** – Malfunction event, *not* identified in the SSM Plan
- **Category 4** – Non-classified excess emissions
- **Category 5** – Unknown emissions due to CMS downtime

MDEQ requires immediate notification of excess emissions, regardless of the cause or corrective actions followed. These reporting requirements are in addition to those required by the MACT standard.

6.1.1 Category 1 – Excess Emissions Associated with a Startup or Shutdown Event, or any Malfunction Event, Identified in the Plan and the Procedures in the Plan Have Been Followed

Procedures should be followed as described in Section 4. Documentation should be maintained during equipment startup and shutdown, and in the event of a system malfunction for the duration of that event as defined in Section 4. Records of each event should be maintained to verify that the SSM Plan was followed. The means to document the startup, shutdown, and malfunction event is completion of the Excess Emission Report (Appendix A). The corrective action plan outlined in Subsection 5 must be followed.

Records or reported excess emissions are to be stored on site. For each semi-annual period, the records will be aggregated and a summary report will be completed. The amount of time in which excess emissions occurred for startup, shutdown, and malfunction will be reported.

6.1.2 Category 2 – Excess Emissions Associated with a Startup, Shutdown, and Malfunction Event Identified in the Plan and the Procedures in the Plan Have Not Been Followed

If the startup, shutdown, and malfunction procedures in Section 4 were not followed during the startup, shutdown, and malfunction event, the change in the procedures and duration of the event should be recorded. The means to record this event is completion of the Excess Emission Report (Appendix A). For malfunctions, the corrective action plan outlined in Section 5 of the Operations and Maintenance plan and Subsection 4.3.1 SSM Plan must be followed.

CCI will review these events and will determine if procedures need to be modified. A discussion of these events will be included for each deviation noted in the semi-annual compliance report.

6.1.3 Category 3 – Malfunction Event Not Identified in the Plan

A malfunction may occur that is not identified in the SSM Plan. The event must clearly meet the definition of a malfunction: A sudden or infrequent failure, or failure that is not reasonably preventable, or an event that causes the process to not operate in a normal or usual manner which is *not* caused in part by poor maintenance or careless operation.

The procedures followed during such an event should be recorded by completing the Excess Emission Report (Appendix A).

CCI will review these events and will determine if procedures need to be modified and will update this SSM Plan within 45 days. A discussion of these events will be included for each deviation noted in the semi-annual compliance report.

6.1.4 Category 4 – Non-Classified Excess Emissions

Events considered to be non-classified emissions (excess emissions not associated with startup, shutdown or malfunction) must be reported via MDEQ reporting procedures. The O&M corrective action plan (Subsection 5) must be followed (63.7551(b)(7-8)).

6.1.5 Category 5 – Unknown Emissions Due to CMS Downtime

Records must be maintained for the time that the CMS is off-line while the process is in operation. This includes calibration as well as malfunction. The CMS is considered down when any of the required instruments are not properly transmitting/recording data or the data transmitted is inaccurate.

If the equipment is repaired or replaced immediately, then CCI is required to include in each CMS summary report a record of the CMS performance that includes total CMS downtime during the reporting period (reported in hours) and total duration of CMS downtime expressed as a percentage of the operating period. Also to be included is a breakdown of CMS downtime attributable to monitoring equipment malfunctions, non-monitoring equipment malfunctions, quality assurance/quality control calibrations, other known causes, and unknown causes.

Any excess emissions must be reported per MDEQ reporting procedures.

6.2 Semi-Annual Reporting Periods

Throughout each semi-annual period records are kept and filed of system operation and excess emission events that occur. At the end of each semi-annual period, the information will be aggregated and a summary report will be completed by CCI. These events include startup and shutdown periods, as well as procedures followed when a malfunction occurs. All revisions to the SSM Plan must be reported in the semi-annual report.

6.3 Record Retention

CCI will maintain records of all startup, shutdown, and malfunction events that occur for the cupola and A-Line, their control equipment and CMS. CCI will also maintain records of the

actions taken during each startup, shutdown, and malfunction event. The report in Appendix A meets the regulatory requirements of recordkeeping that confirms procedures were followed in accordance to the SSM Plan for such events.

The files of all records, including reports and notifications, will be maintained in a suitable manner and will be readily available for inspection and review.

The files will be maintained for at least 5 years following the date of occurrence, measurement, maintenance, corrective action, report, or record. A minimum of 2 years of data will be retained on the site, and the remaining 3 years may be retained off site. The files may be maintained on microfilm, computer, magnetic tape disks, or microfiche.

Section 7
Plan Updates and Revisions

7.1 Plan Updates

The SSM Plan will be updated as required for the following reasons:

- modification to the process or CMS;
- as required by the permitting agency; or
- a previously unidentified malfunction is identified.

Any time a modification is planned for the cupola or A-Line pouring or any of the control devices, instrumentation, or continuous monitoring systems, an update to the SSM Plan may be required. Appropriate CCI personnel must be notified to review the proposed modification and to determine its effect on the SSM Plan.

The permitting agency can require that the SSM Plan be updated for the following reasons:

- It fails to address a startup, shutdown, and malfunction event that occurred.
- It fails to provide for operation of the source during a startup, shutdown, and malfunction event in a manner consistent with the general duty to minimize emissions.
- It fails to provide adequate procedures for correcting malfunctioning equipment as quickly as practicable.
- It includes an event that does not meet the definition of startup, shutdown, and malfunction listed in 63.2.

Should the permitting agency request an update to the SSM Plan, CCI will initiate the update procedure.

If a previously unidentified malfunction is identified, then the SSM Plan is required to be updated within 45 days (Subsection 6.1.3).

7.2 Update Procedures

An update to the SSM Plan can be requested from the operating facility, the permitting agency, or the environmental department. If requested, CCI will draft the plan modification. The revised plan will be distributed to all holders of controlled copies.

7.3 Startup, Shutdown, and Malfunction Plan Retention

CCI will keep the original version of this document and copies will be made available to staff for the life of the operations. If changes are required to this document for any reason, it is the environmental department's responsibility to update the original document and redistribute accordingly. The original version and each revision will be made accessible for inspection. When a version of the SSM Plan is updated, a copy of the previous version must be kept for a minimum of 5 years at the facility. This pertains to all past versions. Any past copies that were distributed should be discarded once a revised copy is distributed.

Appendix A
Excess Emission Report

Excess Emission Report

1. Which CMS parameter was exceeded?	c Burner Combustion Zone Temperature	c Scrubber Pressure Drop	c Scrubber Water Flow Rate
2. Date CMS parameter exceedance was detected: _____ Start Time: _____ Stop Time: _____	3. Purpose of report: c Startup event c Shutdown event c Malfunction event c CMS Malfunction c Poor maintenance / operations	*For startup or shutdown, go to No. 4* *For malfunction, go to No. 5* *Go to No. 8* *Go to No. 9*	

4. Startup / Shutdown

Startup – sources in operation, collecting gases, and venting to control device. c Yes c No *If yes, no further*
Shutdown – collection continued until sources generating emissions have completed shutdown. c Yes c No *action is required. Sign and date report.*

If no, what actions have been taken to minimize emissions during startup / shutdown?

5. Malfunction

Identify malfunction resulting in CMS parameter exceedance: _____

Collection System
- c Control valve failure at fan
- c Control valve failure at afterburner
- c Plugged flame arrestor
- c Process safety device failure

Process System
- c Thermocouple failure
- c Vent line plugged
- c Pump failure

Control System
- c Flame indicator failure
- c Limit switch failure
- c Temperature monitors
- c Pressure monitor
- c Water flow monitor

Monitoring System
- c Failed / lost calibration
- c Pressure line plugged
- c Transducer failure
- c Thermocouple failure

Operating System
- c Loss of computer system
- c Loss of plant air
- c Loss of water
- c Loss of power
- c Loss of natural gas
- c Process heater trip

Safety Systems
- c Safety interlocks/permissives/ process safety devices

c *Other malfunction (Brief description): If more room is needed, use back of sheet.*

6. Was the process immediately shutdown? c Yes c No

7. What actions have been taken to minimize emissions and correct the malfunction? *If more room is needed, use back of sheet.*

8. CMS Malfunction

What type of CMS equipment failed? _____
Was the CMS repair initiated immediately or a backup monitor used? c Yes c No
If yes, what time was the CMS properly working? _____
If no, what actions have been taken to repair or replace the CMS? _____
Total CMS Downtime: _____

9. Poor Maintenance / Operations

Describe situation resulting in excess emissions and actions taken to minimize excess emissions.

Completed by: _____ Date: _____

CALL AND FAX/E-MAIL TO ENVIRONMENTAL MANAGER WITHIN 4 HOURS OF EVENT

Appendix B
Excess Emission Recordkeeping and Reporting Flow Chart

Excess Emission Recordkeeping And Reporting Flow Chart