APPENDIX G

STARTUP, SHUTDOWN, AND MALFUNCTION PLAN

STARTUP, SHUTDOWN AND MALFUNCTION PLAN

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1.0 INTRODUCTION

Veolia ES Technical Solutions, LLC (Veolia) owns and operates two fixed hearth incinerators (Units 2 and 3) and a rotary kiln incinerator (Unit 4) at its facility located in Sauget, Illinois. The incinerators are subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Hazardous Waste Combustors (HWC), 40 CFR, Part 63, Subpart EEE (§ 63.1200 to § 63.1221). The NESHAP specifies emissions standards which reflect emissions performance of Maximum Achievable Control Technologies (MACT), and is commonly referred to as the HWC MACT.

The HWC MACT Standard defines the control of emissions during normal, day-to-day operations. In order to address the control of emissions during transient periods, the development of a Startup, Shutdown, and Malfunction Plan (SSMP) is required. Startup, shutdown, and malfunction (SSM) are defined in § 63.2 as follows:

- *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

During these transient periods of operations, a source must conform with its SSMP. Therefore, during periods of startup, shutdown, and malfunctions the operating and maintaining of the incinerator will be consistent with the procedures and corrective actions that are prescribed in this plan. This will ensure that emissions are minimized, to the extent practical.

The purpose of this startup, shutdown, and malfunction plan is to:

- Prescribe procedures for operating the incinerator systems during periods of startup, shutdown, and malfunction that are consistent with safety and good air pollution control practices
- Describe measures for the prevention and minimization of excess emissions during periods of startup, shutdown, and malfunction
- Reduce the reporting burden associated with periods of startup, shutdown, and malfunction
- Satisfy the requirements of § 63.1206(c) and § 63.6(e)(3), as shown in Table 1-1

Due to the similarity of the three incinerator systems, general references to an incinerator in this document will imply all three incinerator systems. Information that is only applicable to one or two of the three units will be clearly identified either parenthetically or delineated by the section heading.

As required by §§ 63.6(e)(v) and 63.6(e)(vi), this plan and other documents containing procedures or information referred to in this plan will be made available for inspection when requested by the Administrator. If Veolia is required to submit copies of this plan or portions of this plan (or related documents) confidential business information entitled to protection from disclosure will be clearly designated.

The remainder of this section provides an overview of regulatory requirements and a program for compliance with the recordkeeping and reporting requirements. Section 2.0 references an engineering description of the incinerator, air pollution control system, and continuous monitoring system. Section 3.0 addresses the startup and shutdown of the incinerator system. Section 4.0 addresses potential malfunctions of the incinerator system.

1.1 Regulatory Requirements

One of the objectives for this document is to establish a program that will ensure compliance with relevant sections of the Interim MACT Standards. Table 1-1 includes the regulatory requirements and the location of each requirement addressed herein.

1.2 Recordkeeping and Reporting Procedures

This section addresses the recordkeeping and reporting requirements related to periods of SSM. The startup, shutdown, and malfunction reports discussed in this plan ensure that Veolia is satisfying the general duty to minimize emissions and document that actions taken during those periods are consistent with this plan. These reports and records provide the necessary documentation to shield transient events from the HWC MACT emission standards imposed on steady-state operations.

As long as actions taken during a transient event sufficiently maintain the incinerator system within limits, there is no justification in distinguishing that event from steady-state operations. For example, problems may arise that meet the definition of a malfunction yet do not impact the ability to maintain the incinerator system within limits. In these cases, maintaining the incinerator system within limits substantiates that the actions taken sufficiently met the objectives of this SSMP and minimized emissions to a greater degree than required by regulations.

Table 1-1

Overview of Regulations Regarding Startup, Shutdown and Malfunction

Regulatory Citation	Description	SSMP Section
§ 63.6(e)(3)(i)	Purpose of the SSMP	1.0
§ 63.6(e)(3)(i)	Procedures for operating and maintaining the source during startup	3.1, Table 3-1
§ 63.6(e)(3)(i)	Procedures for operating and maintaining the source during shutdown	3.2, Table 3-1
§ 63.6(e)(3)(i)	Procedures for operating and maintaining the source during malfunction	Attachment 4
§ 63.6(e)(3)(i)	A program of corrective action for malfunctioning process	Attachment 4
§ 63.6(e)(3)(ii)	During SSM, operate and maintain source in accordance with SSMP	1.0
§ 63.6(e)(3)(iii)	Records and reports when actions conform with SSMP	1.2.1
§ 63.6(e)(3)(iv)	Records and reports when actions do not conform with SSMP and result in an exceedance	1.2.2
§ 63.6(e)(3)(v)	Availability of current and superseded SSMPs	1.2
§ 63.6(e)(3)(vi)	Use and availability of other plans	1.0
§ 63.6(e)(3)(viii)	Revisions to the SSMP	1.2.2
§ 63.10(b)(1)	Maintaining files	1.2
§ 63.10(b)(2)(i)	Record occurrence and duration of each startup and shutdown	1.2.1
§ 63.10(b)(2)(ii)	Record occurrence and duration of each malfunction	1.2.1
§ 63.10(b)(2)(iv)	Records of actions inconsistent with SSMP	1.2.1
§ 63.10(b)(2)(v)	Records demonstrating conformance with SSMP	1.2.1
§ 63.10(b)(2)(vi)	Record periods of malfunctioning CMS	1.2.1
§ 63.10(d)(5)(i)	Periodic startup, shutdown, and malfunction reports	1.2.2
§ 63.10(d)(5)(ii)	Immediate startup, shutdown, and malfunction reports	1.2.2
§ 63.1206(c)(2)(ii)(A)	Description of potential causes of malfunctions	Table 4-1, Attachment 4
§ 63.1206(c)(2)(ii)(A)	Actions to minimize the frequency and severity of malfunctions	4.1, 4.2 Table 4-2 Attachment 4
§ 63.1206(c)(2)(ii)(C)	Changes to the plan	1.2.2
§ 63.1206(c)(2)(iii)	Projected oxygen correction factor to use during startup and shutdown	3.0
§ 63.1206(c)(2)(iv)	Record plan in the operating record	1.2
§ 63.1206(c)(2)(v)(A)(1)	AWFCO requirements during malfunctions	3.0
§ 63.1206(c)(2)(v)(A)(3)(i)	Investigation and evaluation of excessive exceedances during malfunctions	1.2.2
§ 63.1206(c)(2)(v)(A)(3)(i)	Revisions to SSMP due to excessive exceedances during malfunctions	1.2.2
§ 63.1206(c)(2)(v)(A)(3)(ii)	Record results from investigation and evaluation of excessive exceedances	1.2.2
§ 63.12006(c)(2)(v)A(3)(ii)	Additions to excess emissions report [§ 63.10(e)(3)] due to excessive exceedances during malfunctions	1.2.2
§ 63.1206(c)(2)(v)(B)(1)	Waste feed restrictions and other OPLs during startup and shutdown	3.0
§ 63.1206(c)(2)(v)(B)(2)	Interlock OPLs of (c)(2)(v)(B)(1) with AWFCO system	3.0
§ 63.1206(c)(2)(v)(B)(3)	AWFCO due to exceedance of startup/shutdown OPL	3.0

Accordingly, the recordkeeping and reporting requirements presented in this section are only applicable to periods of SSM in which there is a reasonable expectation that an OPL or emission standard can not be met. This includes all startups, all shutdowns, and all malfunctions that result in an exceedance of an operating limit or emission standard. Malfunctions that prevent the ability to document on-going compliance are also subject to recordkeeping and reporting requirements.

This plan, all revisions to this plan, and all records and reports described in this section will be retained in the operating record for at least five years.

1.2.1 Records

SSM records will include the following:

- Date and time of each SSM
- The duration of each SSM
- Documentation to demonstrate that actions taken during periods of SSM are consistent with this SSMP
- Description of any actions taken during periods of SSM that are not consistent with procedures in this SSMP
- Results of investigations and evaluations of excessive exceedances occurring during malfunctions

Attachments 1, 2, and 3 are blank recordkeeping forms for startups, shutdowns, and malfunctions, respectively. The information recorded on these forms will be utilized to document conformance with the SSMP and to comply with the reporting requirements. The startup, shutdown, and malfunction reporting requirements are described in the next section.

1.2.2 Reports

Revisions to this SSMP may be made without prior agency approval to reflect changes in equipment and procedures and to meet the regulatory requirements. Any such revisions made during a semiannual reporting period will be submitted with the periodic SSM report. Revisions to this plan—which alter the scope of activities during a startup, shutdown, or malfunction—will not take effect until a written notice, describing the revisions, is submitted to the permitting authority. Changes made to this plan that may significantly increase emissions are subject to approval by the Administrator. A written request for approval of the changes and the revised SSMP will be submitted to the

Administrator within 5 days after making such a change to this plan. Should an SSM event occur that is not addressed or inadequately addressed in this SSMP, Veolia will make the appropriate revisions to this plan within 45 days after the event.

An investigation and evaluation will be performed on each set of 10 exceedances of a specific emission standard or a specific operating parameter limit that occur during malfunctions within a 60 day period. Within 45 days of the 10^{th} exceedance, the investigation will determine plausible causes for each excessive exceedance. The evaluation will conclude how to minimize the frequency, duration, and severity of each excessive exceedance. The excessive emissions report required under § 63.10(e)(3) will include a summary of each investigation and evaluation required during the semiannual reporting period. In addition, the excessive emissions report will include any changes to this plan that may result from required investigations and evaluations of excessive exceedances occurring during malfunctions.

Periodic SSM reports will be submitted to the Administrator semiannually, if a startup, shutdown, or malfunction occurred during that semiannual reporting period. This report will take the form of a letter to the Administrator and include the following information:

- A statement that actions taken during all periods of startup, shutdown, or malfunction were consistent with the procedures given in this SSMP
- The number, duration, and a brief description of each malfunction
- The name, title, and signature of the owner/operator (or other responsible official) certifying the accuracy of the report

An immediate SSM report will be submitted if an action performed during a period of SSM is not consistent with this plan; and an OPL or emission standard is exceeded. Within two working days after such an action, the Administrator will be advised via telephone or fax. Within 7 working days after such an action, a letter to the Administrator will be delivered or postmarked. The letter will explain the event, reasons for not following this plan, and descriptions of the excess emissions and/or operating parameter monitoring exceedances believed to have occurred. The letter will also include the name, title, and signature of the owner/operator (or other responsible official) certifying the accuracy of the report.

2.0 ENGINEERING DESCRIPTION

Brief descriptions of the fixed hearth incinerators and the rotary kiln incinerator are presented in this section. A detailed engineering description of the Unit 2 and 3 incinerators is provided by *Technical Description—Fixed Hearth, Incinerators Units NOS. 2 & 3*. A detailed engineering description of the Unit 4 incinerators is provided by *Technical Description, Transportable Rotary Kiln Incinerator Unit No. 4*. Drawing numbers PFD-2000, PFD-3000, PFD-4000 are the process flow diagrams for these incinerators. These documents and drawings are incorporated here by reference.

2.1 Fixed Hearth Incinerators

Each of the fixed hearth incinerators includes the following components:

- Feed equipment
- Primary and secondary combustion chambers
- Lime injection system
- Spray dryer absorber (SDA)
- Fabric filter baghouse
- Solids and ash removal systems
- Induced draft (ID) fan and stack
- Instrumentation, controls, and data acquisition systems

Figure 2-1 presents a block flow diagram of the Unit 2 incinerator system. The block flow diagram for Unit 3 is presented in Figure 2-2.

A variety of solid, liquid, and gaseous wastes are thermally treated in the fixed hearth incinerators. Solid waste is fed to the primary (lower) combustion chamber via a feed conveyor system and pneumatic ram. Liquid waste from tanks and tanker trucks are fed to the primary combustion chamber through two atomized liquid injectors.

Both Units 2 and 3 are equipped with a specialty waste feed systems. The Unit 2 primary waste from liquid containers and gas cylinders are fed to the Unit 2 primary combustion chamber through a specialty feed port. Waste from liquid containers is fed from a hooded feed system to the Unit 3 primary combustion chamber through a specialty feed injector. Off gases from the hooded feed emission control system are fed directly to

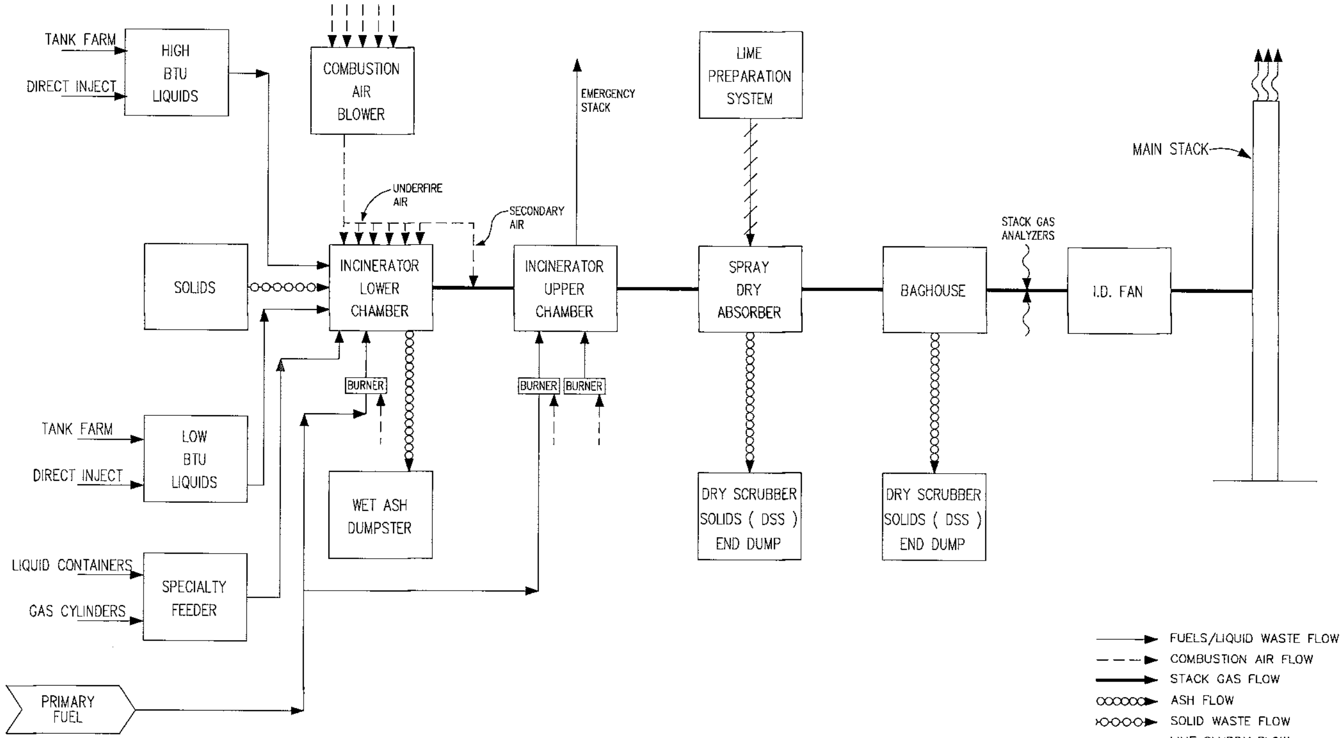

Figure 2-1 Fixed Hearth Incinerator, Unit 2, Block Flow Diagram

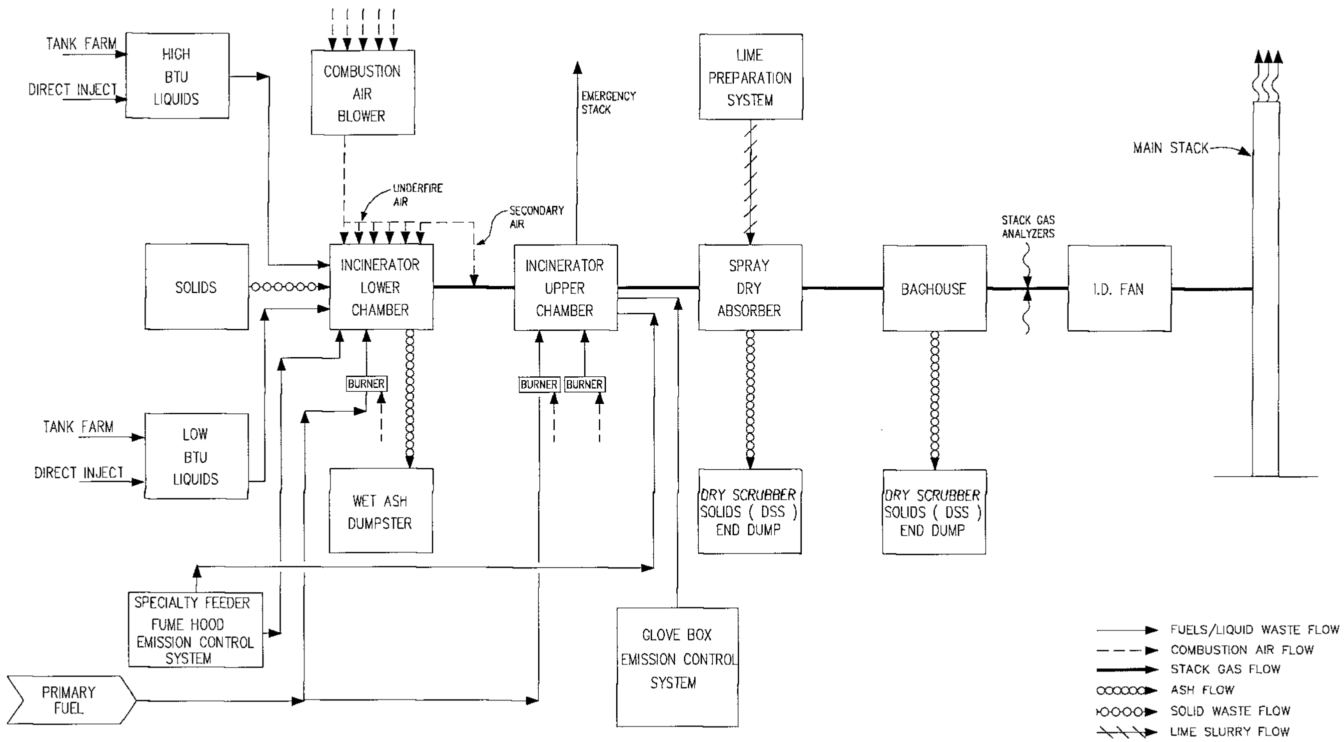

Figure 2-2 Fixed Hearth Incinerator, Unit 3, Block Flow Diagram

the Unit 3 secondary combustion chamber. Off gases from a waste handling glove box are also fed directly to the Unit 3 secondary combustion chamber.

The primary combustion chamber main burner and the secondary combustion chamber main burner are used to maintain temperatures on natural gas. Combustion gases exit the primary combustion chamber and enter into the secondary combustion chamber, which serves as an afterburner. Combustion gases exit the secondary combustion chamber and enter the SDA. The secondary combustion chamber is equipped with an emergency stack.

Lime slurry and water are fed to the SDA atomizer. The atomizer has a rapidly spinning wheel that atomizes the lime slurry and water into a cloud of fine droplets. Combustion gases are directed upward through a disperser in the SDA and into the cloud of fine droplet created by the atomizer. This provides acid gas removal and cooling of the combustion gas. Dried spent chemicals and ash settle to the bottom of the SDA and are discharged to the ash removal system.

Combustion gas exits the SDA and is distributed to the fabric filter modules. Unit 2 has four fabric filter modules and Unit 3 has three fabric filter modules. Combustion gas passes through Teflon-coated fiberglass cloth bags. Particles in the combustion gases are deposited on the outside of each bag in the filter module. During the bag cleaning cycle, a burst of air in the direction opposite to the gas flow dislodges particulate matter from the bag.

The induced draft fan is located downstream of the fabric filter baghouse. The induced draft fan moves the combustion gas through the system and exhausts the gas through the main stack.

Hot, wet gas is extracted downstream of the baghouse through a continuous emissions monitoring system. This system features a multi-component infrared gas analyzer that detects hydrogen chloride, carbon monoxide, and water vapor concentrations. An integrated zirconium oxide-based analyzer detects oxygen concentrations.

2.2 Rotary Kiln Incinerator

The rotary kiln incinerator includes the following components:

- Waste feed system

- Primary and secondary combustion chambers
- Tempering chamber
- Lime injection system
- Spray dryer absorber
- Carbon injection system
- Fabric filter baghouse
- Solids and ash removal systems
- Induced draft (ID) fan and stack
- Instrumentation, controls, and data acquisition systems

Figure 2-3 presents a block flow diagram of the Unit 4 incinerator system.

A variety of solid and liquid wastes are thermally treated in the rotary kiln incinerator. Solid wastes are fed to a ram feeder via a clamshell, a drum feed conveyor and an auxiliary feed conveyor. A hydraulic ram pushes the solid waste into the kiln. Liquid waste from tanks and tanker trucks is fed to the primary and secondary combustion chambers through atomized liquid injectors.

The primary combustion chamber main burner and the secondary combustion chamber main burner are used to maintain temperatures on natural gas. Combustion gases exit the primary combustion chamber and enter into the secondary combustion chamber, which serves as an afterburner. A surge vent is located at the front of the kiln and the secondary combustion chamber is equipped with a thermal relief vent.

Combustion gases exit the secondary combustion chamber and enter the tempering chamber. Process water is fed to tempering chamber through air atomized spray nozzles. Combustion gas is cooled as it passes through the spray of water. The water is completely vaporized, cooling the combustion gas. The combustion gas exits the tempering chamber and is distributed between two identical SDAs.

Lime slurry is fed to each SDA through air atomized spray nozzles. Combustion gases are directed downward through a duct in the SDA and then dispersed symmetrically into the cloud of atomized lime. This provides acid gas removal and cooling of the combustion gas. Dried spent chemicals and ash settle to the bottom of the SDA and are discharged to the ash removal system.

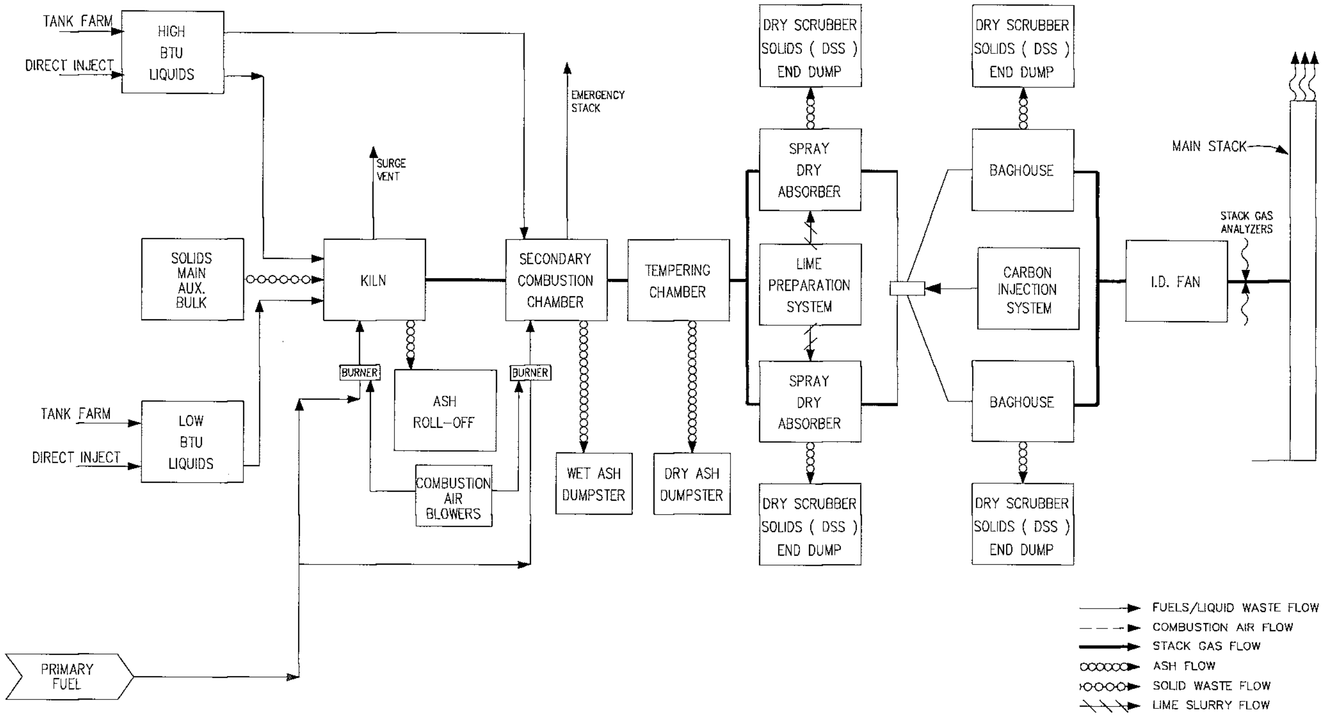

Figure 2-3 Rotary Kiln Incinerator, Unit 4, Block Flow Diagram

A carbon injection system is utilized for controlling dioxin/furan and mercury emissions. The activated carbon is air injected into the combustion gas immediately downstream of the convergence of combustion gases from the SDAs.

Combustion gases exit the SDAs and are distributed to two fabric filter modules. Each module has three compartments in parallel containing multiple fabric bags. Combustion gas passes through the fabric bags. Particles in the combustion gases are deposited on the outside of each bag. During the bag cleaning cycle, a burst of air in the direction opposite to the gas flow dislodges particulate matter from the bag.

The induced draft fan is located downstream of the fabric filter baghouse. The induced draft fan moves the combustion gas through the system and exhausts the gas through the main stack.

Hot, wet gas is extracted downstream of the ID fan through a continuous emissions monitoring system. This system features a multi-component infrared gas analyzer that detects hydrogen chloride, carbon monoxide, and water vapor concentrations. An integrated zirconium oxide-based analyzer detects oxygen concentrations.

3.0 STARTUP AND SHUTDOWN PROCEDURES

The purpose of this section is to prescribe procedures for the startup and shutdown of the incinerator system. This section also clarifies which actions are within the scope of the regulatory definition of startup and shutdown.

To satisfy the requirements of § 63.1206(c)(2)(v)(B), waste feed restriction and operating limits have been imposed to startups and shutdowns. During a startup, the feeding of hazardous waste to the incinerator will not be initiated until all operating parameters are within limits. Hazardous waste will not be fed during a shutdown event.

Consistent with the requirements of § 63.1206(c)(2)(iii), Veolia will utilize an oxygen correction factor of 1.6 (i.e., 12.3% O_2) during periods of startup and shutdown. This will eliminate wide variations in corrected CO concentration that can occur during startup and shutdown due to changes in the oxygen concentration. The oxygen correction factor of 1.6 is based on the average oxygen correction factor observed during normal operations of the incinerators. This "default" oxygen correction factor can only be utilized when the waste residence time in the primary combustion chamber has expired and when the incinerator is in startup or shutdown.

Veolia has developed standard division practices (SDPs) for the operation of each incinerator system and ancillary equipment and systems. The SDPs containing startup and shutdown procedures for the incinerators are:

- SDP 2201 *Startup, Operation, and Shutdown of No. 2/3 Incinerators*
- SDP 2417 *Startup, Operation, and Shutdown of No. 4 Incinerator*

3.1 Startup

All startups are preceded by a shutdown. Depending on the purpose of the preceding shutdown, portions of the air pollution control system may be in service upon commencing a startup. This will be reflected on the startup record (see Attachments 1). During a startup, waste will not be introduced until all operating parameters are within limits. A startup event is concluded once waste is introduced and all operating parameters are within limits.

Veolia's startup procedures are representative of safety and good air pollution control practices. The procedures are designed to minimize the potential for excess emissions by ensuring that all equipment is fully operational (within permit limits) prior to the introduction of hazardous waste to the system. Adherence to these startup procedures will employ the knowledge and skills demonstrated through the implementation of the Operator Training and Certification Program.

3.2 Normal Shutdown

Some shutdowns will allow the primary combustion chamber to cool. Prior to these shutdowns, the incinerator will be burning auxiliary fuel only and the hazardous waste residence time will have transpired. A shutdown will be initiated with the shutoff of auxiliary fuel to the incinerator or by shutoff of the ID fan. Other shutdowns will be initiated with the cessation of all waste feeds by the operator to stabilize system operating parameters. Portions or all of the air pollution control system may remain in operating mode at the conclusion of a shutdown through the subsequent startup.

Veolia's shutdown procedures are representative of safety and good air pollution control practice. The procedures are designed to minimize the potential for excess emissions by ensuring that all waste feeds are off and/or the hazardous waste residence time has transpired prior to the shutdown of the incinerator system. Adherence to these shutdown procedures will employ the knowledge and skills demonstrated through the implementation of the Operator Training and Certification Program. Procedures for emergency shutdown are described in the next section regarding malfunctions.

4.0 MALFUNCTIONS

The purpose of this section of the Startup, Shutdown and Malfunction Plan is to:

- Define potential malfunctions and their causes
- Describe measures to minimize the frequency and severity of malfunctions.
- Prescribe procedures for operating and maintaining the incinerator during malfunctions
- Prescribe actions to correct the cause of a malfunction

A summary of potential malfunctions and their causes is given in Table 4-1. This list of potential malfunctions is arranged according to unit operations. The occurrence of any event listed in Table 4-1 should be responded to as a malfunction and a malfunction recordkeeping form, included as Attachment 3, should be initiated. During the response to these events, it will be determined if the event meets the regulatory definition of a malfunction.

4.1 Measures to Minimize the Frequency of Malfunctions

The following measures contribute to prevent malfunctions:

- Incinerator system design consistent with safety and good engineering practices
- Hazards and operability studies of the incinerators
- Appropriate frequency of preventative maintenance and inspection
- Good operating practices
- Well trained and qualified personnel

Veolia's performance history, this document, and the following regulatory documents serve as evidence of Veolia's proactive measures to minimize the frequency of malfunctions.

- *Operation and Maintenance Plan*
- *Operating Training and Certification Program*
- *Continuous Emissions Monitoring System Quality Assurance Plan (CEMS QA Plan)*
- *Continuous Monitoring System Quality Control Plan* (CMS QC Plan)
- *Automatic Waste Feed Cutoff System Operability Test Procedures*

Table 4-1 Summary of Potential Malfunctions and Causes

Potential Malfunctions for Units 2, 3, and 4		Potential Causes for a Malfunction
GENERAL – Loss of Electrical Power Supply – Loss of Instrument/Plant Air Supply – Loss of Plant Nitrogen Supply – Loss of City Water Supply – Loss of Process Water Pressure/Flow (Unit 4) – Malfunction of Safety Interlock or Automatic Waste Feed Cutoff Interlock – Excessive Air In-leakage in Air Pollution Control System **PRIMARY COMBUSTION CHAMBER** – Loss of Natural Gas Pressure/Flow to PCC Main Burner – Loss of Combustion Air Pressure/Flow to PCC – PCC Main Burner Pilot Failure – Loss of Waste Flow to PCC Injector – Loss of Waste Feedrate Control to PCC Injector – Loss of Atomization Air Pressure to a PCC Injector – Loss of PCC Draft Control (Unit 4) – Loss of PCC Temperature Control – Flame Failure – Kiln Rotation Malfunction (Unit 4) – Bulk/Charge Feed Door Malfunction – Physical/Mechanical Internal Equipment Failure – PCC Seal Visual Emissions Monitoring and Recording System – Rapid Steam Generation from Ash Collection System Water **SECONDARY COMBUSTION CHAMBER** – Loss of Natural Gas Pressure/Flow to SCC Main Burner – Loss of Combustion Air Pressure/Flow to SCC – SCC Main Burner Ignition Failure – Loss of Waste Flow to SCC Injector – Loss of Waste Feedrate Control to SCC Injector – Loss of Atomization Air Pressure to a SCC Injector – Loss of SCC Temperature Control – Flame Failure – Emergency Safety Vent Opening – Physical/Mechanical Internal Equipment Failure	-- Low Water Level in Slag Collection System (Unit 4) -- Rapid Steam Generation from Ash Collection System Water **TEMPERING CHAMBER (UNIT 4)** – Loss of Tempering Chamber Exit Gas Temperature Control – Loss of Atomization Air Pressure to Nozzle **LIME SLURRY SYSTEM** – Loss of Lime Feed to Lime Slurry Feed Tank – Malfunction in Lime Slurry Concentration **UNITS 2 AND 3 SPRAY DRYER ABSORBER (SDA)** – Loss of Lime Slurry Flow to SDA – Loss of Lime Slurry Flow Control – Loss of City Water Flow to SDA – Loss of Cooling Air Flow to Atomizer – Loss of SDA Exit Gas Temperature Control – Atomizer Failure **UNITS 4 SPRAY DRYER ABSORBER (SDA)** – Loss of Lime Slurry Flow to SDA – Loss of Lime Slurry Flow Control/Exit Gas Temperature Control – Loss of Atomization Air Pressure to SDA Nozzle **CARBON INJECTION SYSTEM (UNIT 4)** – Loss of Carrier Gas Pressure – Loss/Restriction of Activated Carbon Flow – Loss of Plant Air Pressure/Flow to Carbon Bulk Sack **BAGHOUSE & INDUCED DRAFT (ID) FAN** – Torn/Leaking Bag – Bag Blinding/High-High Pressure Drop – Loss of Stack Gas Flowrate Control (Unit 2 and 3) – Baghouse Isolation Damper Malfunction (Unit 4) – ID Fan Failure **CONTROL SYSTEM/CONTINUOUS MONITORING SYSTEM** – Control System/Continuous Monitoring System Malfunction – Continuous Emissions Monitoring System Malfunction	Mechanical/electrical failure of rotating equipment. Plugging/physical failure of lines/nozzles Physical/electrical failure of instrumentation Mechanical/electrical failure of actuated valves/dampers Physical/electrical failure of control system Mechanical/electrical failure of utility supplies Electrical/actuation failure of safety interlocks Physical/mechanical internal equipment failure

Despite these efforts, equipment failures and other operating anomalies can occur. Within the scope of regulatory requirements, the operating record will contain the appropriate documentation to establish that poor maintenance or careless operations are not contributing factors to the cause of a malfunction.

4.2 Measures to Minimize the Severity of Malfunctions

The following measures contribute to minimize the severity of malfunctions:

- Alarms and interlocks
- AWFCO testing
- Failure positions for critical equipment
- Well trained and qualified personnel
- Design of the incinerator system

Typically, an event that meets the definition of a malfunction will trigger an alarm. An alarm informs the operator of the situation and may provide an opportunity to avoid an exceedance. If conditions become unsafe or exceed operating limits, interlocks are in place for an automated response that is specific to the triggering condition. Refer to Veolia's *Documentation of Compliance* or *Notification of Compliance*, whichever is currently applicable, for details on AWFCO conditions. Additional details on alarms and interlocks are maintained on piping and instrumentation diagrams (P&IDs)

The most critical key to minimizing the severity of malfunctions is the functionality of AWFCO interlocks. Accordingly, Veolia performs testing of the AWFCO system, as described in the *AWFCO Plan*. This testing confirms a state of readiness to respond to a malfunction in a manner that will minimize the release of hazardous air pollutants.

Through training and job experience, the operator will have the process knowledge that qualifies him to use discretion in responding to malfunctions. Due to the unusual and dynamic conditions that are present during a malfunction, operator discretion is essential to minimizing the severity of malfunctions. An operator can evaluate process conditions and alarms and choose the best response to avoid an exceedance, if possible. If the malfunction adversely affects the functionality of alarms, interlocks, or fail safe positions, the operator must recognize the situation and respond appropriately. In the event that the malfunction affects the ability to automatically cutoff waste, the operator will manually cutoff waste feeds as quickly as possible.

The design of the each incinerator system also ensures that the severity of malfunctions will be minimized. This includes alarms and interlocks, the fail safe position of actuated valves, and redundant instrumentation and process equipment. Also, the design of each incinerator's instrumentation and control systems provides the operator convenient access to process variable indication, including position indication of selected actuated valves. This is essential to providing the operator the information required to best evaluate system conditions and responses. Table 4-2 lists potential malfunctions and associated redundant equipment and systems that are available to prevent these malfunctions or to minimize the potential for a significant release of hazardous air pollutants.

4.3 Corrective Measures

The *Program of Corrective Actions for Malfunctions* is Attachment 4 of this document. This program addresses how the incinerator will be operated and maintained during malfunctions. In this program, potential malfunctions are listed for each portion of the incinerator system. The malfunctions are events that will be recognized by the operator, or indicated by an alarm, and threaten to cause an exceedance. In the response to the malfunction and/or alarms, the operator will apply discretion and attempt to maintain the incinerator system within regulatory limits. In the program of corrective actions, potential causes of each malfunction are listed. The operator will utilize process knowledge, job experience, and, if needed, assistance from other personnel to identify the cause of the malfunction. For each potential cause, actions to correct the failure are listed. The corrective actions prescribed may require the collaboration of multi-disciplined personnel who are qualified to return the incinerator system to proper working conditions (i.e., maintenance personnel, control system technicians, engineering).

Table 4-2
Redundant Equipment and Systems for
Minimizing the Frequency or Severity of Malfunctions

Redundant Equipment/Systems	Potential Malfunctions Prevented/Minimized
Emergency generator (Unit 4)	Loss of Electrical Power Supply
Universal Power Supply (UPS) system powers computers, monitors, and control systems	Loss of Electrical Power Supply
Two compressors are on hot standby (Unit 4) Three air compressors running and one compressor on hot standby (Unit 2 and 3).	Loss of Instrument/Plant Air Supply
Dual Process Water Pumps	Loss of Process Water Pressure/Flow
Dedicated PCC combustion air fan (Unit 4)	Loss of Combustion Air Pressure/Flow to PCC
Dedicated SCC combustion air fan (Unit 4) Spare SCC combustion air fan (Unit 4)	Loss of Combustion Air Pressure/Flow to SCC
Multiple Tempering Chamber Nozzles	Loss of Tempering Chamber Exit Gas Temperature Control Loss of Atomization Air Pressure to Nozzle
Dual Slurry Feed Pumps (Unit 4) Shared Back-up Pump (Unit 2 and 3)	Loss of Slurry Feed to SDA
Off-line Spare Lime Slurry Atomizer (Unit 2 & 3)	Atomizer Failure
Dual SDAs (Unit 4)	Loss of Lime Slurry Flow to SDA Loss of Lime Slurry Flow Control/Exit Gas Temperature Control Loss of Atomization Air Pressure to SDA Nozzle
Off-line Spare Baghouse Module (Unit 2)	Torn/Leaking Bag
Two baghouse modules with three compartments each. 5 compartments provide sufficient particulate removal so that one of the 6 compartments can be isolated as a spare. (Unit 4)	Torn/Leaking Bag

ATTACHMENT 1

STARTUP RECORDKEEPING FORM

VEOLIA ENVIRONMENTAL SERVICES, INC.
INCINERATOR STARTUP RECORD

This report pertains to a startup of Unit 2 / 3 / 4 (circle one).

Startup event initiated on: ______________________
(Month/Day/Year, Hours : Minutes)

Startup event concluded on: ______________________
(Month/Day/Year, Hours : Minutes)

The total duration of this startup event was: ____________
(Hours : Minutes)

Attached to this form is a checklist that summarizes the approved startup procedures referenced in Veolia's *Startup, Shutdown, and Malfunction Plan* (SSMP). The operational steps that have been checked document that the detailed startup procedures were followed.

Were all actions associated with this startup event in conformance with the SSMP? Yes / No (circle one). If no, describe the inconsistent actions below.

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Were there any exceedances of an operating parameter limit? Yes / No (circle one). If yes, please list/describe. If any actions were not consistent with the SSMP and an operating parameter limit was exceeded, an immediate SSM report is required.

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Notes/Recommendations:

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The following signature certifies the accuracy of this record:

______________________ (Name)	______________________ (Title)
______________________ (Signature)	______________________ (Date)

VEOLIA ENVIRONMENTAL SERVICES, INC.
INCINERATOR STARTUP RECORD

Unit 2 and 3 Incinerator Startup Checklist	Initials
Verify that pre-startup has been completed	
Check thermal relief vent (TRV)	
Start combustion air fan	
Start PCC main burner and temperature ramp-up	
Start SCC main burner and temperature ramp-up	
Check stack gas flow and SDA temperatures control settings	
Start ID fan. Monitor SDA temperature while ramping up stack gas flowrate	
Close TRV	
Start lime slurry	
Establish all operating parameters within limits	
Operator's Notes:	

Note: Certain air pollution control and ancillary equipment may be operational prior to startup

(Signature of Shift Leader or Designee) (Date)

VEOLIA ENVIRONMENTAL SERVICES, INC.
INCINERATOR STARTUP RECORD

Unit 4 Incinerator Startup Checklist	**Initials**
Verify that pre-startup has been completed	
Check thermal relief vent (TRV)	
Start ID fan and set kiln draft (start of purge cycle)	
Start SCC combustion air fan	
Start the kiln combustion air fan (purge cycle complete)	
Start SCC main burner and temperature ramp-up	
Start PCC main burner and temperature ramp-up	
Start kiln rotation before 500 °F	
Start the kiln seal air	
Start the SCC conveyor	
Set up the tempering chamber for operation	
Set up lime slurry injection system	
Set up the SDAs for operation	
Set up the ash collection system	
Set up the baghouses for operation	
Slowly ramp-up the tempering chamber exit temperature	
Continue PCC and SCC temperature ramp-up	
Start the kiln seal conveyor	
Establish all operating parameters within limits	
Operator's Notes:	

Note: Certain air pollution control and ancillary equipment may be operational prior to startup.

(Signature of Shift Leader or Designee) (Date)

ATTACHMENT 2

SHUTDOWN RECORDKEEPING FORM

VEOLIA ENVIRONMENTAL SERVICES, INC.
INCINERATOR SHUTDOWN RECORD

This report pertains to a shutdown of Unit 2 / 3 / 4 (circle one).

Shutdown event initiated on: ______________________
(Month/Day/Year, Hours : Minutes)

Shutdown event concluded on: ______________________
(Month/Day/Year, Hours : Minutes)

The total duration of this shutdown event was: ____________
(Hours : Minutes)

Attached to this form is a checklist that summarizes the approved shutdown procedures referenced in the *Veolia Startup, Shutdown, and Malfunction Plan* (SSMP). The operational steps that have been checked document that the detailed shutdown procedures were followed.

Were all actions associated with this shutdown event in conformance with the SSMP? Yes / No (circle one). If no, describe the inconsistent actions below.

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Were there any exceedances of an operating parameter limit? Yes / No (circle one). If yes, please list/describe. If any actions were not consistent with the SSMP and an operating parameter limit was exceeded, an immediate SSM report is required.

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Notes/Recommendations:

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The following signature certifies the accuracy of this record:

______________________	______________________
(Name)	(Title)
______________________	______________________
(Signature)	(Date)

VEOLIA ENVIRONMENTAL SERVICES, INC.
INCINERATOR SHUTDOWN RECORD

Unit 2 and 3 Incinerator Shutdown Checklist	**Initials**
Verify that all waste feeds are off and/or that the hazardous waste residence time has transpired	
Monitor CEMS output to verify stable conditions	
Open the stack cap	
Stop the ID fan	
Shut off water and lime slurry flow to the atomizer	
Remove atomizer and position lid	
Operator's Notes:	

Note: All or certain air pollution control and ancillary equipment may remain operational throughout shutdown. Once the hazardous waste residence time has transpired, operator's discretion can be applied.

(Signature of Shift Leader or Designee) (Date)

VEOLIA ENVIRONMENTAL SERVICES, INC.
INCINERATOR SHUTDOWN RECORD

Unit 4 Incinerator Shutdown Checklist	**Initials**
Verify that all waste feeds are off and/or that the hazardous waste residence time has transpired	
Shut off the kiln burner and SCC burner	
Shut off the kiln and SCC combustion air fans	
Reduce the tempering chamber outlet temperature to 500 °F	
Shutdown SDA (at appropriate temperatures)	
Shutdown tempering chamber (at appropriate temperatures)	
After PCC and SCC reach the appropriate temperature, shut off the ID fan	
Operator's Notes:	

Note: All or certain air pollution control and ancillary equipment may remain operational throughout shutdown. Once the hazardous waste residence time has transpired, operator's discretion can be applied.

(Signature of Shift Leader or Designee) (Date)

ATTACHMENT 3

MALFUNCTION RECORDKEEPING FORM

VEOLIA ENVIRONMENTAL SERVICES, INC.
MALFUNCTION RECORD

This report pertains to a malfunction of Unit 2 / 3 / 4 (circle one).

The malfunction event occurred on: ______________________

(Month/Day/Year, Hours : Minutes)

The malfunction event concluded on: ______________________

(Month/Day/Year, Hours : Minutes)

The total duration of this malfunction event was: ____________

(Hours : Minutes)

The *Veolia Program of Corrective Actions for Malfunctions* must be adhered to for the operating and maintaining of the incinerator system and for correcting the cause of the malfunction. Describe the malfunction, the automated and/or operator response, the potential cause of the malfunction, and the corrective actions taken:

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Waste Feeds off Time ---

Incinerator "Clear of Waste" Time --

Were all actions associated with this malfunction event in conformance with the SSMP? Yes / No (circle one). If no, initiate an immediate startup, shutdown, and malfunction report.

List/describe the exceedances that occurred (or believed to have occurred) due to this malfunction:

____

____

Notes/Recommendations:

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The following signature certifies the accuracy of this record:

______________________	______________________
(Name)	(Title)
______________________	______________________
(Signature)	(Date)

ATTACHMENT 4

PROGRAM OF CORRECTIVE ACTIONS FOR MALFUNCTIONS

PROGRAM OF CORRECTIVE ACTIONS FOR MALFUNCTIONS TABLE OF CONTENTS

6.2. Loss of Lime Slurry Flow Control
6.3. Loss of City Water Flow to SDA (Unit 2 and 3)
6.4. Loss of Cooling Air Flow to Atomizer
6.5. Loss of SDA Exit Gas Temperature Control
6.6. Atomizer Failure

7.0 UNIT 4 SPRAY DRYER ABSORBER (SDA)
7.1. Loss of Lime Slurry Flow to SDA
7.2. Loss of Lime Slurry Flow Control/Exit Gas Temperature Control
7.3. Loss of Atomization Air Pressure to SDA Nozzle

8.0 CARBON INJECTION SYSTEM (UNIT 4)
8.1. Loss of Carrier Gas Pressure
8.2. Loss/Restriction of Activated Carbon Flow
8.3. Loss of Plant Air Pressure/Flow to Carbon Bulk Sack

9.0 BAGHOUSE & INDUCED DRAFT (ID) FAN
9.1. Torn/Leaking Bag
9.2. Bag Blinding/High-High Pressure Drop
9.3. Loss of Stack Gas Flowrate Control (Unit 2 and 3)
9.4. Baghouse Isolation Damper Malfunction (Unit 4)
9.5. ID Fan Failure

10.0 CONTROL SYSTEM/CONTINUOUS MONITORING SYSTEM
10.1. Control System/Continuous Monitoring System Malfunction
10.2. Continuous Emissions Monitoring System Malfunction

VEOLIA ENVIRONMENTAL SERVICES, INC.
PROGRAM OF CORRECTIVE ACTIONS FOR MALFUNCTIONS

1.0 GENERAL

1.1. Operating and Maintaining the System during Malfunctions

1.1.1. Due to the sudden, infrequent, and unusual conditions associated with malfunctions, continually evaluate the situation. Using discretion, respond in a manner consistent with safety and good air pollution control practices.

1.1.2. Take the following actions to minimize the release of hazardous air pollutants

1.1.2.1. Cutoff all waste feeds and/or confirm that the automatic waste feed cutoff system functioned properly.

1.1.2.2. Maintain operating parameters within limits, if possible.

1.1.2.3. If applicable, follow the procedures provided by the *Emergency Safety Vent Plan.*

1.1.3. Keep supervisor and/or maintenance supervisor informed, as appropriate.

1.1.4. Identify the malfunction and potential cause.

1.1.5. Implement corrective actions involving the troubleshooting of failures and the servicing and/or replacing of components, as needed. Refer to manufacture's troubleshooting and service recommendations, as needed.

1.1.6. Record the appropriate information using a malfunction record form.

1.2. Loss of Electrical Power Supply

1.2.1. Verify proper failure position of actuated valves.

1.2.2. Identify link in power supply path that is not operational.

1.2.3. Take the necessary actions to restore the supply of electrical power.

1.3. Loss of Instrument/Plant Air Supply

1.3.1. Verify proper failure position of actuated valves.

1.3.2. In case of plugging/physical failure of line or line components:

1.3.2.1. Identify the location/cause of the restriction of instrument air flow.

1.3.2.2. Clear line plugging and/or service/replace faulty line components, as needed.

1.3.3. In case of mechanical/electrical failure of actuated valve:

1.3.3.1. Identify cause of actuation failure.

1.3.3.2. Service/replace electrical and/or pneumatic components, as needed.

1.3.3.3. Service/replace actuator and/or valve components, as needed.

1.3.4. In case of mechanical/electrical failure at air supply source:

1.3.4.1. Identify the cause of the failure.

1.3.4.2. Take the necessary actions to restore the supply of instrument/plant air.

1.4. Loss of Plant Nitrogen Supply

1.4.1. In case of plugging/physical failure of line or line components:

1.4.1.1. Identify the location/cause of the restriction of nitrogen flow.

1.4.1.2. Clear line plugging and/or service/replace faulty line components, as needed.

1.4.2. In case of mechanical/electrical failure of actuated valve:

1.4.2.1. Identify cause of actuation failure.

1.4.2.2. Service/replace electrical and/or pneumatic components, as needed.

1.4.2.3. Service/replace actuator and/or valve components, as needed.

1.4.3. In case of mechanical/electrical failure at nitrogen supply source:

1.4.3.1. Identify the cause of the failure.

1.4.3.2. Take the necessary actions to restore the supply of nitrogen.

1.5. Loss of City Water Supply

1.5.1. In case of plugging/physical failure of line or line components:

1.5.1.1. Identify the location of plugging or line failure.

1.5.1.2. Clear line plugging and/or service/replace faulty line components, as needed.

1.5.2. In case of mechanical/electrical failure of actuated valve:

1.5.2.1. Identify cause of actuation failure.

1.5.2.2. Service/replace electrical and/or pneumatic components, as needed.

1.5.2.3. Service/replace actuator and/or valve components, as needed.

1.5.3. In case of mechanical/electrical failure at city water supply source:

1.5.3.1. Identify the cause of the failure.

1.5.3.2. Take the necessary actions to restore the supply of city water.

1.6. Loss of Process Water Pressure/Flow (Unit 4)

1.6.1. For loss of city water supply to process water tank, see 1.5.

1.6.2. In case of mechanical/electrical failure of process water pump:

1.6.2.1. Diagnose pump/drive failure.

1.6.2.2. Service/replace the pump/drive, as needed.

1.6.2.3. Restore electrical power supply to the pump.

1.6.3. In case of plugging/physical failure of line or line components:

1.6.3.1. Identify the location of plugging or line failure.

1.6.3.2. Clear line plugging and/or service/replace faulty line components, as needed.

1.6.4. In case of mechanical/electrical failure of actuated valve:

1.6.4.1. Identify cause of actuation failure.

1.6.4.2. Service/replace electrical and/or pneumatic components, as needed.

1.6.4.3. Service/replace actuator and/or valve components, as needed.

1.6.5. In case of physical/electrical failure of control system component:

1.6.5.1. Identify faulty control system component.

1.6.5.2. Service/replace control system components, as needed.

1.7. Malfunction of Safety Interlock or Automatic Waste Feed Cutoff Interlock

1.7.1. If safety interlock or AWFCO interlock was erroneously triggered, proceed with corrective actions.

1.7.2. If safety or AWFCO condition exists but automated response failed, cutoff waste feed as quickly as possible, then proceed with corrective actions.

1.7.3. In case of physical/electrical failure of instrumentation:

1.7.3.1. Identify faulty instrumentation component.

1.7.3.2. Service/replace faulty instrumentation components, as needed.

1.7.4. In case of mechanical/electrical failure of actuated valve/damper:

1.7.4.1. Identify cause of actuation failure.

1.7.4.2. Service/replace electrical and/or pneumatic components, as needed.

1.7.4.3. Service/replace actuator and/or valve components, as needed.

1.7.5. In case of physical/electrical failure of control system component:

1.7.5.1. Identify faulty control system component.

1.7.5.2 Service/replace control system components, as needed.

1.8. Excessive Air In-leakage in Air Pollution Control System

1.8.1 In case of holes due to corrosion:

1.8.1.1. Identify location of hole.

1.8.1.2. Repair system as needed.

1.8.2 In case of open ports, manways, access ports, etc.

1.8.2.1. Identify location of open port, manway, etc.

1.8.2.2. Replace cover on open port, manway, etc.

2.0 PRIMARY COMBUSTION CHAMBER

2.1. Loss of Natural Gas Pressure/Flow to PCC Main Burner

2.1.1. In case of plugging/physical failure of line or line component:

2.1.1.1. Identify the location of plugging or line failure.

2.1.1.2. Clear line plugging and/or service/replace faulty line components, as needed.

2.1.2. In case of mechanical/electrical failure of actuated valve:

2.1.2.1. Identify cause of actuation failure.

2.1.2.2. Service/replace electrical and/or pneumatic components, as needed.

2.1.2.3. Service/replace actuator and/or valve components, as needed.

2.1.3. In case of physical/electrical failure of control system component:

2.1.3.1. Identify faulty control system component.

2.1.3.2. Service/replace control system components, as needed.

2.1.4. In case of mechanical/electrical failure at natural gas supply source:

2.1.4.1. Identify the cause of the failure.

2.1.4.2. Take the necessary actions to restore the supply of natural gas.

2.2. Loss of Combustion Air Pressure/Flow to PCC

2.2.1. In case of mechanical/electrical failure of combustion air blower:

2.2.1.1. Diagnose blower/drive failure.

2.2.1.2. Service/replace the blower/drive, as needed.

2.2.1.3. Restore electrical power supply to the blower.

2.2.2. In case of physical failure of combustion air duct:

2.2.2.1. Identify the location of duct failure.

2.2.2.2. Service/replace faulty duct, as needed.

2.2.3. In case of mechanical/electrical failure of actuated valve:

2.2.3.1. Identify cause of actuation failure.

2.2.3.2. Service/replace electrical and/or pneumatic components, as needed.

2.2.3.3. Service/replace actuator and/or valve components, as needed.

2.2.4. In case of physical/electrical failure of control system component:

2.2.4.1. Identify faulty control system component.

2.2.4.2. Service/replace control system components, as needed.

2.3. PCC Main Burner Pilot Failure

2.3.1. For loss of natural gas pressure/flow, see 2.1.

2.3.2. For loss of combustion air pressure/flow, see 2.2.

2.3.3. In case of physical/electrical failure of igniter:

2.3.3.1. Identify cause of igniter failure.

2.3.3.2. Service/replace igniter and/or associated components, as needed.

2.3.4. In case of physical/electrical failure of control system component:

2.3.4.1. Identify faulty control system component.

2.3.4.2. Service/replace control system components, as needed.

2.4. Loss of Waste Flow to PCC Injector

2.4.1. In case of mechanical/electrical failure of waste feed pump:

2.4.1.1. Diagnose pump/drive failure.

2.4.1.2. Service/replace the pump/drive, as needed.

2.4.1.3. Restore electrical power supply to the pump.

2.4.2. In case of low nitrogen pressure, see 1.4.

2.4.3. In case of plugging/physical failure of line or line component:

2.4.3.1. Identify the location of plugging or line failure.

2.4.3.2. Clear line plugging and/or service/replace faulty line components, as needed.

2.4.3.3. Restore/confirm functional heat tracing, if applicable.

2.4.4. In case of mechanical/electrical failure of actuated valve:

2.4.4.1. Identify cause of actuation failure.

2.4.4.2. Service/replace electrical and/or pneumatic components, as needed.

2.4.4.3. Service/replace actuator and/or valve components, as needed.

2.4.5. In case of physical/electrical failure of control system component:

2.4.5.1. Identify faulty control system component.

2.4.5.2. Service/replace control system components, as needed.

2.5. Loss of Waste Feedrate Control to PCC Injector

2.5.1. In case of loss of waste pressure/flow to PCC injector, see 2.4.

2.5.2. In case of physical/electrical failure of flow transmitter: Service/replace flow transmitter and/or associated instrumentation, as needed.

2.5.3. In case of actuated valve failure:

2.5.3.1. Identify cause of actuation failure.

2.5.3.2. Service/replace electrical and/or pneumatic components, as needed.

2.5.3.3. Service/replace actuator and/or valve components, as needed.

2.5.4. In case of physical/electrical failure of control system component:

2.5.4.1. Identify faulty control system component.

2.5.4.2. Service/replace control system components, as needed.

2.6. Loss of Atomization Air Pressure to a PCC Injector

2.6.1. For a total loss of plant/instrument air supply, see 1.3.

2.6.2. In case of plugging/physical failure of line or line component:

2.6.2.1. Identify the location of plugging or line failure.

2.6.2.2. Clear line plugging and/or service/replace faulty line components, as needed.

2.6.3. In case of mechanical/physical failure of pressure control valve: Service/replace pressure control valve, as needed.

2.7. Loss of PCC Draft Control (Unit 4)

2.7.1. In case of ID fan failure, see 9.5

2.7.2. In case of physical/electrical failure of kiln pressure transmitter: Service/replace pressure transmitter and/or associated instrumentation, as needed.

2.7.3. In case of actuated damper failure:

2.7.3.1. Identify cause of actuation failure.

2.7.3.2. Service/replace electrical and/or pneumatic components, as needed.

2.7.3.3. Service/replace actuator and/or damper components, as needed.

2.7.4. In case of physical/electrical failure of control system component:

2.7.4.1. Identify faulty control system component.

2.7.4.2. Service/replace control system components, as needed.

2.8. Loss of PCC Temperature Control

2.8.1. In case of loss of natural gas pressure/flow to main burner, see 2.1.

2.8.2. In case of loss of waste pressure/flow to PCC injector, see 2.4.

2.8.3. In case of physical/electrical failure of temperature element:

2.8.3.1. Service/replace faulty temperature element and/or associated instrumentation, as needed.

2.8.4. In case of physical/electrical failure of control system component:

2.8.4.1. Identify faulty control system component.

2.8.4.2. Service/replace control system components, as needed.

2.9. Flame Failure

2.9.1. In case of physical/electrical failure of flame detector:

2.9.1.1. Identify faulty flame detector component.

2.9.1.2. Service/replace flame detector components, as needed.

2.9.2. In case of physical/electrical failure of control system component:

2.9.2.1. Identify faulty control system component.

2.9.2.2. Service/replace control system components, as needed.

2.10. Kiln Rotation Malfunction (Unit 4)

2.10.1. In case of mechanical/electrical kiln drive system:

2.10.1.1. Diagnose drive failure.

2.10.1.2. Service/replace the drive, as needed.

2.10.1.3. Restore electrical power supply to motor.

2.10.2. In case of physical/electrical failure of kiln rotational speed transmitter: Service/replace transmitter and/or associated instrumentation, as needed.

2.10.3. In case of physical/electrical failure of control system component:

2.10.3.1. Identify faulty control system component.

2.10.3.2. Service/replace control system components, as needed.

2.11. Bulk/Charge Feed Door Malfunction

2.11.1. In case of mechanical/electrical failure of actuated door:

2.11.1.1. Identify cause of actuation failure.

2.11.1.2. Service/replace electrical, hydraulic, and/or pneumatic components, as needed.

2.11.1.3. Service/replace actuator and/or valve components, as needed.

2.11.2. In case of physical/electrical failure of control system component:

2.11.2.1. Identify faulty control system component.

2.11.2.2. Service/replace control system components, as needed.

2.12. Physical/Mechanical Internal Equipment Failure

2.12.1. In case of refractory failure, repair/replace refractory

2.12.2. In case of ash collection failure

2.12.2.1. Diagnose ash collection system failure

2.12.2.2. Service/replace ash collection system components, as needed.

2.13. PCC Seal Visual Emissions Monitoring and Recording System

2.13.1. In case of physical/electrical failure of camera, service/replace camera.

2.13.2. In case of physical/electrical failure of monitor, service/replace monitor.

2.13.3. In case of physical/electrical failure of recording system, service/replace recording system.

2.14. Rapid Steam Generation from Ash Collection System Water

2.14.1. In case of refractory failure, repair/replace refractory.

2.14.2. In case of uncontrolled movement/dropping of residue into ash collection system water, inspect system to identify/remove other suspect material.

3.0 SECONDARY COMBUSTION CHAMBER

3.1. Loss of Natural Gas Pressure/Flow to SCC Main Burner

3.1.1. In case of plugging/physical failure of line or line component:

3.1.1.1. Identify the location of plugging or line failure.

3.1.1.2. Clear line plugging and/or service/replace faulty line components, as needed.

3.1.2. In case of mechanical/electrical failure of actuated valve:

3.1.2.1. Identify cause of actuation failure.

3.1.2.2. Service/replace electrical and/or pneumatic components, as needed.

3.1.2.3. Service/replace actuator and/or valve components, as needed.

3.1.3. In case of physical/electrical failure of control system component:

3.1.3.1. Identify faulty control system component.

3.1.3.2. Service/replace control system components, as needed.

3.1.4. In case of mechanical/electrical failure at natural gas supply source:

3.1.4.1. Identify the cause of the failure.

3.1.4.2. Take the necessary actions to restore the supply of natural gas.

3.2. Loss of Combustion Air Pressure/Flow to SCC

3.2.1. In case of mechanical/electrical failure of combustion air blower:

3.2.1.1. Diagnose blower/drive failure.

3.2.1.2. Service/replace the blower/drive, as needed.

3.2.1.3. Restore electrical power supply to the blower.

3.2.2. In case of physical failure combustion air duct:

3.2.2.1. Identify the location of duct failure.

3.2.2.2. Service/replace faulty duct, as needed.

3.2.3. In case of mechanical/electrical failure of actuated valve:

3.2.3.1. Identify cause of actuation failure.

3.2.3.2. Service/replace electrical and/or pneumatic components, as needed.

3.2.3.3. Service/replace actuator and/or valve components, as needed.

3.2.4. In case of physical/electrical failure of control system component:
- 3.2.4.1. Identify faulty control system component.
- 3.2.4.2. Service/replace control system components, as needed.

3.3. SCC Main Burner Ignition Failure

3.3.1. For loss of natural gas pressure/flow, see 3.1.

3.3.2. For loss of combustion air pressure/flow, see 3.2.

3.3.3. In case of physical/electrical failure of igniter:
- 3.3.3.1. Identify cause of igniter failure.
- 3.3.3.2. Service/replace igniter and/or associated components, as needed.

3.3.4. In case of physical/electrical failure of control system component:
- 3.3.4.1. Identify faulty control system component.
- 3.3.4.2. Service/replace control system components, as needed.

3.4. Loss of Waste Flow to SCC Injector (Unit 4)

3.4.1. In case of mechanical/electrical failure of waste feed pump:
- 3.4.1.1. Diagnose pump/drive failure.
- 3.4.1.2. Service/replace the pump/drive, as needed.
- 3.4.1.3. Restore electrical power supply to the pump.

3.4.2. In case of low nitrogen pressure, see 1.4.

3.4.3. In case of plugging/physical failure of line or line component:
- 3.4.3.1. Identify the location of plugging or line failure.
- 3.4.3.2. Clear line plugging and/or service/replace faulty line components, as needed.
- 3.4.3.3. Restore/confirm functional heat tracing, if applicable.

3.4.4. In case of mechanical/electrical failure of actuated valve:
- 3.4.4.1. Identify cause of actuation failure.
- 3.4.4.2. Service/replace electrical and/or pneumatic components, as needed.
- 3.4.4.3. Service/replace actuator and/or valve components, as needed.

3.4.5. In case of physical/electrical failure of control system component:
- 3.4.5.1. Identify faulty control system component.
- 3.4.5.2. Service/replace control system components, as needed.

3.5. Loss of Waste Feedrate Control to SCC Injector (Unit 4)

3.5.1. In case of loss of waste pressure/flow to SCC injector, see 3.4.

3.5.2. In case of physical/electrical failure of flow transmitter: Service/replace flow transmitter and/or associated instrumentation, as needed.

3.5.3. In case of actuated valve failure:

3.5.3.1. Identify cause of actuation failure.

3.5.3.2. Service/replace electrical and/or pneumatic components, as needed.

3.5.3.3. Service/replace actuator and/or valve components, as needed.

3.5.4. In case of physical/electrical failure of control system component:

3.5.4.1. Identify faulty control system component.

3.5.4.2. Service/replace control system components, as needed.

3.6. Loss of Atomization Air Pressure to a SCC Injector

3.6.1. For a total loss of plant/instrument air supply, see 1.3.

3.6.2. In case of plugging/physical failure of line or line component:

3.6.2.1. Identify the location of plugging or line failure.

3.6.2.2. Clear line plugging and/or service/replace faulty line components, as needed.

3.6.3. In case of mechanical/physical failure of pressure control valve: Service/replace pressure control valve, as needed.

3.7. Loss of SCC Temperature Control

3.7.1. In case of loss of natural gas pressure/flow to main burner, see 3.1.

3.7.2. In case of loss of waste pressure/flow to SCC injector, see 3.4.

3.7.3. In case of physical/electrical failure of temperature element:

3.7.3.1. Service/replace faulty temperature element and/or associated instrumentation, as needed.

3.7.4. In case of physical/electrical failure of control system component:

3.7.4.1. Identify faulty control system component.

3.7.4.2. Service/replace control system components, as needed.

3.8. Flame Failure

3.8.1. In case of physical/electrical failure of flame detector:

3.8.1.1. Identify faulty flame detector component.

3.8.1.2. Service/replace flame detector components, as needed.

3.8.2. In case of physical/electrical failure of control system component:

3.8.2.1. Identify faulty control system component.

3.8.2.2. Service/replace control system components, as needed.

3.9. Physical/Mechanical Internal Equipment Failure

3.9.1. In case of refractory failure, repair/replace refractory.

3.10. Low Water Level in Slag Collection System (Unit 4)

3.10.1. For a loss of process water pressure/flow, see 1.6.

3.10.2. In case of physical/mechanical failure of level controller: Service/replace faulty level controller and/or associated components, as needed.

3.10.3. In case of physical/mechanical failure of actuated valve:

3.10.3.1. Identify cause of actuation failure.

3.10.3.2. Service/replace pneumatic components, as needed.

3.10.3.3. Service/replace actuator and/or valve components, as needed.

3.11. Emergency Safety Vent Opening

3.11.1. Respond to an emergency safety vent opening in a manner consistent with the *Emergency Safety Vent Plan.*

3.11.2. In case of mechanical failure of the actuator:

3.11.2.1. Identify cause of actuation failure.

3.11.2.2. Service/replace emergency safety vent components, as needed.

3.12. Rapid Steam Generation from Ash Collection System Water

2.14.1. In case of refractory failure, repair/replace refractory.

2.14.2. In case of uncontrolled movement/dropping of residue into ash collection system water, inspect system to identify/remove other suspect material.

4.0 TEMPERING CHAMBER (UNIT 4)

4.1. Loss of Tempering Chamber Exit Gas Temperature Control

4.1.1. For a loss of process water pressure/flow, see 1.6.

4.1.2. In case of physical/electrical failure of flow transmitter: Service/replace flow transmitter and/or associated instrumentation, as needed.

4.1.3. In case of actuated valve failure:

4.1.3.1. Identify cause of actuation failure.

4.1.3.2. Service/replace electrical and/or pneumatic components, as needed.

4.1.3.3. Service/replace actuator and/or valve components, as needed.

4.1.4. In case of physical/electrical failure of control system component:

4.1.4.1. Identify faulty control system component.

4.1.4.2. Service/replace control system components, as needed.

4.1.5. In case of nozzle failure, service/replace nozzle, as needed.

4.2. Loss of Atomization Air Pressure to Nozzle

4.2.1. For a total loss of plant/instrument air supply, see 1.3.

4.2.2. In case of plugging/physical failure of line or line component:

4.2.2.1. Identify the location of plugging or line failure.

4.2.2.2. Clear line plugging and/or service/replace faulty line components, as needed.

5.0 LIME SLURRY SYSTEM

5.1. Loss of Lime Feed to Lime Slurry Feed Tank

5.1.1. In case of mechanical/electrical failure of lime slurry screw feeder:
- 5.1.1.1. Diagnose feeder/drive failure.
- 5.1.1.2. Service/replace the feeder/drive, as needed.
- 5.1.1.3. Restore electrical power supply to the lime slurry screw feeder.

5.1.2. In case of mechanical/electrical failure of lime bin activator/vibrator:
- 5.1.2.1. Diagnose lime bin activator/vibrator failure.
- 5.1.2.2. Service/replace the lime bin activator/vibrator, as needed.
- 5.1.2.3. Restore electrical power supply to the lime slurry screw feeder.

5.1.3. In case of plugging/physical failure of line or line component:
- 5.1.3.1. Identify the location of plugging or line failure.
- 5.1.3.2. Clear line plugging and/or service/replace faulty line components, as needed.

5.1.4. In case of physical/electrical failure of lime feed controls: Service/replace faulty instrumentation and/or control system components, as needed.

5.2. Malfunction in Lime Slurry Concentration

5.2.1. In case of loss of lime feed to lime slurry feed tank, see 5.1

5.2.2. In case of loss of water flow to lime slurry feed tank, see 1.5

5.2.3. In case of mechanical/electrical failure of lime slurry agitator:
- 5.2.3.1. Diagnose agitator/drive failure.
- 5.2.3.2. Service/replace the agitator/drive, as needed.
- 5.2.3.3. Restore electrical power supply to the lime slurry agitator.

5.2.4. In case of physical/electrical failure of instrumentation: Service/replace faulty instrumentation, as needed.

5.2.5. In case of physical/electrical failure of control system component:
- 5.2.5.1. Identify faulty control system component.
- 5.2.5.2. Service/replace control system components, as needed.

6.0 UNITS 2 AND 3 SPRAY DRYER ABSORBER (SDA)

6.1. Loss of Lime Slurry Flow to SDA

6.1.1. In case of mechanical/electrical failure of lime slurry feed pump:

6.1.1.1. Diagnose pump/drive failure.

6.1.1.2. Service/replace the pump/drive, as needed.

6.1.1.3. Restore electrical power supply to the pump.

6.1.2. In case of plugging/physical failure of line or line component:

6.1.2.1. Identify the location of plugging or line failure.

6.1.2.2. Clear line plugging and/or service/replace faulty line components, as needed.

6.1.2.3. Restore/confirm functional heat tracing, if applicable.

6.1.3. In case of mechanical/electrical failure of actuated valve:

6.1.3.1. Identify cause of actuation failure.

6.1.3.2. Service/replace electrical and/or pneumatic components, as needed.

6.1.3.3. Service/replace actuator and/or valve components, as needed.

6.1.4. In case of physical/electrical failure of control system component:

6.1.4.1. Identify faulty control system component.

6.1.4.2. Service/replace control system components, as needed.

6.2. Loss of Lime Slurry Flow Control

6.2.1. In case of loss of slurry flow to SDA, see 6.1.

6.2.2. In case of physical/electrical failure of flow transmitter: Service/replace flow transmitter and/or associated instrumentation, as needed.

6.2.3. In case of actuated valve failure:

6.2.3.1. Identify cause of actuation failure.

6.2.3.2. Service/replace electrical and/or pneumatic components, as needed.

6.2.3.3. Service/replace actuator and/or valve components, as needed.

6.2.4. In case of physical/electrical failure of control system component:

6.2.4.1. Identify faulty control system component.

6.2.4.2. Service/replace control system components, as needed.

6.3. Loss of City Water Flow to SDA (Unit 2 and 3)

6.3.1. In case of total loss of city water supply, see 1.5.

6.3.2. In case of plugging/physical failure of line or line component:

6.3.2.1. Identify the location of plugging or line failure.

6.3.2.2. Clear line plugging and/or service/replace faulty line components, as needed.

6.3.3. In case of mechanical/electrical failure of actuated valve:

6.3.3.1. Identify cause of actuation failure.

6.3.3.2. Service/replace electrical and/or pneumatic components, as needed.

6.3.3.3. Service/replace actuator and/or valve components, as needed.

6.4. Loss of Cooling Air Flow to Atomizer

6.4.1. In case of mechanical/electrical failure of atomizer cooling air blower:

6.4.1.1. Diagnose blower/drive failure.

6.4.1.2. Service/replace the blower/drive, as needed.

6.4.1.3. Restore electrical power supply to the blower.

6.4.2. In case of physical failure of atomizer cooling air duct:

6.4.2.1. Identify the location of duct failure.

6.4.2.2. Service/replace faulty duct, as needed.

6.4.3. In case of physical/electrical failure of control system component:

6.4.3.1. Identify faulty control system component.

6.4.3.2. Service/replace control system components, as needed.

6.5. Loss of SDA Exit Gas Temperature Control

6.5.1. In case of loss of city water flow to SDA, see 6.3.

6.5.2. In case of physical/electrical failure of temperature transmitter: Service/replace temperature transmitter and/or associated instrumentation, as needed.

6.5.3. In case of actuated valve failure:

6.5.3.1. Identify cause of actuation failure.

6.5.3.2. Service/replace electrical and/or pneumatic components, as needed.

6.5.3.3. Service/replace actuator and/or valve components, as needed.

6.5.4. In case of physical/electrical failure of control system component:

6.5.4.1. Identify faulty control system component.

6.5.4.2. Service/replace control system components, as needed.

6.6. Atomizer Failure

6.6.1. In case of low atomizer lubrication oil flow:

6.6.1.1. Diagnose the failure in the lubrication system

6.6.1.2. Service/replace components of the lubrication system, as needed.

6.6.2. In case of mechanical/electrical failure of atomizer:

6.6.2.1. Diagnose atomizer/drive failure.

6.6.2.2. Service/replace the atomizer/drive, as needed.

6.6.2.3. Restore electrical power supply to the atomizer.

6.6.2.4. components, as needed.

7.0 UNIT 4 SPRAY DRYER ABSORBER (SDA)

7.1. Loss of Lime Slurry Flow to SDA

7.1.1. In case of mechanical/electrical failure of lime slurry feed pump:
- 7.1.1.1. Diagnose pump/drive failure.
- 7.1.1.2. Service/replace the pump/drive, as needed.
- 7.1.1.3. Restore electrical power supply to the pump.

7.1.2. In case of plugging/physical failure of line or line component:
- 7.1.2.1. Identify the location of plugging or line failure.
- 7.1.2.2. Clear line plugging and/or service/replace faulty line components, as needed.
- 7.1.2.3. Restore/confirm functional heat tracing, if applicable.

7.1.3. In case of mechanical/electrical failure of actuated valve:
- 7.1.3.1. Identify cause of actuation failure.
- 7.1.3.2. Service/replace electrical and/or pneumatic components, as needed.
- 7.1.3.3. Service/replace actuator and/or valve components, as needed.

7.1.4. In case of physical/electrical failure of control system component:
- 7.1.4.1. Identify faulty control system component.
- 7.1.4.2. Service/replace control system components, as needed.

7.2. Loss of Lime Slurry Flow Control/Exit Gas Temperature Control

7.2.1. In case of loss of slurry flow to SDA, see 7.1.

7.2.2. In case of physical/electrical failure of flow transmitter: Service/replace flow transmitter and/or associated instrumentation, as needed.

7.2.3. In case of actuated valve failure:
- 7.2.3.1. Identify cause of actuation failure.
- 7.2.3.2. Service/replace electrical and/or pneumatic components, as needed.
- 7.2.3.3. Service/replace actuator and/or valve components, as needed.

7.2.4. In case of physical/electrical failure of control system component:
- 7.2.4.1. Identify faulty control system component.
- 7.2.4.2. Service/replace control system components, as needed.

7.3. Loss of Atomization Air Pressure to SDA Nozzle

7.3.1. For a total loss of plant/instrument air supply, see 1.3.

7.3.2. In case of plugging/physical failure of line or line component:

7.3.2.1. Identify the location of plugging or line failure.

7.3.2.2. Clear line plugging and/or service/replace faulty line components, as needed.

8.0 CARBON INJECTION SYSTEM (UNIT 4)

8.1. Loss of Carrier Gas Pressure

8.1.1. In case of mechanical/electrical failure of carbon injection air blower:

- 8.1.1.1. Diagnose blower/drive failure.
- 8.1.1.2. Service/replace the blower/drive, as needed.
- 8.1.1.3. Restore electrical power supply to the blower.

8.1.2. In case of physical failure air duct:

- 8.1.2.1. Identify the location of duct failure.
- 8.1.2.2. Service/replace faulty duct, as needed.

8.1.3. In case of physical/electrical failure of control system component:

- 8.1.3.1. Identify faulty control system component.
- 8.1.3.2. Service/replace control system components, as needed.

8.2. Loss/Restriction of Activated Carbon Flow

8.2.1. In case of loss of plant air to carbon bulk sack, see 8.3

8.2.2. In case of mechanical/electrical failure of carbon feeder:

- 8.2.2.1. Diagnose feeder/drive failure.
- 8.2.2.2. Service/replace the feeder/drive, as needed.
- 8.2.2.3. Restore electrical power supply to the carbon feeder.

8.2.3. In case of plugging/physical failure of line or line component:

- 8.2.3.1. Identify the location of plugging or line failure.
- 8.2.3.2. Clear line plugging and/or service/replace faulty line components, as needed.
- 8.2.3.3. Restore/confirm functional heat tracing, if applicable.

8.3. Loss of Plant Air Pressure/Flow to Carbon Bulk Sack

8.3.1. For a total loss of plant/instrument air supply, see 1.3.

8.3.2. In case of plugging/physical failure of line or line component:

- 8.3.2.1. Identify the location of plugging or line failure.
- 8.3.2.2. Clear line plugging and/or service/replace faulty line components, as needed.

8.3.3. In case of mechanical/electrical failure of actuated valve:

- 8.3.3.1. Identify cause of actuation failure.
- 8.3.3.2. Service/replace electrical and/or pneumatic components, as needed.

8.3.3.3. Service/replace actuator and/or valve components, as needed.

8.3.4. In case of physical/electrical failure of control system component:

8.3.4.1. Identify faulty control system component.

8.3.4.2. Service/replace control system components, as needed.

9.0 BAGHOUSE & INDUCED DRAFT (ID) FAN

9.1. Torn/Leaking Bag

9.1.1. In case of a baghouse leak detection alarm, follow the relevant corrective measures prescribed in the Operation and Maintenance Plan.

9.1.2. In case of a baghouse leak detection system failure:

9.1.2.1. Service/replace torn/leaking bag(s), as needed.

9.1.2.2. Diagnose the failure of the baghouse detection system.

9.1.2.3. Service/replace baghouse leak detection system, as needed.

9.2. Bag Blinding/High-High Pressure Drop

9.2.1. In case of low baghouse inlet gas temperature:

9.2.1.1. Follow the appropriate corrective actions prescribed by paragraph 6.5 (Unit 2 and 3)

9.2.1.2. Follow the appropriate corrective actions prescribed by paragraph 7.2 (Unit 4)

9.2.1.3. Perform baghouse inspection.

9.2.1.4. Service/replace bag(s), as needed.

9.3. Loss of Stack Gas Flowrate Control (Unit 2 and 3)

9.3.1. In case of ID fan failure, see 9.5

9.3.2. In case of physical/electrical failure of flow transmitter: Service/replace flow transmitter and/or associated instrumentation, as needed.

9.3.3. In case of actuated damper failure:

9.3.3.1. Identify cause of actuation failure.

9.3.3.2. Service/replace electrical and/or pneumatic components, as needed.

9.3.3.3. Service/replace actuator and/or damper components, as needed.

9.3.4. In case of physical/electrical failure of control system component:

9.3.4.1. Identify faulty control system component.

9.3.4.2. Service/replace control system components, as needed.

9.4. Baghouse Isolation Damper Malfunction (Unit 4)

9.4.1. In case of actuated damper failure:

9.4.1.1. Identify cause of actuation failure.

9.4.1.2. Service/replace electrical and/or pneumatic components, as needed.

9.4.1.3. Service/replace actuator and/or damper components, as needed.

9.4.2. In case of physical/electrical failure of control system component:

9.4.2.1. Identify faulty control system component.

9.4.2.2. Service/replace control system components, as needed.

9.5. ID Fan Failure

9.5.1. In case of mechanical/electrical failure of ID fan:

9.5.1.1. Diagnose fan/drive failure.

9.5.1.2. Service/replace the fan/drive, as needed.

9.5.1.3. Restore electrical power supply to the ID fan.

10.0 CONTROL SYSTEM/CONTINUOUS MONITORING SYSTEM

10.1. Control System/Continuous Monitoring System Malfunction

10.1.1. As needed, refer to the *CMS QA/QC Plan* for guidance and to ensure that proper calibrations are performed.

10.1.2. In case of physical/electrical failure of instrumentation:

10.1.2.1. Identify faulty instrumentation component.

10.1.2.2. Service/replace faulty instrumentation components, as needed.

10.1.3. In case of physical/electrical failure of control system component:

10.1.3.1. Identify faulty control system component.

10.1.3.2. Service/replace control system components, as needed.

10.1.4. In case of physical/electrical failure of data acquisition/availability:

10.1.4.1. Identify faulty data system components.

10.1.4.2. Service/replace data system components, as needed.

10.2. Continuous Emissions Monitoring System Malfunction

10.2.1. As needed, refer to the *CEMS QA/QC Plan* for guidance and to ensure that proper calibrations are performed and that the appropriate performance specifications are met.

10.2.2. In case of physical/electrical failure umbilical heat tracing:

10.2.2.1. Diagnose failure of heat tracing.

10.2.2.2. Replace/restore heat traced sample umbilical.

10.2.3. In case of mechanical/electrical failure of heated vacuum pump:

10.2.3.1. Diagnose pump/drive failure.

10.2.3.2. Service/replace the pump/drive, as needed.

10.2.3.3. Replace/restore pump head heat source.

10.2.3.4. Restore electrical power supply to heated vacuum pump.

10.2.4. In case of plugging/physical failure of sample probe/umbilical:

10.2.4.1. Identify the location of failure.

10.2.4.2. Clear plugging and/or service/replace faulty components, as needed.

10.2.5. In case of mechanical/electrical failure of actuated valve:

10.2.5.1. Identify cause of actuation failure.

10.2.5.2. Service/replace electrical and/or pneumatic components, as needed.

10.2.5.3. Service/replace actuator and/or valve components, as needed.

10.2.6. In case of mechanical/electrical failure of analyzer:

10.2.6.1. Refer to manufacturer's service manual for guidance on troubleshooting and servicing analyzer.

10.2.6.2. Service/replace analyzer, as needed.

10.2.7. In case of mechanical/electrical failure of associated instrumentation:

10.2.7.1. Identify faulty instrumentation component.

10.2.7.2. Service/replace faulty instrumentation components, as needed.

10.2.8. In case of physical/electrical failure of control system component:

10.2.8.1. Identify faulty control system component.

10.2.8.2. Service/replace control system components, as needed.