APPENDIX H

AUTOMATIC WASTE FEED CUTOFF PLAN

AUTOMATIC WASTE FEED CUTOFF PLAN

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1.0 INTRODUCTION AND BACKGROUND

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. These incinerators are subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Hazardous Waste Combustors (HWCs), Part 63, Subpart EEE (§§63.1200 to 63.1221). The NESHAP for HWCs specifies emissions standards which reflect emissions performance of maximum achievable control technologies (MACT), and is commonly referred to as the HWC MACT.

Hazardous Waste Combustors are required to have a functioning system that immediately and automatically cuts off the hazardous waste feed under certain conditions. The Automatic Waste Feed Cut-Off (AWFCO) System must follow the requirements described in 40 CFR 63.1206(c)(3). This Automatic Waste Feed Cut-Off Plan demonstrates Veolia's compliance with these requirements.

This plan includes information about AWFCO systems, procedures for responding to an AWFCO event, and procedures for testing the operability of the AWFCO systems. Table 1-1 presents the regulatory references related to AWFCO Plans and the section of this plan that addresses each specific requirement.

Due to the similarity of the three AWFCO systems (one for each incinerator system), general references to an AWFCO system or incinerator system in this document will imply all three systems. Information that is only applicable to one or two of the three systems will be clearly identified.

1.1 Summary of Facility Information

Brief summaries which describe the fixed hearth incinerators and the rotary kiln incinerator are presented in this section.

1.1.1 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

Various solid and liquid wastes and gaseous feedstreams 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. Liquid waste from containers are fed to the primary combustion chamber through a specialty feed injector. A gaseous feedstream is fed to the Unit 2 primary combustion chamber directly from gas cylinders. Off gases from a hooded feed emission control system and from a waste handling glove box are fed directly to the Unit 3 secondary combustion chamber. Combustion chamber temperatures are maintained using natural gas fired to a dedicated burner in both the primary and secondary chambers.

Combustion gas exits the secondary combustion chamber and enters the SDA, which provides acid gas removal and cooling of the combustion gas. Combustion gas exits the SDA and is distributed to the fabric filter baghouses, which provide particulate matter removal. The induced draft fan, located downstream of the baghouses, 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.

1.1.2 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
- ID fan and stack
- Instrumentation, controls, and data acquisition systems

Various 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. Combustion chamber temperatures are maintained using natural gas fired to a dedicated burner in both the primary and secondary chambers.

Combustion gas exits the secondary combustion chamber and enters the tempering chamber, which provides cooling of the combustion gases. The combustion gas exits the tempering chamber and is distributed between two identical SDAs, which provide acid gas removal and additional gas cooling. 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. From the SDAs, combustion gas is distributed to fabric filter baghouses, which provide particulate matter removal. The ID fan, located downstream of the baghouses, 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.

Table 1-1
Regulatory Requirements for AWFCO Plan and
Corresponding Section that Addresses the Requirement

Regulatory Citation	Description	Plan Section
§ 63.1206(c)(3)(i)	Facility must have a functioning AWFCO system	Section 1.0
§ 63.1206(c)(3)(i)(A)	System must cut off waste when any of the following are exceeded: (1) Operating Parameter Limit (2) Emission standard monitored by CEMS (3) Allowable Combustion Chamber Pressure	(1) Section 1.2 (2) Section 1.2 (3) Section 1.2
§ 63.1206(c)(3)(i)(B)	System must cut off waste when span value of any CMS detector is met or exceeded	Section 1.2
§ 63.1206(c)(3)(i)(C)	System must cut off waste upon malfunction of a CMS monitoring an OPL or emission level	Section 1.2
§ 63.1206(c)(3)(i)(D)	Waste cut-off must occur when any component of the AWFCO system fails	Section 1.2
§ 63.1206(c)(3)(ii)	Ducting of combustion gases	Section 3.0
§ 63.1206(c)(3)(iii)	Restarting waste feed	Section 3.0
§ 63.1206(c)(3)(iv)	Failure of AWFCO system	Section 4.0
§ 63.1206(c)(3)(v)	Corrective measures	Section 3.0
§ 63.1206(c)(3)(vi)	Reporting exceedance of emission standard or operating requirement	Section 3.1
§ 63.1206(c)(3)(vii)	AWFCO system testing	Section 2.0
§ 63.1206(c)(3)(viii)	Ramping down waste feed	NA
§ 63.1209(b)(4)	Interlock span of non-CEMS CMS into the AWFCO system	Section 1.2

1.2 Description of the AWFCO System

The AWFCO system includes all hardware and software (i.e., control logic) necessary to immediately and automatically cutoff waste feeds to the incinerator in the event that an AWFCO interlock is triggered. Table 1-2 lists the parameter and setpoint for each required AWFCO interlock. In addition to the interlocks specified in Tables 1-2, the following conditions are interlocked with each AWFCO system:

- The span value of each CMS instrument (except for a CEMS instrument)
- CMS Malfunction
- AWFCO System Malfunction

AWFCO interlocks ensure that the pneumatically actuated waste feed block valves cannot open or remain open unless all regulated operating parameters and conditions are within limits. Additionally, the waste feed block valves will fail in the closed position if there is a loss of electrical power or instrument air supply. The parameters interlocked with the AWFCO system are described below in further detail.

- **Maximum Pumpable Hazardous Waste Feedrate** – Each pumpable hazardous waste feed line to the incinerator is equipped with a mass flowmeter. The pumpable hazardous waste feedrate is continuously calculated as the sum of the individual flowrates. If the hourly rolling total (HRT) pumpable hazardous waste feedrate meets or exceeds its limit, an AWFCO interlock is triggered.

- **Maximum Total Hazardous Waste Feedrate** – For Units 2 and 3, solid waste is fed to the primary combustion chamber via a feed conveyor and pneumatic ram. A scale in the feed conveyor monitors the weight of each charge of solid waste. For Unit 4, solid wastes are fed to a ram feeder via a clamshell, a drum feed conveyor, and an auxiliary feed conveyor. The clamshell empties into a hopper equipped with a load cell that monitors each charge weight. The solid feed conveyors are equipped with weigh scales. For each incinerator, the time between charges is used to convert these charge weights to a solid waste feedrate. The solid waste feedrate is summed with the pumpable hazardous waste feedrate to calculate the total hazardous waste feedrate. If the HRT of the total hazardous waste feedrate meets or exceeds its limit, an AWFCO interlock is triggered.

Table 1-2
Automatic Waste Feed Cutoff Interlocks

Operating Parameter	Averaging Period	Units	AWFCO Interlock Setpoint	
			Unit 2/3	Unit 4
Maximum Pumpable Waste Feedrate	HRT	lb/hr	3,107	PCC-3256/SCC-1006
Maximum Total Waste Feed Rate	HRT	lb/hr	4,017	PCC-13,796/SCC-1006
Maximum Ash Feed Rate	12-HRT	lb/hr	673	8,777
Maximum Chlorine/Chloride Feedrate	12-HRT	lb/hr	218	252
Maximum Mercury Feedrate Limit	12-HRT	lb/hr	0.0047	0.031
Maximum Semi Volatile Metals Feedrate	12-HRT	lb/hr	63	65
Maximum Total Low Volatile Metals Feedrate	12-HRT	lb/hr	46	55
Maximum Pumpable Low Volatile Metals Feedrate	12-HRT	lb/hr	47	47
Maximum Primary Combustion Chamber Pressure	Instantaneous	in. w.c.	> 0.0 for 5 seconds	> 0.0 for 5 seconds
Minimum Primary Combustion Chamber Temperature	HRA	°F	1,734	1,507
Minimum Secondary Combustion Chamber Temperature	HRA	°F	1,849	1,886
Emergency Safety Vent Position	Instantaneous	--	TRV Open	Surge Vent Open TRV Open
Maximum Baghouse Inlet Temperature	HRA	°F	420	434
Maximum Bag Leak Detector Output	10 seconds	% of scale	> 30 % for 6 minutes	> 15% for 12 minutes
Minimum Carbon Feedrate	HRA	lb/hr	--	6.2
Minimum Carbon Feeder Exit Pressure	Instantaneous	psig	--	4
Maximum Carbon Carrier Gas Supply Pressure	Instantaneous	in. w.c.	--	1
Maximum Stack Gas Flow Rate	HRA	acfm	15,147	38,086
Stack Gas Carbon Monoxide Concentration	HRA	ppmdv @ 7% O_2	100	100
Minimum Sorbent Feed Rate	HRA	Lb/lb Cl2	1.76	1.01
Minimum Carrier Fluid Flow Rate	HRA	Gal/lb Cl2	1.70	1.61

Notes:
HRA = Hourly Rolling Average
HRT = Hourly Rolling Total
12-HRT = 12-Hour Rolling Total
TRV = Thermal Relief Vent

- **Maximum Ash Feedrate** – The ash concentration of each waste feed is determined in accordance with the Feedstream Analysis Plan. The CMS uses the waste ash concentration and the continuously monitored waste feedrate to calculate the ash feedrate of each waste stream. If the 12-hour rolling total (12-HRT) of the combined ash feedrate meets or exceeds its limit, an AWFCO interlock is triggered.

- **Maximum Chlorine/Chloride Feedrate -** The chlorine/chloride concentration of each waste feed is determined in accordance with the Feedstream Analysis Plan. The CMS uses the chlorine/chloride concentration and the continuously monitored waste feedrate to calculate the chlorine/chloride feedrate of each waste stream. If the 12-HRT of the combined chlorine/chloride feedrate meets or exceeds its limit, an AWFCO interlock is triggered.

- **Maximum Mercury Feedrate -** The concentration of mercury in each waste feed is determined in accordance with the Feedstream Analysis Plan. The CMS uses the mercury concentration and the continuously monitored waste feedrate to calculate the mercury of each waste stream. If the 12-HRT of the combined LVM feedrate meets or exceeds its limit, an AWFCO interlock is triggered.

- **Maximum SVM Feedrate -** The concentrations of cadmium and lead in each waste feed is determined in accordance with the Feedstream Analysis Plan. The semivolatile metals (SVM) concentration in each waste stream is the sum of these metal concentrations. The CMS uses the SVM concentration and the continuously monitored waste feedrate to calculate the SVM feedrate of each waste stream. If the 12-HRT of the combined SVM feedrate meets or exceeds its limit, an AWFCO interlock is triggered.

- **Maximum Total LVM Feedrate -** The concentrations of arsenic, beryllium, and chromium in each waste feed is determined in accordance with the Feedstream Analysis Plan. The low volatile metals (LVM) concentration in each waste stream is the sum of these metal concentrations. The CMS uses the LVM concentration and the continuously monitored waste feedrate to calculate the LVM feedrate of each waste stream. If the 12-HRT of the combined LVM feedrate meets or exceeds its limit, an AWFCO interlock is triggered.

- **Maximum Pumpable LVM Feedrate** – The LVM feedrate from pumpable waste feedstreams are summed to obtain the combined pumpable LVM feedrate. If the 12-HRT pumpable LVM feedrate meets or exceeds its limit, an AWFCO interlock is triggered.

- **Maximum Primary Combustion Chamber Pressure** – The primary chambers for Units 2 and 3 are totally sealed. Both the feed and discharge ends of the kiln (Unit 4) are equipped with an air pressurized double seal system that is comprised of steel spring plates with self-lubricating seal shoes. Fugitive emissions are prevented by these measures and the negative primary combustion chamber pressure maintained by the ID fan. An AWFCO interlock will be triggered if the primary combustion chamber pressure meets or exceeds the maximum limit (0.0 in. w.c. gauge) for greater than five seconds. Continuous video surveillance of the combustion chamber exterior is utilized to determine if an AWFCO caused by high primary combustion chamber pressure corresponds with fugitive emissions. There must be visual evidence of fugitive emissions from the primary combustion chamber for a positive pressure event to be considered an exceedance.

- **Minimum Primary Combustion Chamber Temperature** – The temperature of combustion gas inside the primary chamber is monitored by redundant thermocouples. If the hourly rolling average (HRA) primary combustion chamber temperature meets or exceeds its limit, an AWFCO interlock is triggered.

- **Minimum Secondary Combustion Chamber Temperature** – The temperature of combustion gas inside the secondary chamber is monitored by redundant thermocouples. If the HRA secondary combustion chamber temperature meets or exceeds its limit, an AWFCO interlock is triggered.

- **Emergency Safety Vent Position** – Each incinerator's secondary combustion chamber is equipped with an emergency stack and emergency safety vent (ESV), which is also referred to as the thermal relief vent (TRV). The TRV allows hot combustion gas to vent from the combustion system during certain scenarios to protect the downstream APCS from excessive temperature situations. Unit 4 is also equipped with a second ESV located at the kiln face. This ESV is referred to as the surge vent and provides emergency pressure relief of the kiln. To minimize excessive emissions during an ESV opening, the output from the ESV position transmitter is interlocked with the AWFCO system. If the ESV position is detected as open, an AWFCO interlock is triggered.

- **Maximum Baghouse Inlet Temperature** – For Units 2 and 3, the baghouse inlet temperature (i.e., spray dryer absorber exit gas temperature) is continuously monitored by a thermocouple. Unit 4 is equipped with redundant thermocouples at the exit of each SDA. If the HRA baghouse inlet temperature meets or exceeds its limit, an AWFCO interlock will occur.

- **Maximum Bag Leak Detector Output** – A triboelectric sensor is located in the duct downstream of the ID fan and continuously monitors the relative particulate matter loading of the gas. An AWFCO interlock will be triggered if the bag leak detector output remains at or above it high-high setpoint for the duration of the alarm delay time.

- **Minimum Carbon Feedrate** – Powdered activated carbon is air injected into the plenum immediately upstream of the Unit 4 baghouses. A calibrated feeder is used to continuously monitor the addition rate of carbon to the carbon-air stream. If the HRA carbon feedrate meets or exceeds its limit, an AWFCO interlock is triggered.

- **Carbon Injection System Operating Pressures** – The Unit 4 carbon injection system is equipped with a high level pressure switch located between the carbon feeder and the eductor. A low level pressure switch is located downstream of the blower that supplies air as the carbon carrier fluid. Both pressure switches have two setpoints, which define the permissible operating range at each location. These setpoints are interlocked with AWFCO system.

- **Maximum Stack Gas Flowrate** – The pressure drop across a pitot tube located in the exhaust stack is utilized to continuously monitor the stack gas flowrate. If the HRA stack gas flowrate meets or exceeds it limit, an AWFCO interlock is triggered.

- **Maximum Stack Gas Carbon Monoxide Concentration** – The CEMS continuously samples and analyzes stack gas for the concentrations of carbon monoxide (CO), and moisture using a multicomponent infrared photometer. The oxygen concentration of the sampled gas is analyzed simultaneously using a zirconium oxide analyzer. A back-up zirconium oxide O_2 analyzer also monitors stack gas O_2 concentration. These data are used to calculated the stack gas CO concentration on a dry basis, corrected to 7% O_2. If the CO concentration meets or exceeds the HWC MACT emission standard for CO (100 ppm dry volume, corrected to 7% oxygen), an AWFCO interlock is triggered.

2.0 AWFCO OPERABILITY TEST PROCEDURES

The AWFCO interlocks are tested bi-weekly, as weekly testing would unduly interfere with operations, cause excessive downtime, and substantially increase operating costs. Testing of the AWFCO system is a time-consuming and manpower intensive process. The current testing program has been in place under the RCRA permit for a number of years and has proven to be adequate in detecting problems.

AWFCO system operability testing is conducted by manually simulating input of process conditions to the programmable logic controller (PLC). The simulated input for each OPL will be set outside of limits to trigger the AWFCO interlock and associated alarms. The point at which the simulated input activates the control logic for the closure of the waste feed block valves will be observed and documented. Waste feed valves will not actually close during AWFCO testing. In addition to this AWFCO system control logic testing, the functionality of the waste feed block valves are confirmed during startups, shutdowns, actual AWFCO conditions, and when transitioning to and from warm stand-by mode

Tests of the AWFCO system interlocks and associated alarms are documented an a AWFCO Testing Log and are maintained separately as part of the unit's operating record.

3.0 RESPONCE TO AN AWFCO EVENT

While an AWFCO event will trigger an alarm, and automatically (and immediately) cutoff waste feed to the incinerator, the other portions of the incinerator system will remain operational and functioning (the APCS, CEMS, etc). Combustion chamber temperatures will be maintained on natural gas fired to the main burners, if possible.

An AWFCO event is initiated in the following manner:

1) An alarm is activated at a level below the permit limit in the case of a maximum limit or above the permit limit in the case of a minimum operating condition. This alarm indicates that the system is approaching a regulatory set point. The alarm also indicates a potential malfunction.
2) At this point, the operator reviews the situation and takes action to correct the situation, up to and including a manual shutdown of the affected system. These corrective actions will be consistent with the Startup, Shutdown, and Malfunction Plan (SSMP).
3) If the corrective actions taken are not effective, and the operating parameter reaches its permit limit or a permit preemptive set point, an AWFCO is initiated. An AWFCO Log form will be used to document the event.

If an AWFCO event corresponds with an exceedance while hazardous waste remains in the combustion chamber, it must be determined if the event meets the regulatory definition of a malfunction. If such an event is a malfunction, a malfunction recordkeeping form will be used. Regardless of whether the hazardous waste residence time has transpired, if there is an exceedance that corresponds with an AWFCO event the following actions will be taken:

- Investigate the cause of the AWFCO;
- Take appropriate corrective measures to minimize future AWFCOs; and
- Record the findings and corrective measures in the operating record.

After an AWFCO has occurred, all operating parameters must be within limits prior to restarting hazardous waste feeds.

3.1 Reporting Requirements

For each set of ten[1] exceedances of an emission standard or operating parameter limit, and each exceedance occurs while hazardous waste remains in the combustion chamber, a written report will be submitted by Veolia to the Illinois Environmental Protection Agency (IEPA). The written report will be submitted within five calendar days of the tenth[1] exceedance and will document the exceedances and results of the investigation and corrective measures taken.

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[1] Exceedances occurring during malfunction are not included in this tally. The Startup, Shutdown, and Malfunction Plan summarizes the reporting requirements associated with exceedances occurring during malfunctions.

4.0 MANUAL WASTE FEED CUT-OFF PROCEDURES

If an AWFCO interlock fails to cutoff the feed of hazardous waste to the incinerator, the operator will manually cutoff all waste feeds to the incinerator in a quick and safe manner. This response is consistent with the procedure prescribed by the SSMP and will be documented on a malfunction recordkeeping form. The *Program of Corrective Actions for Malfunctions*, Attachment 4 to the SSMP, will be followed for the restoring the AWFCO system.