

Parker Facility – Permit Modification Summary Table

Purpose: Summary of revisions incorporated to address the communication-loss protective function, automatic waste feed cutoff (AWFCO/WFCO), operator notification, and response procedures.

Table 1.0 – Permit Modification Revisions

RCRA Permit Attachment Appendix XXII – SSMP	Description of Change
3.5.4 Safety and AWFCO	Revised to add: When communication between the Compliance PLC and the process monitoring/historian system is lost and the communication-loss detection system initiates the automatic waste feed cutoff. The communication-loss AWFCO is initiated through an independent Ethernet switch and relay output designed to place the waste feed system in a fail-safe condition upon detection of the communication loss. A distinctive high-priority alarm and/or banner are simultaneously provided to alert control room personnel of the communication-loss condition.
3.6.1 Rapidly Stopping Feed	Revised to add: In addition to the process parameter AWFCOs described above, the facility is equipped with a communication-loss protective function. Loss of communication between the Compliance PLC and the process monitoring/historian system is detected by an independent Ethernet switch and relay output. Upon detection of a communication loss, the relay output initiates an immediate automatic waste feed cutoff to stop spent activated carbon feed to the reactivation furnace. A distinctive high-priority alarm and banner are simultaneously displayed in the control room alarm application to notify operating personnel of the condition.
3.6.2 Shutting Down System	Minor revision to distinguish communication-loss WFCO from complete PLC failure. The following language added: A loss of communication affecting the ability to reliably monitor or control compliance-related process parameters will result in an automatic waste feed cutoff through the communication-loss protective system. Operators will follow the communication-loss response procedure and evaluate whether continued operation of the reactivation furnace and APC system is appropriate based on the condition and duration of the communication loss.
4.3 Identification of Malfunctions	Revise to specifically recognize loss of PLC/SCADA/historian communication as a malfunction indicator. Loss of communication between the Compliance PLC and process monitoring/historian system, as indicated by high-priority alarm/banner and/or automatic waste feed cutoff, shall be evaluated by operating personnel to determine whether a malfunction has occurred and whether the event had the potential to cause an emission standard or operating parameter exceedance.
6.1 Startup Procedures	Minor addition requires verification that the communication-loss protection/WFCO is healthy before feed. The following language added: Verify communication between the Compliance PLC and process monitoring/historian system is established and the communication-loss protective system is in a ready condition prior to initiating spent activated carbon feed.
Table 3-3	New line added as No. 62 and moving number sequence on proceeding items up by “1”. Item 62 Provides for malfunction specific to loss of communication / control network with description of the malfunction, preventive actions and required reactive response. Item 62, updated to include Corrective Action Flow Chart (posted in Control Room), High-priority alarm / visual banner and hardwired AWFCO relay circuit that will automatically stop spent carbon feeds to RF-2 as result of communication loss between Compliance PLC and Dynac historian and independent of operator action.

RCRA Permit Attachment Section D	Description of Change
Section D.5.2 Control Systems	Revised to add the following language: As additional safeguards, the facility has implemented a dedicated, high-priority alarm and visual banner within the facility's existing control room alarm application to immediately notify operators of any loss of communication between the Dynac historian server and the Compliance PLC. In addition, a hardwired waste feed cutoff (WFCO) relay circuit has been installed that operates independently of the PLC and Dynac historian server software logic. Upon loss of communication between the Dynac historian server and the Compliance PLC, the hardwired WFCO circuit automatically stops the spent activated carbon feed to RF-2 without requiring operator action or confirmation of an operating parameter exceedance.
RCRA Permit Condition	Description of Change
Operation of RF-2 Condition V.C.5.b.iii	Upon malfunction of a CMS, including but not limited to loss of communication or signal validity between a CMS and the Compliance PLC or Dynac historian server (e.g., disconnected or damaged communication wiring), regardless of whether a monitored parameter is confirmed to be outside its operating limit;
V.C.5.i	Addition of section title, "AWFCO Interlock Procedure for Loss of Communication". Added the following language: In addition to the parameter-based AWFCO described in Table V-2, the Permittee shall maintain a hard-wired waste feed cutoff relay circuit, independent of the Compliance PLC and Dynac historian server software logic. This relay circuit will automatically stop spent carbon feeds to RF-2 upon loss of communication between the Dynac historian server and Compliance PLC.

REVISED

DESOTEC US LLC**PARKER REACTIVATION FACILITY – RCRA PERMIT MODIFICATION****FLY SHEET 1 – RCRA PERMIT ATTACHMENT APPENDIX XXII - SSMP**

Document Status	CLEAN COPY – proposed revisions highlighted
Revision	RCRA Permit Attachment Appendix XXII-SSMP: Communication Loss Protective Measures
	Section 3.5.4 Safety and AWFCO – revised language
	Section 3.6.1 Rapidly Stopping Feed – revised language
	Section 3.6.2 Shutting Down System – revised language
	Section 4.3 Identification of Malfunctions – revised language
	Section 6.1 Startup Procedures – revised language
	Table 3-3, Item 61 and 62 – revised language
Facility	Desotec US LLC – Parker, Arizona
Purpose	Permit modification submittal fly sheet documenting proposed revisions

REVISED: September 21, 2026

STARTUP, SHUTDOWN, AND MALFUNCTION PLAN

**DESOTEC US LLC
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SEPTEMBER 2026
REVISION: 2

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List of Acronyms

acfh	Actual cubic feet per hour
acfm	Actual cubic feet per minute
APC	Air pollution control
AWFCO	Automatic waste feed cutoff
Btu	British thermal unit
CAA	Clean Air Act
CEM or CEMS	Continuous emission monitor or Continuous emission monitoring system
CFR	Code of Federal Regulations
CMS	Continuous monitoring system
CO	Carbon monoxide
CRIT	Colorado River Indian Tribes
cu. ft.	Cubic foot
DC	Direct current
DRE	Destruction and removal efficiency
dscf	Dry standard cubic foot
dscfm	Dry standard cubic feet per minute
EPA	United States Environmental Protection Agency
ESV	Emergency Stack Vent
ft	Feet
gpm	U.S. Gallons per minute
gr	Grain (equals 1/7000 pound)
HAP	Hazardous air pollutant
HCl	Hydrogen chloride
hr	Hour
ID	Induced draft
in	Inch
in w.c.	Inches of water column (pressure measurement)
L	Liter
lb	Pound
mg	Milligram
ml	Milliliter
MTEC	Maximum theoretical emission concentration
NDIR	Non-dispersive infrared
ng	Nanogram
P&ID	Piping and instrumentation diagram

PCDD/PCDF	Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzo furans
PDT	Performance Demonstration Test
PDTP	Performance Demonstration Test Plan
PFD	Process flow diagram
PLC	Programmable logic controller
POTW	Publicly Owned Treatment Works
ppm	Parts per million
ppmv	Parts per million by volume
ppmvd	Parts per million by volume, dry basis
RCRA	Resource Conservation and Recovery Act
rpm	Revolution per minute
scfm	Standard cubic feet per minute
EWT	Evoqua Water Technologies
SOP	Standard Operating Procedure
sq. ft.	Square feet
SSMP	Startup, Shutdown, and Malfunction Plan
TCDD	Tetrachloro dibenzo-p-dioxin
TEQ	Toxicity equivalent (related to 2,3,7,8-TCDD)
TSCA	Toxic Substances Control Act
ug	Microgram
USEPA	United States Environmental Protection Agency
WESP	Wet electrostatic precipitator

1.0 INTRODUCTION

Evoqua Water Technologies (EWT) operates a carbon reactivation facility located in the Colorado River Indian Tribes (CRIT) Industrial Park near Parker, Arizona. The facility treats spent activated carbon that has been used by industry, state and federal government agencies, and municipalities for the removal of organic compounds from liquid and vapor phase process waste streams. Once the carbon has been used and is spent, it must be either disposed of or reactivated at a facility such as EWT. A Carbon Reactivation Furnace (RF-2) is used by EWT to reactivate the spent carbon. Some of the carbon received at the Parker facility is designated as a hazardous waste under the Resource Conservation and Recovery Act (RCRA) regulations. Much of the spent activated carbon received at the facility is not a RCRA hazardous waste, as it is neither a characteristic nor a listed waste as defined by 40 CFR 261. The carbon reactivation facility is operating under the RCRA Interim Status standards of 40 CFR 265 and is currently in the process of obtaining a RCRA permit.

The carbon reactivation process thermally treats spent activated carbon in a multiple hearth furnace consisting of five hearths. The spent carbon is introduced into the top hearth and flows downward through the remaining four hearths. Reactivated carbon exits the bottom hearth through a cooling screw. Natural gas burners are provided to ensure adequate heat input to the reactivation unit for all of the spent carbons that are reactivated at the facility. The hot gases generated in the reactivation furnace are routed to an afterburner to ensure the thermal oxidation of any organic matter that is not oxidized in the reactivation unit. The afterburner is equipped with two burners that utilize natural gas as the fuel source. From the afterburner, the gases are quenched by direct water contact and routed through a variable throat venturi scrubber for particulate matter control. From the venturi scrubber, the gases are routed to a packed bed scrubber for acid gas control. From the packed bed scrubber, the gases flow through a wet electrostatic precipitator, used for fine particulate matter and metals control. From the wet electrostatic precipitator, the gases are routed through a stack to the atmosphere. The motive force for moving the gases through the air pollution control system is supplied by an induced draft fan. The air pollution control equipment uses a closed loop recycle water system. Scrubber blowdown from reactivation furnace air pollution control equipment is treated in an exempt wastewater treatment unit, or discharged directly to a Publicly Owned Treatment Works (POTW).

RF-2 is not a hazardous waste incinerator. "Incinerator" is defined in 40 CFR 260.10 as "any enclosed device that: (1) Uses controlled flame combustion and neither meets the criteria for classification as a boiler, sludge dryer or carbon regeneration unit, nor is listed as an industrial furnace; or (2) Meets the definition of infrared incinerator or plasma arc incinerator." The multiple hearth furnace is designated by Subpart X of the RCRA regulations as a Miscellaneous Unit.

EPA Region 9 has requested that EWT prepare a Startup, Shutdown and Malfunction Plan (SSMP) as part of the permitting process for the reactivation furnace. The purpose of the SSMP, which will take effect once the final Part B permit is approved, is to do the following:

- To ensure that the reactivation furnace unit, including emission control equipment is operated and maintained in fulfillment of EWT's general duty to minimize emissions to the greatest extent in a manner consistent with good air pollution control practices
- To ensure that owners and operators are prepared to correct malfunctions as soon as practicable
- To minimize the reporting burden associated with excess emissions. The SSMP should address startup, shutdown, and malfunction events of the thermal treatment process that could result in an emission or operating limit exceedance

To meet these SSMP objectives, this Plan includes a description of:

- Procedures for operating and maintaining the source during periods of startup, shutdown, and malfunction
- The corrective action program for responding to malfunctioning process, air pollution control, and related monitoring equipment used to comply with the SSMP standard
- Potential causes of the identified malfunctions that may result in excess emissions of hazardous air pollutants (HAPs), and actions to be taken to minimize the frequency and severity of those malfunctions

Emission standards and operating limits do not apply during periods of startup, shutdown, and malfunction. Facilities are exempted from emission standard and operating limit violations during startup, shutdown, and malfunction events, provided the SSMP procedures are followed and compliance with the SSMP is properly documented. The specific procedures that address startup, shutdown, and response to possible malfunctions of the thermal treatment process, and how facility personnel must document compliance with these procedures, are described in this plan.

In order to ensure that the plan comprehensively identifies potential malfunctions, the plant's reaction to those malfunctions, and the measures in place to prevent them, a EWT cross-functional team reviewed the process and its operational factors via the following:

- independent consideration of the malfunction potential and impact of each relevant piece in the APC system
- planned actions to be taken in response to malfunctions, and
- a determination of the scope and adequacy (with adjustment as needed) of the measures in place to prevent malfunctions from occurring

The cross-functional team consisted of and obtained input from staff in the operations, maintenance, and environmental departments of the Parker facility. In addition, consultative support on this effort was provided via internal corporate and external resources.

2.0 PLAN ORGANIZATION AND OBJECTIVES

This SSMP has been developed to provide guidance for operating and maintaining the spent carbon thermal treatment process during startup, shutdown, and occurrence of malfunctions in a manner consistent with safety and good air pollution control practices for minimizing emissions. Preventative measures as well as corrective measures associated with the malfunctions are also key aspects of this Plan. The SSMP is organized as follows:

- Section 3.0 provides a description of EWT's spent carbon reactivation process
- Section 4.0 defines startup, shutdown, and malfunction as they apply to this Plan, and provides details for complying with the plan. Instructions for preparing new Plan procedures and revising existing procedures are also discussed.
- Section 5.0 describes the decisions, actions and required records associated with the occurrence of startups, shutdowns, or potential malfunction events
- Section 6.0 describes procedures to be followed during startup and shutdown of the thermal treatment process.
- Section 7.0 addresses features of the thermal treatment process intended to prevent system malfunctions, and corrective measures to be taken in the event of malfunctions.
- Section 8.0 describes the SSMP record keeping requirements
- Section 9.0 describes the SSMP reporting requirements.

3.0 CARBON REACTIVATION PROCESS DESCRIPTION

Provided in this section is a general process description of the carbon reactivation process. Included are functional descriptions of each system component as they apply to achieving compliance with the emission limits and operating parameter limits. A block flow diagram of EWT's carbon reactivation system is provided as Figure 3-1. This section also includes a discussion of hazardous waste residence time, which is a critical parameter associated with implementation of this plan.

3.1 CARBON REACTIVATION SYSTEM

The carbon reactivation system is a multiple hearth furnace, consisting of five hearths followed by an afterburner. Spent carbon in an aqueous slurry form is introduced into the top hearth of the reactivation unit by a dewatering screw and flows downward through the remaining four hearths. The top two hearths are unfired hearths. Hot combustion gases generated in the bottom three hearths flow upward through the top hearths and are used to complete the dewatering of the spent carbon. The bottom three hearths are fired hearths where the reactivation process occurs. Rabble arms, with teeth, each connected to a rotating center shaft, are located above each hearth. The rabble arms plow the carbon material across the hearth surface and towards drop holes. The carbon falls through the drop holes to the next lower hearth, and eventually to the outlet of the reactivation unit. Reactivated carbon exits the bottom hearth through a cooling screw. The reactivation furnace is equipped with a primary combustion air fan, and two center shaft cooling fans. Natural gas burners are provided to ensure adequate heat input to the reactivation unit for all carbons that are reactivated at the facility. A Performance Demonstration Test was conducted at the reactivation furnace unit, and demonstrated compliance with all of the performance and emissions standards in 40 CFR 60, Subpart EEE, while processing 3,049 pounds per hour of wet spent carbon feed.

3.1.1 Multiple Hearth Furnace

Following dewatering the spent granular carbon is fed to the top section of the multiple-hearth furnace. In the pre-drying and drying zones (the top hearths), the water retained in the pores and the surface of the carbon is evaporated by the counter-current flow of hot combustion gases coming from the lower hearths. The temperature of the carbon in the top hearths is raised to approximately 210°F. Upon application of heat, water will evaporate freely when the particle temperature goes over 200°F. The adsorbed water is freed at temperatures of approximately 212°F to 230°F. After the water is evaporated from the carbon, the carbon starts to increase in temperature.

At temperatures over 600°F, high molecular weight organic impurities in the carbon will crack to produce gaseous hydrocarbons, hydrogen and water vapor which escape the pores of the granular carbon. Some fixed carbon is formed by pyrolytic (low oxygen) cracking of the organic and is retained in the pores of the granules. In these pre-heating and decomposition zones (middle hearths) the temperature of the carbon

is increased to about 750°F in a virtually oxygen-free atmosphere. Under these conditions the adsorbed organic impurities in the pores of the carbon are pyrolyzed and all volatile materials are driven off.

3.1.2 Afterburner

The afterburner is a self supporting vertical cylindrical chamber approximately 33 feet high with an inside diameter of approximately 5 feet. The design incorporates a mixing zone, choke ring and a minimum residence time, at temperature, of greater than one second. The afterburner shell is constructed of steel plate and is internally lined with firebrick and castable insulation. The afterburner is equipped with two low NO_x burners, which utilize heated combustion air. The afterburner chamber is fitted with a total of six air injection nozzles which are placed to provide combustion air and turbulence to promote the oxidation of organic materials in the flue gas from the multiple hearth furnace. The afterburner is designed to thermally oxidize greater than 99.99 percent of all organic matter entering the afterburner in the furnace off gas. A cross section of the afterburner and the afterburner specification can be found in Appendix X of the RCRA Part B Permit Application.

3.1.3 Residence Time Determination

The hazardous waste residence time for the carbon reactivation process following waste feed cutoff, based on calculations of the time for spent activated carbon to exit the bottom hearth and emitted gases to be treated in the afterburner, is 38 minutes at a rabble arm shaft speed of approximately 1 revolution per minute (rpm).

The hazardous waste residence time is a critical parameter for establishing, following automatic or manual shutoff of the spent carbon, whether exceedances from permit limits are or could be counted as permit violations. Additional discussion of the significance of hazardous waste residence time as it applies to this SSMP is provided in Section 4.0.

3.2 BURNER AND FEED SYSTEMS

Six natural gas burners are installed in the reactivation furnace, two per hearth on hearths 3, 4, and 5. Two natural gas burners are installed in the afterburner. Depending on temperature requirements in the unit, not all burners will be required to be operated at any one time.

3.2.1 Burner Description

The six burners installed in the reactivation furnace are North American Manufacturing Company burners (NA 6422-6) or equivalent. The two burners installed in the afterburner are North American Manufacturing Company burners (NA 6514-8B) or equivalent. Literature describing these burners can be found in Appendix X of the RCRA Part B Permit Application.

3.2.2 Spent Activated Carbon Feed System

The spent activated carbon feed system to the reactivation furnace consists of a feed tank, a dewatering screw, and a weigh belt conveyor. The spent carbon/recycle water slurry is discharged from the feed tank to the dewatering screw via a control valve. The dewatered spent carbon is discharged from the dewatering screw on to the weigh belt conveyor, which is used to measure the feed rate to the reactivation furnace.

3.2.3 Auxiliary Fuel System

The six burners in the reactivation furnace and the two burners in the afterburner are fired with natural gas, supplied by the local utility company via pipeline.

3.2.4 Combustion Air

Combustion air is supplied to the six reactivation furnace burners and two afterburner burners by a combustion air blower. The blower is designed to supply approximately 351,600 actual cubic feet per hour (acfh) of preheated combustion air. Fan specifications are located in Appendix X of the RCRA Part B Permit Application.

3.3 REACTIVATED CARBON HANDLING SYSTEM

The reactivated carbon exiting from the reactivation furnace is a product and hence not regulated under RCRA. No solid residues are produced by the reactivation furnace. The reactivated carbon is discharged from the reactivation furnace into a screw cooler and from the screw cooler into one of three reactivated carbon product storage tanks. From the reactivated carbon storage tanks, the reactivated carbon product is transported through an enclosed conveyor to a product packaging facility. At the product packaging facility, the reactivated carbon is removed from the storage tanks and placed in appropriate containers for shipment to customers.

Scrubber blowdown from the reactivation furnace air pollution control equipment is treated in a RCRA-exempt wastewater treatment unit, or discharged directly to the POTW. The discharge to the POTW is continuously monitored for pH, total dissolved solids, flow and temperature to ensure compliance with the discharge limitations found in the facility's industrial wastewater discharge permit.

3.4 AIR POLLUTION CONTROL (APC) SYSTEM

The APC system for the reactivation furnace includes a quench/venturi scrubber, a packed bed scrubber and a wet electrostatic precipitator. The APC system does not include an Emergency Stack Vent (ESV). Exhaust gases from the carbon reactivation system are continuously routed through the APC equipment, and cannot by-pass the APC equipment under any circumstances. The individual components of the APC equipment are described in the following sections.

3.4.1 Quench/Venturi Scrubber

The Quench/Venturi Scrubber is a dual-purpose device used to rapidly quench the hot combustion gases exiting the afterburner and to remove particulate matter. The quench section uses water sprays to cool the afterburner exit gas to the point of adiabatic saturation (approximately 170 to 190°F). The venturi scrubber has an adjustable throat, and is a low energy, vertical down flow type. The throat area is adjusted by a pneumatic cylinder actuator and an electro/pneumatic positioner. The remotely adjustable throat is automatically controlled to maintain a constant pressure differential. The venturi scrubber is located directly below the quench section and is connected by a flooded elbow to the packed bed scrubber. The elbow incorporates a water-filled gas impact section directly beneath the throat to prevent erosion of the shell. The water supply for venturi irrigation is recirculated scrubber water at a total flow of approximately 7.5 gpm/1000 acfm.

The design data and equipment descriptions for the Quench/Venturi Scrubber as well as a description of the physical dimensions of the venturi scrubber section can be found in Appendix X of the RCRA Part B Permit Application.

3.4.2 Packed Bed Scrubber

The packed bed scrubber consists of a vertical up flow and cylindrical disengaging section followed by a packed bed section and mist eliminator. The bottom portion of the scrubber is used to separate entrained water droplets from the gas prior to entering the packed section of the scrubber. The packed bed scrubber is designed to remove a minimum of 99 percent of the incoming hydrogen chloride.

The design data and equipment description for the packed bed scrubber as well as a description of the physical dimensions of the packed bed scrubber can be found in Appendix X of the RCRA Part B Permit Application.

3.4.3 Wet Electrostatic Precipitator

The wet electrostatic precipitator (WESP) is a vertical tubular design with self irrigating tubes. The WESP consists of inlet gas distribution to promote even distribution of the process gas flow entering the WESP, inlet and outlet plenums and a collecting electrode tube bundle. The WESP is equipped with outboard high voltage insulator compartments which include a purge air system, high voltage distribution-support grids, high intensity rigid tube type charging/precipitating discharge electrodes, high voltage power supply (transformer/rectifier and controller) system, ground sticks, safety key interlocks, warning labels, and electronic control logic equipment and valving.

The WESP, in conjunction with the venturi scrubber, is designed to achieve a maximum outlet particulate matter grain loading of 0.015 grains/dscf adjusted to 7 percent oxygen. The design data and equipment

description for the WESP as well as a description of the physical dimensions of the WESP can be found in Appendix X of the RCRA Part B Permit Application.

3.4.4 ID Fan

A variable speed induced draft fan is provided to exhaust combustion gases from the furnace and afterburner and through the air pollution control system. Design specifications for the fan can be found in Appendix X of the RCRA Part B Permit Application.

3.4.5 Stack

The cleaned gas stream is exhausted to the atmosphere via a 110 foot high stack with an inside diameter of two feet and a gas outlet that is 19.75 inches in diameter. A stack drawing is provided in Appendix X of the RCRA Part B Permit Application.

3.5 PROCESS MONITORING, CONTROL, AND OPERATION

The facility is equipped with a programmable logic control (PLC) system which monitors and/or controls process variables to ensure proper facility operation. The reactivation furnace system is equipped with instrumentation to monitor and control process flows, temperatures, and pressures, and to transmit signals to the main control system. The automation system has the capabilities of controlling valves, motors, pumps, and fans as well as alarming and initiating waste feed cutoff interlocks if process conditions deviate from established limits.

Figure 3-2 shows the location of pertinent instrumentation related to permit compliance. Complete Piping and Instrumentation Diagrams (P&IDs) are included in Appendix VI of the RCRA Part B Permit Application. It is important to note that these drawings include many components of the facility that are exempt from permitting under various provisions of RCRA. These components are provided for informational purposes and ease of review only, and they are not intended to become regulated components of the facility. Information concerning major process instruments associated with regulatory compliance is presented in Table 3-1. Calibration schedules are based on manufacturer's recommendations and EWT operating experience.

Process monitoring and emissions monitoring performed for regulatory compliance is conducted on a continuous basis in accordance with USEPA definitions of continuous monitors.

A "Continuous Monitor" is a device (or series of devices) which continuously samples the regulated parameter without interruption, evaluates the detector response at least once every 15 seconds, and computes and records the average value at least every 60 seconds, except during periods of calibration or as otherwise allowed by the applicable regulations or guidelines. For many parameters, rolling averages are calculated. A "Rolling Average" is defined as the arithmetic mean of a defined number of the most recent one-minute average values calculated by the continuous monitor. For example, an

hourly rolling average would incorporate the 60 most recent one-minute average values. As each new one-minute average value is computed, the least recent of the 60 values is discarded and a new hourly rolling average is calculated and recorded. Twelve hour rolling averages use 720 one-minute average values rather than 60.

Two subsets of continuous monitoring systems are employed on the reactivation furnace: process continuous monitoring systems (CMS) and continuous emissions monitoring systems (CEMS). The following is a discussion of each type of continuous monitoring system.

3.5.1 Process Continuous Monitoring System (CMS)

The carbon reactivation process utilizes a continuous monitoring system (CMS) to monitor regulated stack gas emissions and operating parameters. The CMS consists of a combination of continuous emissions monitoring systems (CEMS) and instruments (parameter CMSs) that monitor and record parameter data from the operations of the process.

Parameter CMSs are process instruments that continuously monitor and record parameter data from the operation of the carbon reactivation process. The instruments consist of weigh belts, flowmeters, pressure transducers, thermocouples and other devices that collect process information on key regulatory parameters. The parameter CMSs sample each regulated parameter without interruption, evaluate the detector response at least once every 15 seconds, and compute and record the average values at least once every 60 seconds. The specified operating parameter limits are shown in Table 3-2. The parameter CMSs that will be used to continuously demonstrate compliance with the operating parameter limits are shown in Table 3-1.

Figure 3-2 shows the general location and function of the parameter CMSs that monitor temperature, pressure, and flow indicating and control devices for the system. The specifications for these devices are shown in Table 3-1. The following is a discussion of each type of process monitoring and control to be performed in the reactivation furnace system for regulatory compliance purposes.

Spent Activated Carbon Feed Rate

The flow rate of the spent activated carbon is monitored and controlled using a weigh belt conveyor and carbon slurry feed valve. When the feed valve is open, carbon slurry drops into the dewatering screw and is then discharged onto the weight belt conveyor, which feeds the carbon to the reactivation furnace. The feed rate control system consists of a weigh cell, weight transmitting element, weight indicating controller, variable timed open/closed carbon slurry feed valve, and continuous weight feed rate recorder. The desired spent activated carbon feed rate is achieved by the control system adjusting the time that the carbon slurry feed valve is open and closed. Automatic waste feed cutoff interlocks stop the weigh belt conveyor and hold the carbon slurry valve closed which stops the feed of carbon to the reactivation furnace.

Regulated Constituent Feed Rates

The total feed rate of mercury, semivolatile metals (the combination of cadmium plus lead), and low volatility metals (the combination of arsenic, beryllium and chromium) is continuously monitored and recorded. This is accomplished by the process computer which continuously monitors the flow rate of spent activated carbon, and multiplies that flow rate by the constituent concentration, which is input to the computer whenever the feedstream characterization is updated as described in the facility Waste Analysis Plan.

Afterburner Temperature

The reactivation furnace afterburner combustion temperature is continuously measured by a thermocouple located in the bottom of the afterburner chamber. The automatic waste feed cutoff interlock is activated during low temperature conditions. The automatic temperature controller accepts the signal from the thermocouple and manipulates the auxiliary fuel feed rate.

Venturi Pressure Differential

Venturi scrubber pressure differential is measured and controlled as an indicator of the energy supplied for particulate matter removal. A minimum pressure differential is necessary for proper control efficiency. The pressure differential is continuously measured by a pressure differential indicator with pressure taps located at the inlet and outlet of the venturi. The pressure differential is controlled by changing the position of the venturi throat control valve elements.

Quench/Venturi Scrubber Liquid Flow Rate

The recycle flow rate is continuously monitored using magnetic flow meters in the recycle water lines. A minimum recycle water flow rate is maintained in order to provide sufficient cooling and scrubbing water for particle removal. A low total recycle flow rate will initiate an automatic waste feed cutoff.

Packed Bed Scrubber pH and Flow Rate

The packed bed scrubber recycle pH and the flow rate of recycled liquid to the packed bed scrubber influence the effectiveness of acid gas removal. The pH is measured continuously by an in-line pH probe installed in the recycle liquid piping. The recycle flow rate is continuously monitored using a magnetic flow meter in the recycle water line. Either low pH or low packed bed scrubber recycle flow rate will initiate an automatic waste feed cutoff.

Packed Bed Scrubber Pressure Differential

The differential pressure across the packed bed is measured as an indicator of proper liquid and gas distribution in the tower. The pressure differential is continuously measured by a differential pressure element with taps located at the inlet and outlet of the packed bed scrubber.

WESP Secondary Voltage

EWT monitors the secondary voltage as an indicator of proper collection of fine particles and metals. A minimum secondary voltage has been established based upon the operating conditions during the Performance Demonstration Test.

Scrubber Blowdown Flowrate

In order to conserve water, EWT recycles most of the liquid from the air pollution control system. In order to prevent the buildup of dissolved solids, EWT bleeds water from the system. As water is bled, fresh makeup water is added. The APC system blowdown flow rate is continuously monitored using a magnetic flowmeter, and a low flow rate will trigger an automatic waste feed cutoff.

Stack Gas Flow Rate

The flow rate of stack gases is used as the indicator of combustion gas velocity prescribed by the applicable regulations. A flow sensor located in the stack provides the direct flow measurement. High stack gas flow rate will initiate an automatic waste feed cutoff.

3.5.2 Continuous Emissions Monitoring System (CEMS)

The exhaust gases are continuously monitored for carbon monoxide and oxygen content as an indicator of proper operation of the combustion process.

The oxygen analyzer is a paramagnetic analyzer. The carbon monoxide analyzer is a non-dispersive infrared monitor having a dual range of 0-100 ppm and 0-1000 ppm. Performance specifications for the CEMS, as well as a drawing of the sampling system can be found in Appendix X of the RCRA Part B Permit Application.

3.5.3 Process Control System

The carbon reactivation facility is equipped with a programmable logic control (PLC) system which monitors and/or controls process variables to ensure proper facility operation. The reactivation furnace system is equipped with instrumentation to monitor and control process flows, temperatures, and pressures, and to transmit signals to the main control system. The automation system has the capabilities of controlling valves, motors, pumps and fans as well as alarming and initiating waste feed cutoff interlocks if process conditions deviate from established limits.

The process control system maintains the operations within desired operating conditions, and manages continuously monitored process data required for compliance demonstration and specific operational

purposes. Regulatory and safety interlocks as well as shutdown features are important aspects of the process control system. Safety shutdown responses are relayed to various equipment items when process limits are not met so that the equipment will go to a fail-safe mode.

3.5.4 Safety and Automatic Waste Feed Cutoffs

The control system includes automatic waste feed cutoff (AWFCO) system that stops the feed of spent activated carbon when operating conditions are at or near limits necessary to comply with specific permit conditions. A listing of the AWFCO parameters is provided in Table 3-2. When any of these parameters deviates from the established limit, an electronic signal from the control system will stop the carbon weigh belt feeder.

The parameter CMSs and CEMS described in this plan are integrated with the AWFCO system. The AWFCO system also incorporates safety related parameters that are not regulated by the facility's operating limits that are tied into the burner management and combustion control systems. The safety shutdown responses are relayed to various equipment and instruments when process limits are not met so that the equipment will enter a fail-safe mode. An AWFCO will occur following any of the below conditions:

- When the measured emission level of a regulated compound reaches or exceeds the AWFCO setpoint
- When the monitoring input of a regulated operating parameter reaches or exceeds its AWFCO setpoint
- When communication between the Compliance PLC and the process monitoring/historian system is lost and the communication-loss detection system initiates the automatic waste feed cutoff. The communication-loss AWFCO is initiated through an independent Ethernet switch and relay output designed to place the waste feed system in a fail-safe condition upon detection of the communication loss. A distinctive high-priority alarm and/or banner are simultaneously provided to alert control room personnel of the communication-loss condition.

On a monthly basis, during reactivation furnace operations, the AWFCO system will be tested by running a software routine to check PLC logic functions associated with the AWFCO subsystem. Each of the regulatory AWFCOs will be tested by using a control system console to input a software value which corresponds to an exceedance of the permit limit. The AWFCO test will be documented, via the Monthly RCRA Inspection Checklist. It should be noted that during the brief period of time when the AWFCO parameters are being tested, regulatory AWFCOs will be precluded. Non-regulatory AWFCOs will not be affected by the test.

3.6 PROCEDURES TO RAPIDLY STOP SPENT ACTIVATED CARBON FEEDS AND CONTROL EMISSIONS

3.6.1 Rapidly Stopping Spent Activated Carbon Feeds

The reactivation furnace is controlled by a process control computer. EWT has included alarms and waste feed cutoff interlock setpoints which will automatically stop the feed of spent activated carbon. In the event any of these preprogrammed operating setpoints are reached, the computer will take automatic action to stop the carbon weigh belt conveyer to immediately stop spent activated carbon feed to the system. The same action to cease spent activated carbon feed can be activated from the control room by operating personnel. These actions do not necessarily constitute a shutdown of the reactivation furnace; only a stoppage of spent activated carbon feed. The reactivation furnace will normally operate on auxiliary fuel after spent activated carbon feed is ceased to maintain operating temperature.

In addition to the process parameter AWFCOs described above, the facility is equipped with a communication-loss protective function. Loss of communication between the Compliance PLC and the process monitoring/historian system is detected by an independent Ethernet switch and relay output. Upon detection of a communication loss, the relay output initiates an immediate automatic waste feed cutoff to stop spent activated carbon feed to the reactivation furnace. A distinctive high-priority alarm and banner are simultaneously displayed in the control room alarm application to notify operating personnel of the condition.

3.6.2 Shutting Down the System

Reactivation furnace system shutdowns may occur for three reasons:

- A loss or malfunction of systems or controllers critical to maintaining performance standards and operating requirements.
- Plant-wide electrical power or natural gas outage or loss of external water service.
- A scheduled shutdown for normal maintenance or other operational purposes.

In the event of a system failure, the reactivation furnace system is equipped with spent activated carbon feed and fuel shutoff valves which fail to the “safe” (closed or off) position. Operations personnel have the ability to initiate an emergency system shutdown manually from the control room, although a controlled shutdown is preferred. Complete shutdown of the reactivation furnace system can be undertaken as required in an orderly fashion to allow for a proper rate of cooling.

A loss of communication affecting the ability to reliably monitor or control compliance-related process parameters will result in an automatic waste feed cutoff through the communication-loss protective

system. Operators will follow the communication-loss response procedure and evaluate whether continued operation of the reactivation furnace and APC system is appropriate based on the condition and duration of the communication loss.

3.6.3 Controlling Emissions During Equipment Malfunctions

Equipment shells and interconnecting ductwork are free from openings or gaps. Emissions from the spent activated carbon feed point are prevented through the use of a rotary air lock on the multiple hearth furnace feed port. Emissions from the rotating parts in the multiple hearth are prevented by a sand seal. Daily inspections are conducted in accordance with the inspection procedures of the RCRA permit application. Process gases are always directed through the emissions control equipment, and there are no provisions to bypass the air pollution control system. In addition, the emissions control equipment is among the last equipment to be taken off-line under any circumstance. In the event of an equipment malfunction affecting reactivation furnace system performance, spent activated carbon feed is automatically discontinued. Stopping the spent activated carbon feed immediately eliminates the flow of untreated spent activated carbon into the reactivation furnace system, however since the spent activated carbon takes 38 minutes to travel through the reactivation furnace hearths, a slight potential for emissions remains during this time. To the greatest extent possible, the afterburner and emissions control equipment will continue to operate while the malfunction is corrected. Spent activated carbon feed may be resumed once operating conditions have been returned within the permit limits. If the malfunction can not be corrected in a reasonable time frame or requires the unit to be taken off line, the reactivation furnace, afterburner, and APC systems will be shut down in an orderly fashion according to standard operating procedures. Spent activated carbon feed will not resume until the malfunction has been corrected and the entire reactivation furnace system has been returned to operating conditions within the permitted limits.

3.6.4 Emergency Safety Vent Operations

The EWT reactivation furnace design does not require or utilize an emergency safety vent. Process gases are always directed through the emissions control equipment, and there are no provisions to bypass the air pollution control system.

4.0 SSMP IMPLEMENTATION

The presumption is that startup, shutdown, and malfunction events have a higher chance of excess emissions or operating limit exceedances compared to normal operation. Although the carbon reactivation system's sophisticated process monitoring and control system is configured to shutoff spent activated carbon upon a malfunction, potential operating limit exceedances could occur during the spent activated carbon residence time in the multiple hearth and gaseous residence time in the afterburners (after the spent activated carbon has been shutoff). This section defines the periods of startup, shutdown and malfunctions as it applies to the SSMP, and describes activities and responsibilities for following and documenting compliance with the SSMP procedures.

4.1 APPLICABILITY

4.1.1 Startup

For the purposes of this SSMP, startup will begin when the system begins firing natural gas in any of the bottom three hearths or the afterburner during a "cold startup". Startup ends when spent activated carbon feed to the multiple hearth is initiated.

4.1.2 Shutdown

For the EWT carbon reactivation system, shutdown includes the period when natural gas feed is being ramped down and the spent activated carbon reactivation system is being cooled. Shutdown will begin when spent activated carbon feed is discontinued to the multiple hearth furnace and the hazardous waste residence time of 38 minutes has expired. Permit limits are not applicable when spent carbon is not in the furnace.

4.1.3 Malfunction

A malfunction is defined as any sudden, infrequent, and not reasonably preventable failure of air pollution control, 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. The emission limitations refer to the CO standard and various parameter operating limits.

4.2 FOLLOWING THE STARTUP, SHUTDOWN, AND MALFUNCTION PLAN

One purpose of the SSMP is to ensure that EWT fulfills its general duty to operate and maintain the unit, including emission control equipment, in a manner consistent with safety and good air pollution control practices during periods of startup and shutdown, and in responding to potential malfunctions. The instructions in this SSMP must be followed during all startups, shutdowns, and malfunctions. Also, documentation of whether the SSMP steps were followed during startups, shutdowns, and malfunctions

must be maintained, as well as numerous specific details associated with these startup, shutdowns and malfunctions. For the purposes of documenting the duration of an exceedance as a result of a malfunction, the exceedance will begin once an emission standard or operating limit is exceeded while spent carbon is in the multiple hearth. The exceedance will end once the spent activated carbon has cleared the multiple hearth furnace or once the emissions and operating parameters are reestablished within their respective permit limits, whichever occurs sooner. Additional detailed discussions for operating the activated carbon reactivation process during startups and shutdowns, responding to known or potential malfunctions, and abiding by all required recordkeeping and reporting requirements, are addressed in the remainder of this SSMP.

4.3 METHODOLOGY FOR IDENTIFICATION OF MALFUNCTIONS

This SSMP was developed to be both proactive and reactive to malfunctions. Malfunctions involving process equipment, instrumentation/CMS, and the process control system were included in the malfunction evaluation. After identifying these potential malfunctions, proactive measures were identified that would be expected to prevent these malfunctions from occurring as well as the reactive procedures that provide instructions for operating and controlling the system in the event that the malfunctions actually occurred. The primary work product of this team consists of a spreadsheet entitled "Potential Malfunctions From the Spent Activated Carbon Reactivation Furnace That May Result in Emission Exceedances". This spreadsheet is attached and incorporated into this plan by reference as Table 3-3. Additional discussions on procedures to respond to malfunctions are included in Section 7.0 of this plan.

In addition to the potential malfunctions identified in Table 3-3, future unexpected malfunctions could occur that might require compliance documentation, and that could possibly require revision of this SSMP to include the unexpected malfunctions. As such, operational personnel should be prepared to recognize incidents that may qualify as malfunctions that have not been previously identified. Indication that a potential malfunction is occurring or has occurred may be signaled by:

- Exceedance of an emission standard or operating limit
- Alarm
- Automatic waste feed cutoff
- Inspection or general observation of operational data

Loss of communication between the Compliance PLC and process monitoring/historian system, as indicated by high-priority alarm/banner and/or automatic waste feed cutoff, shall be evaluated by operating personnel to determine whether a malfunction has occurred and whether the event had the potential to cause an emission standard or operating parameter exceedance.

For the purposes of this plan, equipment problems that do not or could not cause an exceedance will not be considered a malfunction. Determining whether an equipment problem is a malfunction may require additional review of the process data and circumstances surrounding the event.

4.4 DOCUMENTATION OF COMPLIANCE WITH THE SSMP

During operational periods when the SSMP is applicable, process control operators will use the information contained in it to make regulatory compliance-related decisions about the operation of the system, and to document what is needed to ensure compliance. It includes determining whether a potential malfunction event qualifies as a malfunction according to the Plan and how personnel document actions taken that are consistent or not consistent with the Plan. EWT has taken measures to train the control room operators and other key personnel on the importance of maintaining a thorough SSMP and following the procedures referenced in the plan. EWT has also provided extensive training on the procedures referenced in this plan. Exceedances of emission limits or operating parameters that occur when actions taken are consistent with the plan are not considered violations, even if hazardous waste is present in the combustion chamber.

EWT will use a checklist similar to the ones identified in the Appendix of this plan to document compliance with the SSMP during startup, shutdown, and malfunction events.

4.5 PROCEDURE DEVELOPMENT AND MAINTENANCE

This plan includes information on potential malfunctions and the reactive and proactive nature of EWT malfunction activities. In the event that any part of this plan or the referenced attachments requires revisions, new or modified procedures are needed, or changes are made to the review and approval process. Two basic circumstances may prompt these changes:

- Periodic changes in equipment or procedures that are addressed by the SSMP, and
- Revisions to the SSMP if the plan fails to address an event that occurs and that meets the characteristics of a malfunction.

If the SSMP fails to address or inadequately addresses an event that meets the characteristics of a malfunction, EWT will revise the SSMP within 45 days after the event to include detailed procedures for operating and maintaining the spent activated carbon reactivation process during similar malfunction events and a program of corrective action.

4.6 AUTOMATIC WASTE FEED CUTOFF SYSTEM REQUIREMENTS DURING MALFUNCTIONS

The AWFCO requirements will continue to apply during malfunctions. If an emission limit or operation limit is exceeded during a malfunction, the automatic waste feed cutoff system must immediately cutoff spent activated carbon feeds. If the malfunction itself prevents immediate and automatic cutoff of spent activated carbon feed, EWT will cease feeding spent activated carbon as quickly as possible.

Although AWFCO requirements continue to apply during malfunctions, an exceedance of an emission standard or operating limit is not a violation if corrective measures taken during the malfunction are consistent with procedures prescribed in the SSMP.

4.7 PROJECTED OXYGEN CORRECTION FACTOR ASSOCIATED WITH STARTUP AND SHUTDOWN

The stack gas oxygen concentration is used to calculate an oxygen correction factor which is applied to the stack gas CO concentration to develop a CO concentration, corrected to 7% oxygen. The oxygen correction factor is determined by the following equation:

$$OCF = \left(\frac{21 - 7}{21 - O_2} \right)$$

where: OCF = oxygen correction factor

O₂ = stack gas oxygen concentration (vol %)

During startup or shutdown, conditions may be such that the stack gas oxygen concentration approaches 21%, resulting in an oxygen correction factor approaching infinity. The CO values during the startup, shutdown and when spent carbon feed is not in the furnace will not be valid or considered a permit violation.

5.0 DECISIONS, ACTIONS, AND RECORDS ASSOCIATED WITH STARTUPS, SHUTDOWNS, OR MALFUNCTIONS

When a startup, shutdown or malfunction occurs, whether actions taken were consistent or not consistent with the SSMP will be documented in the facility operating record. Also, if it is a malfunction that occurs, the duration and a brief description of the malfunction must be included in the operating record. A determination must then be made as to whether an emission standard or operating limit exceedance occurred while spent activated carbon was in the multiple hearth during the startup, shutdown, or malfunction. If an exceedance did occur while spent activated carbon was in the multiple hearth, the occurrence and duration of the exceedance will be recorded in the operating record. The duration of the exceedance will be determined from the time the exceedance occurred until spent activated carbon is no longer in the multiple hearth (i.e. the hazardous waste residence time has expired) or once the emissions and operating parameters are reestablished within their respective permit limits, whichever occurs sooner.

If an exceedance did not occur while spent activated carbon was in the multiple hearth, determine whether the SSMP adequately addressed the SSM event. If the SSMP adequately addressed the event, no further action is required. If the SSMP did not adequately address the event, the SSMP will be revised.

A determination must then be made as to whether the exceedance was a result of a malfunction. In order to qualify as a malfunction, the event must be sudden, infrequent, and not reasonably preventable.

If the event was caused by a malfunction, investigate whether the malfunction was adequately addressed in the SSMP and whether actions taken in response to the event were consistent with the SSMP.

6.0 STARTUP AND SHUTDOWN PROCEDURES

The procedures for operating the carbon reactivation process during startup and shutdown are delineated in the facility's operating manuals for the operation of the reactivation process. Conceptual startup and shutdown procedures are provided below.

6.1 STARTUP PROCEDURES

The sequence below is a general summary of the procedures used for startup of the spent activated carbon reactivation system:

- Verification of power supply to all motors and process equipment/instrumentation
- Verification of utility supplies to all process equipment and instrumentation
- Verify communication between the Compliance PLC and process monitoring/historian system is established and the communication-loss protective system is in a ready condition prior to initiating spent activated carbon feed.
- Startup of the afterburner forced draft fans
- Startup of the process induced draft fan
- Startup of the multiple hearth furnace shaft cooling fan
- Startup of the afterburner pilot
- Startup of multiple hearth furnace burner pilot
- Bring spent activated carbon reactivation system to operating temperature
- Startup of multiple hearth furnace air motor
- Startup of the multiple hearth furnace rabble arm drive
- Startup of multiple hearth furnace carbon product discharge system
- Startup of spent activated carbon feed.

Once the power and utility supply to all motors and process equipment/instrumentation is verified, the startup of the carbon reactivation system is initiated. This includes the startup of the afterburner forced draft fans, ID Fan, multiple hearth furnace cooler forced draft fans, quench/venturi scrubber, packed bed scrubber and the WESP. The afterburner system natural gas burners are lighted followed by the multiple hearth furnace natural gas burners. The multiple hearth furnace activated carbon product discharge system is activated prior to initiating waste feed. Additionally, all automatic waste feed cutoffs (AWFCOs) must be satisfied in order to initiate a feed start.

6.2 SHUTDOWN PROCEDURES

In general, normal shutdown procedures are in reverse to the sequence used for startup. In the case of any interruptions, either AWFCOs or mechanical of short duration, the APCS continues to operate at permitted levels ensuring no excess particulate, metals and hydrogen chloride (HCl) emissions from the combustion system.

Emergency shutdown procedures occur either automatically via automatic shutdown control loops or by manual control. Conditions of unsafe operations for either the equipment or personnel (as defined by the safety interlock system) can result in emergency shutdown. In the event any emergency shutdown occurs, the reason for the condition occurring and the corrective action taken must be documented according to the SSMP requirements found in this plan.

7.0 PROCEDURES TO RESPOND TO MALFUNCTIONS

Section 4.3 described the methodology that EWT utilized to identify possible malfunctions of the carbon reactivation process that, if they occurred, could possibly lead to an exceedance of an emission limit or operating parameter. This section provides information on the procedures for responding to these identified malfunctions. The procedures listed in Table 3-3 are a combination of procedures that provide proactive measures to prevent malfunctions and procedures that provide responses to such malfunctions. For potential malfunctions, the following is provided as referenced above:

- A description of how the malfunction could credibly occur and lead to an exceedance.
- Design and operational proactive measures that have been taken to prevent occurrence of the malfunction, and
- Corrective measures that should be taken in response to the malfunction

Proactive measures included in EWT carbon reactivation process control system and in routine inspection procedures are briefly described in the following subsections.

7.1 CARBON REACTIVATION PROCESS CONTROL SYSTEM

The carbon reactivation process is operated by a sophisticated control system. The control system is programmed to adjust the unit when operating conditions warrant and respond to certain malfunctions. The control system notifies the operators via alarms when operating conditions are outside optimal ranges.

7.2 INSPECTIONS

EWT performs many proactive measures to identify potential problems with the system before they result in malfunctions. Such measures include daily inspections in which EWT visually inspects the reactivation furnace and associated equipment. The inspection includes a walk through around the carbon reactivation equipment and associated air pollution control system for leaks, spills, and fugitive emissions.

8.0 RECORDKEEPING REQUIREMENTS

EWT will keep records for events of startup, shutdown, or corrective measures resulting from a malfunction which document that the procedures referenced in this Plan were followed. Records will also be maintained for events that occur where the procedures were not followed, and for malfunction events that occur where no corresponding response to malfunction procedures exist in the SSMP. The occurrence and duration of all startups, shutdowns, and malfunctions must be maintained in the operating record.

- Complete an investigation of the cause of each exceedance
- Evaluate approaches to minimize the frequency, duration, and severity of each exceedance
- Revise the SSMP as warranted by the investigation
- The results of the investigation and evaluation will be recorded in the operating record.
- A summary of the investigation and evaluation, and any changes to the SSMP

9.0 REPORTING REQUIREMENTS

Details on the SSMP reports are provided below:

9.1 PERIODIC STARTUP, SHUTDOWN, AND MALFUNCTION REPORTS

These reports will be kept in the facility's operating record and will contain the following:

- If action taken during a startup, shutdown, or malfunction event are consistent with the procedures specified in EWT's SSMP,
- The identification of each instance if actions taken during a startup, shutdown, or malfunction event are not consistent with the SSMP, but no exceedance occurs.
- Number, duration and a brief description of each malfunction.
- Summary of any changes to the SSMP during the last review period

9.2 IMMEDIATE STARTUP, SHUTDOWN, AND MALFUNCTION DOCUMENTATION

- Any time an action taken during a startup, shutdown, or malfunction event is inconsistent with the procedures specified in the EWT SSMP and an exceedance of an emission standard or operating limit occurs while spent activated carbon is in the multiple hearth, EWT will document the details in the facility operating record.

9.3 INVESTIGATION AND EVALUATION SUMMARY REPORT

This investigation and evaluation must include the following:

- Investigation of the cause of each exceedance
- Evaluation of approaches to minimize the frequency, duration, and severity of each exceedance
- Revision of the SSMP as warranted by the investigation

The results of the investigation and evaluation will be recorded in the operating record.

Table 3-1 - Summary of Key Regulatory CMS Instrumentation

Parameter	Identification Number of Sensor/Transmitter (a)	Instrument Type	Units	Range	Expected Operating Point or Range	Calibration frequency	Averaging	AWFCO (Y/N)
Feed rate of spent activated carbon	WE/WT-427	Weigh cell	lb/h	0-6000	< 3049	Semi-annually	1-hr Block	Y
Total feed rate of mercury	Computer	Calculated	lb/h	NA	0 – 1.9E-03	NA	12-hr RA	N
Total feed rate of SVM	Computer	Calculated	lb/h	NA	0 – 1.0	NA	12-hr RA	N
Total feed rate of LVM	Computer	Calculated	lb/h	NA	0 – 1.2	NA	12-hr RA	N
Afterburner gas temperature	TE-464A/B	T/C	F	0-2400	>1750	Annually	1-hr RA	Y
Venturi scrubber pressure differential	PDIT-556	Pressure sensor	in w.c.	0-50	>15	Annually	1-hr RA	Y
Venturi/Quench scrubber recycle liquid flow rate (Total Flow)	FI-562 (Total of FE/FIT-553, 554, & 555)	Sum of Magnetic flow meters (Dynac Function)	gpm	0-656	>75	Annually	1-hr RA	Y
Packed bed scrubber pH	AE/AIT-590	pH probe	pH	0-14	5	Quarterly	1-hr RA	Y
Packed bed scrubber recycle liquid flow rate	FE/FIT-552	Magnetic flow meter	gpm	0-200	>60	Annually	1-hr RA	Y
Packed bed scrubber pressure differential	PDIT-560	Pressure sensors	in w.c.	0-10	>0.1	Annually	1-hr RA	N
Scrubber blowdown flow rate	FE/FIT-605	Magnetic flow meter	gpm	0-691	>30	Annually	1-hr RA	Y
WESP secondary DC voltage	EI-558	Voltmeter	kVDC	0-80	14-22	NA	1-hr RA	Y
Stack gas flow rate	FE/FIT-700	Ultrasonic meter	acfm	Not available	<10,000	Annually	1-hr RA	Y
Stack gas carbon monoxide (b)	AE-575	Nondispersive infrared CEMS	ppmvd @7% O ₂	0-100 0-1000	< 100	Daily/ Quarterly/	1-hr RA	Y
Stack gas oxygen (b)	AE-576	Paramagnetic CEMS	vol%, dry	0-25	7	Daily/ Quarterly/	None	N

RA = Rolling average.

(a) Instrument identification from P&IDs.

(b) CEMS calibrations include daily zero and span check and quarterly cylinder gas audit,.

Table 3-2. Evoqua Operating Parameter Limits

Control Parameters^a	Operating Limit	Comments^b
GROUP A1 PARAMETERS		
Maximum spent carbon feed rate (lb/hr)	3049	Block hour AWFCO
Minimum afterburner temperature (°F)	1760	Hourly rolling average AWFCO
Minimum hearth #5 temperature (°F)	1350	Hourly rolling average AWFCO
Minimum venturi scrubber pressure differential (in. w.c.)	18	Hourly rolling average AWFCO
Minimum quench/venturi scrubber total liquid flow rate (gpm)	75	Hourly rolling average AWFCO
Minimum packed bed scrubber pH	4.4	Hourly rolling average AWFCO
Minimum packed bed scrubber liquid flow rate (gpm)	63	Hourly rolling average AWFCO
Minimum wet scrubber blowdown flow rate (gpm)	58	Hourly rolling average AWFCO
Minimum WESP secondary voltage (kVDC)	22	Hourly rolling average AWFCO
Maximum stack gas flow rate acfm	9,550	Hourly rolling average AWFCO
GROUP A2 PARAMETERS		
Maximum stack gas carbon monoxide (ppmvd, @7% oxygen) ^c	100	Hourly rolling average AWFCO
GROUP B PARAMETERS		
Allowable hazardous constituents	All except dioxin wastes and TSCA PCBs	Class 1 POHC demonstrated
Maximum total chlorine and chloride feed rate (lb/hr)	60	12-hour rolling average
Maximum mercury feed rate (lb/hr)	1.8E-03	12-hour rolling average
Maximum semivolatile metal (Cd + Pb) feed rate (lb/hr)	1.0E-01	12-hour rolling average
Maximum low volatility metal (As + Be + Cr) feed rate (lb/hr)	1.5E+00	12-hour rolling average
GROUP C PARAMETERS		
Minimum packed bed scrubber pressure differential (in. w.c.)	0.1	Hourly rolling average

- (a) Group A1 parameters are continuously monitored and recorded, and are interlocked with the automatic waste feed cutoff system. The values for the Group A1 parameters are based on the performance demonstration test operating conditions. Group A2 parameters are continuously monitored and recorded, and are interlocked with the automatic waste feed cutoff system. The values for the Group A2 parameters are based on regulatory standards or good operating practice rather than performance demonstration test operating conditions.

Group B parameters are continuously monitored and recorded, but are not interlocked with the automatic waste feed cutoff system. Values for the group B parameters are based on the performance demonstration test operating conditions.

Group C parameters are continuously monitoring and recording, but are not interlocked with the automatic waste feed cutoff system. The values for the Group C parameters are based on manufacturer's specifications and/or operational and safety considerations rather than performance demonstration test operating conditions.

- (b) AWFCO = Automatic waste feed cutoff.
- (c) AWFCO interlock will not be active during the daily CEM calibration period.

Table 3-3. Potential Malfunctions from the Spent Activated Carbon Reactivation Furnace that may Result Permit Exceedances

	Area	Malfunction	Potential Exceedance	Preventative Measures	Reactive Response
1	SPENT CARBON FEED SYSTEM	Control system failure on weigh scale (Weigh cell, controller, encoder, recorder, etc.) allowing too much waste to enter combustion chamber.	DRE, particulate, dioxins, metals, chlorides, CO.	(1) Interlocks are set to stop spent activated carbon feed before reaching permitted parameter limit based on weigh belt. (2) Weigh belt is routinely checked as per inspection schedule. (3) inspection by operators.	If the automated preventative measures do not detect and stop spent activated carbon feed, an operator will manually stop spent activated carbon feed upon identification of the malfunction.
2		Conveyor weigh belt continues to feed spent carbon during an AWFCO.	DRE, particulate, dioxins, metals, chlorides, CO.	(1) Weigh belt motor shut off is routinely tested during AWFCO testing. Operator will make sure that rotary airlock valve (RV-1) is closed.	Operator will manually shut the weigh belt off to prevent waste from entering the multiple hearth.
3		Rotary Air Lock Fails	Fugitive emissions.	(1) Rotary air lock is periodically checked during the an inspection schedule. (2) Inspections by operators. (3) Operator will make sure that rotary airlock valve (RV-1) is functioning properly.	If preventative measures fail to manage problem, spent activated carbon feed will manually be stopped by the operator upon identification of malfunction.
4		Sand Seal Fails	Fugitive emissions.	(1) Sand seal is periodically checked during the plant inspections. (2) Inspections by operators.	If preventative measures fail to manage problem, spent activated carbon feed will manually be stopped by the operator upon identification of malfunction.
5		Drop Chute Fails	Fugitive emissions.	(1) Drop chute is periodically checked during the plant inspections. (2) Inspections by operators.	If preventative measures fail to manage problem, spent activated carbon feed will manually be stopped by the operator upon identification of malfunction.
6	MULTIPLE HEARTH FURNACE (RF-2)	Shaft cooling air starts leaking into RF and may cause emissions from RF seals.	Fugitive emissions.	(1) Interlocks are set to stop spent activated carbon feed. (2) Cooling air shaft is periodically checked during plant inspections. (3) Inspections by operators.	If preventative measures fail to manage problem, spent activated carbon feed will manually be stopped by the operator upon identification of malfunction.
7		Loss of ID Fan because coupling breaks causing pressure increase in RF that results in seal leaks.	Fugitive emissions.	(1) ID fan is periodically checked during plant inspections. (2) Inspections by operators	If preventative measures fail to manage problem, spent activated carbon feed will manually be stopped by the operator upon identification of malfunction.
8		ID Fan shuts down because of vibration causing pressure increase in RF that results in seal leaks.	Fugitive emissions.	(1) ID fan is periodically checked during plant inspections. (2) Inspections by operators	If preventative measures fail to manage problem, spent activated carbon feed will manually be stopped by the operator upon identification of malfunction.

Table 3-3. Potential Malfunctions from the Spent Activated Carbon Reactivation Furnace that may Result Permit Exceedances

	Area	Malfunction	Potential Exceedance	Preventative Measures	Reactive Response
9		Loss of ID Fan because of variable frequency drive (VFD) malfunction or controller tripped requiring reset	Fugitive emissions.	(1) ID fan is periodically checked during plant inspections. (2) Inspections by operators	If preventative measures fail to manage problem, spent activated carbon feed will manually be stopped by the operator upon identification of malfunction.
10		Loss of ID Fan because of impeller failure	Fugitive emissions.	(1) ID fan is periodically checked during the plant outages. (2) Inspections by operators	If preventative measures fail to manage problem, spent activated carbon feed will manually be stopped by the operator upon identification of malfunction.
11		Loss of ID Fan due to moisture buildup in fan housing from condensation.	Fugitive emissions.	(1) ID fan is periodically checked during plant inspections. (2) Inspections by operators	If preventative measures fail to manage problem, spent activated carbon feed will manually be stopped by the operator upon identification of malfunction.
12		Draft Sensor plugged up	Fugitive emissions.	(1) Sensor port periodically checked during plant inspections. (2) Inspections by operators	If preventative measures fail to manage problem, spent activated carbon feed will manually be stopped by the operator upon identification of malfunction.
13		Malfunction of thermocouples in furnace	DRE, dioxins, CO	Thermocouple elements are located in the Reactivation Furnace (RF-2). (1) Failure of thermocouples causes burner system to shut down (2) Thermocouples are periodically checked during plant inspections and thermowells are visually inspected during shutdowns. (3) Inspections by operators.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
14		Furnace roof arch fails	Fugitive emissions.	(1) Roof checked inspected during plant outages (2) Inspections by operators and/or maintenance personnel.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
15		Furnace hearth door fails.	Fugitive emissions.	(1) Doors periodically checked during plant outages. (2) Inspections by operators and/or maintenance personnel.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
16		Furnace hearth brickwork	Fugitive emissions possible.	(1) Brickwork periodically checked during plant outages. (2) Inspections by operators and/or maintenance personnel.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.

Table 3-3. Potential Malfunctions from the Spent Activated Carbon Reactivation Furnace that may Result Permit Exceedances

	Area	Malfunction	Potential Exceedance	Preventative Measures	Reactive Response
17		Furnace Discharge Chute Fails	Fugitive emissions possible.	(1) Outlet chute periodically checked during plant outages. (2) Inspections by operators and/or maintenance personnel.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
18	AFTERBURNER (AB-2)	Slag buildup on burner in Afterburner causes low Afterburner temperature while spent activated carbon is in the multiple hearth.	DRE, dioxins, CO	(1) Interlocks are set to stop spent activated carbon feed before reaching permitted parameter limit and to increase natural gas feed rate to increase temperature. (2) Inspection of burners by operators and/or maintenance personnel.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
19		Slag buildup on burner in multiple hearth causes low temperature of combustion gas entering afterburner. Afterburner burners not able to maintain minimum afterburner temperature while spent activated carbon is in the multiple hearth.	DRE, dioxins, CO	(1) Interlocks are set to stop spent activated carbon feed before reaching permitted parameter limit and to increase natural gas feed rate to increase temperature. (2) Inspection of burners by operators and/or maintenance personnel..	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
20		Slag buildup in Afterburner causes restrictions in flow which, in turn, causes the loss of the water seal	DRE, dioxins, CO	(1) Water Seal level is routinely checked measured each shift by operators.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
21		Malfunction of thermocouples in combustion chamber	DRE, dioxins, CO	A thermocouple element is located in the Afterburner (AB-2). (1) Failure of thermocouples causes burner system to shut down (2) Thermocouples are periodically checked and thermowells are visually inspected during shutdowns. (3) Inspections by operators and/or maintenance personnel.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
22		Failure of flame to be present due to flame detector failure.	DRE, dioxins, CO	(1) Flame detectors are present, a failure will not shut the system down. Two failures will cause an AWFCO and burner shutdown. (2) UV flame detectors are periodically inspected. (3) Inspection by operators and/or maintenance personnel.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
23		Loss of natural gas because of failure of NG pressure regulator. (APC continues running)	DRE, dioxins, CO	(1) Interlocks are set to stop spent activated carbon feed on loss of gas pressure. (2) Loss of gas will cause low Afterburner combustion zone temperature and stop of spent activated carbon feed.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.

Table 3-3. Potential Malfunctions from the Spent Activated Carbon Reactivation Furnace that may Result Permit Exceedances

	Area	Malfunction	Potential Exceedance	Preventative Measures	Reactive Response
24		Loss of natural gas because of failure of supplier to supply required amount (APC continues running)	DRE, dioxins, CO	(1) Interlocks are set to stop spent activated carbon feed on loss of gas pressure. (2) Loss of gas will cause immediate shut down of the feed system.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
25		Loss of combustion air fan	DRE, dioxins, CO	Burners will shut down and spent activated carbon feed to multiple hearth will be stopped. Air Pollution Control (APC) equipment will continue running.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
26		Loss or Inadequate levels of secondary combustion air	DRE, dioxins, CO	Burners will shut down and spent activated carbon feed to multiple hearth will be stopped. Air Pollution Control (APC) equipment will continue running.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
27	QUENCH VENTURI SYSTEM (SC-11)	Low Quench/Venturi pressure differential because of failure of DP instrumentation.	Particulate, dioxins, metals, chlorides.	(1) Interlocks are set to stop spent activated carbon feed upon reaching permitted parameter limit. (2) The instruments are on a calibration and inspection schedule. (3) Inspections by operators.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
28		Low Quench/Venturi pressure differential because of dampers hung up	Particulate, dioxins, metals, chlorides.	(1) Interlocks are set to stop spent activated carbon feed upon reaching permitted parameter limit. (2) The instruments are on a Preventive Maintenance Program. (3) Inspections by operators.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
29		Water Seal Fails	Particulate, dioxins, metals, chlorides.	Monitor water seal at least twice per day to determine the level. Low level may be caused by lack of water flow or a restriction in the off-gas system.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
30		Pump failure causes low total water flow to Quench/Venturi (temperature out of Q/V does not exceed high-high setting for TSHH-557 and Afterburner burners stay on).	Particulate, dioxins, metals, chlorides.	(1) There are two sources of make-up water. The first is from the city water booster pumps (P 17A/B). The second is from the city water supply. (2) Interlocks are set to stop spent activated carbon feed and increase the city water flow upon reaching permitted parameter limit. (3) The instruments are on the routine inspection schedule. (4) If leakage in the waste lines after the flow meters are present, they will be detected during routine walkthroughs of the area.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.

Table 3-3. Potential Malfunctions from the Spent Activated Carbon Reactivation Furnace that may Result Permit Exceedances

	Area	Malfunction	Potential Exceedance	Preventative Measures	Reactive Response
31		Pump failure causes low total water flow to Quench/Venturi (temperature out of Q/V does exceed high-high setting for TSHH-557 and Afterburner burners shut off).	DRE, particulate, dioxins, metals, chlorides, CO.	(1) There are two sources of make-up water. The first is from the city water booster pumps (P-17A/B). The second is from the city water supply. (2) Interlocks are set to stop spent activated carbon feed and increase the city water flow before reaching permitted parameter limit. (3) The instruments are on a calibration and inspection schedule.. (4) If leakage in the waste lines after the flow meters are present, they will be detected during routine walkthroughs of the area.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
32		TDS instrument failure causes low Quench/Venturi blowdown rate	Particulate, dioxins, metals, chlorides.	(1) Interlocks are set to stop spent activated carbon feed upon reaching permitted parameter limit. (2) The instruments are on Preventive Maintenance Program. (3) Inspections by operators.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
33		Flow control instrument failure causes low Quench/Venturi blowdown rate	Particulate, dioxins, metals, chlorides.	(1) Interlocks are set to stop spent activated carbon feed before reaching permitted parameter limit. (2) The instruments are on calibration and inspection checklist. (3) Inspections by operators.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
34		Pump, impeller, sprays/strainer plugged	Particulate, metals, chlorides.	Packing, strainer and impeller will be inspected routinely during selected shutdowns.	Packing will be adjusted (if needed), based on routine inspections during select shutdowns.
35		Motor-pump coupling failure causes loss of pump (P-22) to provide recycle water to Quench/Venturi	Particulate, dioxins, metals, chlorides.	(1) Interlocks are set to stop spent activated carbon feed. (2) When temperature out the Q/V exceeds the High-High limit, the city water will flow to the Q/V. (3) The recycle water pump P-22 is on a inspection schedule. (3) Inspections by operators.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
36		Motor failure or overload causes loss of pump (P-22) to provide recycle water to Quench/Venturi	Particulate, dioxins, metals, chlorides.	(1) Interlocks are set to stop spent activated carbon feed. (2) When flowrate is below to the permit limit the feed is stopped. (3) The recycle water pump (P-22) is on a routine inspection schedule. (3) Inspections by operators.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
37		Low flow caused by sprays in quench/venturi plugging up	Particulate, dioxins, metals, chlorides.	(1) Interlocks are set to stop spent activated carbon feed. (2) When temperature out the Q/V exceeds the High-High limit, the city water will flow to the Q/V. (3) The recycle water pump P-22 is on a inspection schedule. (3) Inspections by operators.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.

Table 3-3. Potential Malfunctions from the Spent Activated Carbon Reactivation Furnace that may Result Permit Exceedances

	Area	Malfunction	Potential Exceedance	Preventative Measures	Reactive Response
38		Failure of level control instrument causes low level in PBS Tank shuts down PBS recycle water pump (P-22)	Particulate, metals, chlorides.	(1) Low PBS recycle water flow from P-22 initiates interlock to stop spent activated carbon feed. (2) The scrubber water equalization tank (SC-12) level gages are on a inspection checklist. (3) Inspection by operators.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
39		Low flow caused by impeller malfunction or plugging.	Particulate, dioxins, metals, chlorides.	(1) Interlocks are set to stop spent activated carbon feed. (2) The recycle water pump (P-22) is on a Preventive Maintenance Program. (3) Inspections by operators.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
40		High cross-over temperature due to low quench/venturi flow creating ID fan shutdown	Fugitive emissions.	(1) Sprays are periodically checked as part of an inspection schedule (2) Inspections by operators	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
41	PACKED BED SCRUBBER (SC-12)	Flow control instrument failure causes low total water flow to packed bed scrubber (PBS) (temperature out of PBS does not exceed high-high setting for TSHH-557 and Afterburner burners stay on).	Particulate, metals, chlorides.	(1) There are two sources of make-up water. The first is from the city water booster pumps (P-17A/B). The second is from the city water supply. (2) Interlocks are set to stop spent activated carbon feed and increase the city water flow before reaching permitted parameter limit. (3) The instruments are on a calibration and inspection checklist. (4) If leakage in the waste lines after the flow meters are present, they will be detected during routine walkthroughs of the area.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
42		Flow control instrument failure causes low total water flow to PBS (temperature out of PBS does exceed high-high setting for TSHH-557 and Afterburner burners shut off).	DRE, particulate, dioxins, metals, chlorides, CO.	(1) There are two sources of make-up water. The first is from the city water booster pumps (P-17A/B). The second is from the city water supply. (2) Interlocks are set to stop spent activated carbon feed and increase the city water flow before reaching permitted parameter limit. (3) The instruments are on the Preventive Maintenance Program . (4) If leakage in the waste lines after the flow meters are present, they will be detected during routine walkthroughs of the area.	If the automated preventative measures do not detect and stop spent activated carbon feed, an operator will manually stop waste flow upon identification of the malfunction.
43		Loss of pH meter control instrument in pump (P-27) recycle water line.	Chlorides	(1) Interlocks are set to stop waste feed on the permitted parameter limit. (2) The pH control instruments are on a plant inspection checklist (3) inspection by operators.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.

Table 3-3. Potential Malfunctions from the Spent Activated Carbon Reactivation Furnace that may Result Permit Exceedances

	Area	Malfunction	Potential Exceedance	Preventative Measures	Reactive Response
44		Failure of caustic addition system (pump P-28 and/or P-29, pH meter, flow meter, low ambient temperatures causing caustic to congeal and therefore be unpumpable, etc.)	Chlorides	(1) Interlocks are set to stop spent activated carbon feed. (2) The pH control instruments are on a calibration and inspection checklist. (3) inspection by operators and/or maintenance personnel.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
45		Failure of DP instrument causes low packed bed differential pressure drop.	Chlorides	(1) A low packed bed differential pressure will cause an alarm. (2) The instrument is on a calibration and inspection program. (3) Inspection by operators and/or maintenance personnel.	After hearing the alarm, the operator will shut feed off to the furnace.
46		Poor water distribution through the packing due to plugging in the packed bed scrubber.	Particulate, metals, chlorides.	Packing will be inspected routinely during select shutdowns.	Packing will be adjusted (if needed), based on routine inspections during select shutdowns.
47		Pump, impeller, sprays/strainer plugged	Particulate, metals, chlorides.	Packing and impeller will be inspected routinely during select shutdowns.	Packing will be adjusted (if needed), based on routine inspections during select shutdowns.
48		Failure or overload of pump motor causes loss of pump (P-27) to provide recycle water to PBS	Particulate, dioxins, metals, chlorides.	(1) Interlocks are set to stop spent activated carbon feed. (2) The PBS recycle water pump (P-27) is routinely inspected. (3) Inspections by operators and/or maintenance personnel..	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
49		Failure of level control instrument causes low level in Scrubber Water Equalization Tank (T-19) shuts down PBS recycle water pump (P-27)	Particulate, metals, chlorides.	(1) Low PBS recycle water flow from P-27 initiates interlock to stop spent activated carbon feed. (2) The scrubber water equalization tank (T-19) level gages are on a plant inspection checklist. (3) Inspection by operators and/or maintenance personnel.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
50		Failure of makeup water addition (city water) which could be caused by outside utility or failure of an air compressor that feeds air actuated valve.	Particulate, metals, chlorides.	(1) Low PBS recycle water flow from P-27 initiates interlock to stop spent activated carbon feed. (2) The air compressors are on a plant inspection checklist. (3) Inspection by operators and/or maintenance personnel..	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
51	WESP (W-11)	Failure of secondary voltage instrument causes low WESP secondary voltage	Particulate, metals	(1) Interlocks are set to stop spent activated carbon feed before reaching permitted parameter limit. (2) Inspections by operators and/or maintenance personnel..	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
52		WESP failure due to arcs and sparks causing low secondary voltage.	Particulate, metals	(1) The WESP is on a inspected during plant outages. (2) Inspections by operators and/or maintenance personnel..	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.

Table 3-3. Potential Malfunctions from the Spent Activated Carbon Reactivation Furnace that may Result Permit Exceedances

	Area	Malfunction	Potential Exceedance	Preventative Measures	Reactive Response
53		WESP failure due to wet insulators causing excessive arcs and sparks which in turn causes low secondary voltage.	Particulate, metals	(1) The WESP is on a routine inspection schedule during plant maintenance outages. (2) Inspections by operators and/or maintenance personnel..	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
54		Breakage of WESP electrode causes low secondary voltage.	Particulate, metals	(1) The WESP is on a routine inspection schedule during plant maintenance outages. (2) Inspections by operators and/or maintenance personnel..	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
55	ID FAN (B-15)	Failure of ID Fan motor causes process shutdown.	DRE, particulate, dioxins, metals, chlorides, CO.	(1) Interlocks are set to stop spent activated carbon feed. (2) The ID fan is on a Preventive Maintenance Program. (3) Inspections by operators and/or maintenance personnel..	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
56		Failure or malfunction of VFD	DRE, particulate, dioxins, metals, chlorides, CO.	(1) Interlocks are set to stop spent activated carbon feed. (2) The ID fan is on an inspection checklist. (3) Inspections by operators and/or maintenance personnel..	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
57		Failure of Damper, VFD instrumentation	DRE, particulate, dioxins, metals, chlorides, CO.	(1) Interlocks are set to stop spent activated carbon feed. (2) The ID fan is on a inspection checklist (3) Inspection by operators.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
58		Over amp or over volt DC bus link on ID Fan	DRE, particulate, dioxins, metals, chlorides, CO.	(1) Interlocks are set to stop spent activated carbon feed. (2) The ID fan is on an inspection checklist. (3) Inspection by operators.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
59	STACK	Failure of flow control instrument causes high stack gas flowrate (high combustion gas velocity)	DRE, dioxins, CO.	(1) Interlocks are set to stop spent activated carbon feed at the permitted parameter limit. (2) The stack flowmeter is on a calibration and inspection checklist. (3) Inspection by operators and/or maintenance personnel.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.
60	CEMS STACK MONITORS	Failure of CEMS oxygen monitor	DRE, dioxins, CO	(1) Interlocks are set to stop spent activated carbon feed at the permitted parameter limit. (2) The CEMS units are on a calibration and inspection schedule. (3) Inspection by operators and/or maintenance personnel.	If preventative measures fail to manage the problem, spent activated carbon feed will be manually stopped by the operator after malfunction is identified.

Table 3-3. Potential Malfunctions from the Spent Activated Carbon Reactivation Furnace that may Result Permit Exceedances

	Area	Malfunction	Potential Exceedance	Preventative Measures	Reactive Response
61	PROGRAMMABLE LOGIC CONTROLLER (PLC)	Failure of an electronic component in the Programmable Logic Controller (PLC).	DRE, particulate, dioxins, metals, chlorides, CO.	(1) The PLC is inspected by maintenance personnel for proper operation.	Loss of the PLC System automatically initiates a WFCO. Operators will shut down the reactivation furnace (RF) and associated air pollution control (APC) system if the Controller PLC itself fails.
62	LOSS OF COMMUNICATION / CONTROL NETWORK	Loss of communication between the Compliance PLC and the Dynac historian server or control network (e.g., disconnected or damaged communication wiring), resulting in loss of continuous monitoring, recording, and/or display of Automatic Waste Feed Cutoff (AWFCO) parameter data, while the Compliance PLC itself remains operational.	DRE, particulate, dioxins, metals, chlorides, CO.	(1) A dedicated, high-priority alarm and visual banner within the facility's existing control room alarm application immediately notifies operators of a loss of communication between the Dynac historian server and the Compliance PLC. (2) A hardwired waste feed cutoff (WFCO) relay circuit, independent of PLC and Dynac historian software logic, automatically stops spent activated carbon feed upon loss of such communication. (3) Communication cable terminations are included in the facility's preventive maintenance and wiring inspection program.	Upon loss of communication between the Dynac historian server and the Compliance PLC, the hardwired WFCO relay circuit automatically stops spent activated carbon feed to RF-2, independent of operator action. The high-priority alarm and visual banner immediately notify operators of the communication-loss condition. Operators will evaluate the condition and take appropriate shutdown actions in accordance with established facility procedures.
63	ALPHA SERVER/WORK STATIONS	Failure of Alpha server operator interface.	DRE, particulate, dioxins, metals, chlorides, CO.	(1) The Alpha Server is routinely checked for proper operation. (2) Inspection by maintenance personnel.	Operators will shut down the reactivation furnace (RF) and associated air pollution control (APC) system if the Alpha Server failure prevents reliable monitoring or control of compliance-related process parameters.
64	UTILITIES	Failure of air compressor causes loss of instrument air.	DRE, particulate, dioxins, metals, chlorides, CO.	(1) Loss of instrument air will cause interlocks to stop spent activated carbon feed. (2) The instrument air supply equipment is on a (1) The compressors are on a routine inspection schedule (2) Inspections by operators and/or maintenance personnel..	Operators will shutdown RF and APC because of instrument air failure.
65		Failure of flow control instrument causes loss of natural gas.	DRE, particulate, dioxins, metals, chlorides, CO.	(1) Loss of natural gas supply will cause interlocks to stop spent activated carbon feed. (2) Inspection by operators.	Operators will shutdown RF and APC because of natural gas failure.

Table 3-3. Potential Malfunctions from the Spent Activated Carbon Reactivation Furnace that may Result Permit Exceedances

	Area	Malfunction	Potential Exceedance	Preventative Measures	Reactive Response
66		Failure of Duplex Pump Controller causes loss of city water booster pumps (P-17A/B).	DRE, particulate, dioxins, metals, chlorides, CO.	(1) Loss of city water will cause interlocks to stop spent activated carbon feed. (2) The city water supply equipment is routinely inspected. (3) Inspection by operators and/or maintenance personnel.	Operators will shutdown RF and APC because of loss of water supply.
67		Power Outage caused by trip of Main Breaker (GFI or overload)	DRE, particulate, dioxins, metals, chlorides, CO.	(1) Loss of electrical power will shut the whole plant down immediately.	Operators will shutdown RF and APC because of loss of electrical power.
68		Storm or other unforeseen occurrence causes loss of power to facility	DRE, particulate, dioxins, metals, chlorides, CO.	(1) Loss of electrical power will shut the whole plant down immediately.	Operators will shutdown RF and APC because of loss of power .

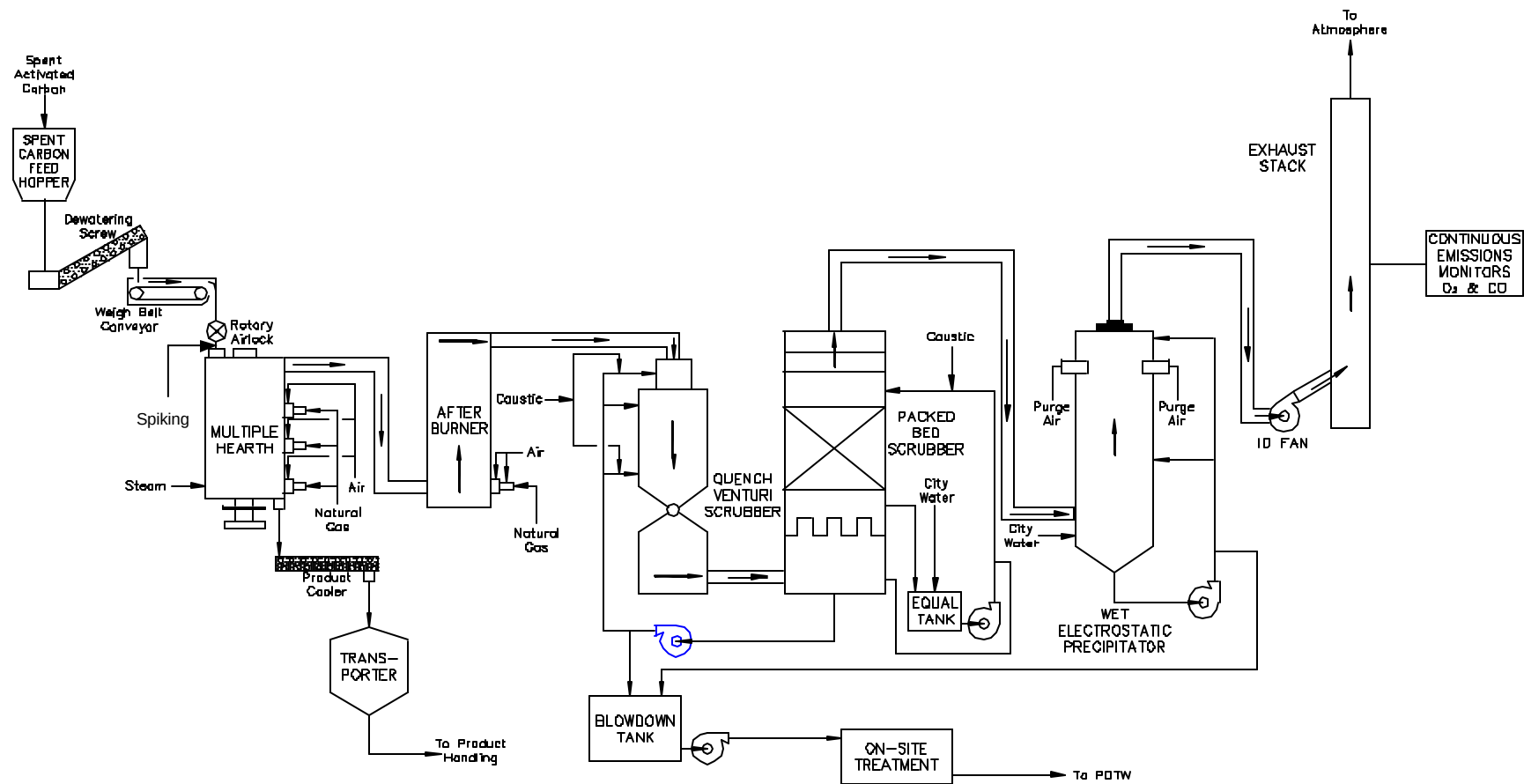


Figure 3-1. Carbon Reactivation Furnace System Block Flow Diagram

- | | |
|--|--|
| (F1) Spent Activated Carbon Feed Rate | (P2) Packed Bed Scrubber Pressure Differential |
| (F2) Quench/Venturi Scrubber Recycle Flow Rate (Total) | (A1) Packed Bed Scrubber pH |
| (F3) Packed Bed Scrubber Recycle Flow Rate | (A2) Stack Gas Carbon Monoxide |
| (F4) Scrubber Blowdown Flow Rate | (A3) Stack Gas Oxygen |
| (F5) Stack Gas Flow Rate | (E1) WESP Secondary Voltage |
| (P1) Venturi Scrubber Pressure Differential | (T1) Afterburner Temperature |

See Table 3-1 And P&IDs For Additional Details

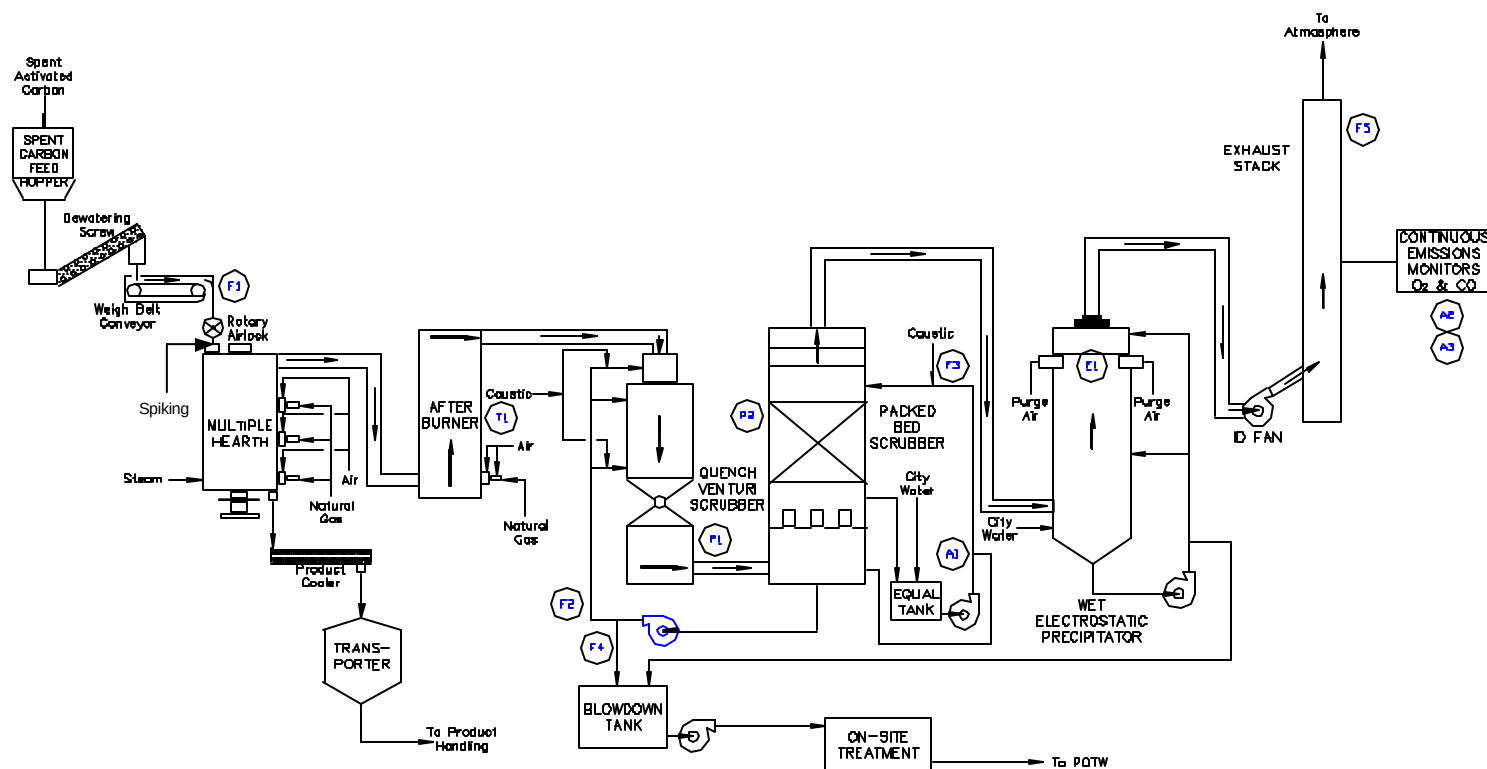


Figure 3-2. Location of Critical Process Instruments

Exhibit A-1: Documentation of Startup, Shutdown, or Malfunction

SECTION 1

Event was a: ☐ Startup ☐ Shutdown ☐ Malfunction (known or potential)
☐ Power Outage

Brief description of event: _____

Date/time SSM commenced: _____ Date/time SSM ended: _____

Is the SSM addressed in the SSMP? ☐ Yes ☐ No

Check all that apply associated with SSM:

- 1) _____ Actions taken were consistent with SSMP/ SOP
- 2) _____ Actions taken were not consistent with SSMP/ SOP
- 3) _____ Permit Limit exceedance did not occur
- 4) _____ Permit Limit exceedance did occur.

SECTION 2

Description of startup, shutdown, or malfunction: _____

Response/corrective action taken: _____

Reason(s) for not following the SSMP (complete if 2 above is checked) _____

Suggested measures to prevent reoccurrence of malfunction: _____

Suggested SSMP revisions or improvements _____

OPERATOR

Print name: _____
Signature _____
Date: _____

ENVIRONMENTAL HEALTH AND SAFETY
MANAGER

Print name: _____
Signature _____
Date: _____

Summary of All Malfunction Events and,
Any instances during a startup, shutdown, or malfunction where the SSMP was not followed and no exceedance occurred

Event Occurrence				Event Duration	Event Description	Exceedance occurred during event? (Yes/ No) ²	SSMP/ Procedures Followed? (Yes/ No) ³	Comments
Begin		End						
Date	Time	Date	Time	(Hrs) ¹				

¹ Duration for a malfunction defined as time exceedance occurring due to malfunction and hazardous waste is in the combustion chamber
² If “yes” to exceedance occurred during event?, provide description of exceedance(s) in Comments column
³ If “no” to SSMP/ procedures followed?, and “no” to exceedance occurred, explain in Comments column. If “no” to SSMP/ procedure followed, and “Yes” to exceedance occurred, event is not required to be included in this report, but is required in the Immediate Startup Shutdown and Malfunction Report per 63.10(d)(5)(ii)

DESOTEC US LLC**PARKER REACTIVATION FACILITY – RCRA PERMIT MODIFICATION****FLY SHEET 2 – RCRA PERMIT ATTACHMENT SECTION D: PROCESS INFORMATION**

Document Status	CLEAN COPY – proposed revisions highlighted
Revision	RCRA Permit Attachment Section D: Process Information - Revision of Process Monitoring and Communication-Loss Protection
	Section D.5.2 Control Systems – revised language
Facility	Desotec US LLC – Parker, Arizona
Purpose	Permit modification submittal fly sheet documenting proposed revisions

REVISED: September 21, 2026

PERMIT ATTACHMENT

SECTION D

PROCESS INFORMATION

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D.1 INTRODUCTION

This section presents a description of the design and operation of the Desotec US LLC (“Desotec” or the “Facility”) carbon reactivation facility. In the November 1995 RCRA Part B permit application, DESOTEC’s predecessor discussed an existing carbon reactivation furnace (RF-1) and a future second carbon reactivation furnace (RF-2) that it expected to install at the facility. Currently, the second carbon reactivation furnace (RF-2) is now operational and the original carbon reactivation furnace (RF-1) was shut down in June 1996, and will not be returned to service. RF-1 will undergo RCRA closure upon final approval of a closure plan submitted to EPA. With the exception of a RCRA Closure Plan prepared specifically for the old RF-1 unit, the RCRA Part A and Part B Permit Applications will only discuss the second carbon reactivation furnace that will continue to be abbreviated in the permit applications as RF-2.

The facility reactivates spent carbon, which, in some cases, may be classified as a RCRA hazardous waste. The facility's container storage area is currently regulated under the provisions found in 40 CFR 264 Subpart I (Use and Management of Containers). The facility's five spent carbon storage tanks are currently regulated under the 40 CFR 264 Subpart J (Tank Systems) requirements. The facility's reactivation unit and its associated air pollution control equipment are currently regulated under the 40 CFR 264 Subpart X (Miscellaneous Units) requirements. The Subpart X classification for carbon reactivation units is consistent with the discussion concerning carbon reactivation units found on page 7200 of the February 21, 1991 Federal Register.

As per the regulations specified in 40 CFR 264.601 and discussions with EPA Region IX, RF-2 underwent a Performance Demonstration Test in March of 2006 that incorporated emission standard requirements from the Hazardous Waste Combustor Maximum Achievable Control Technology (HWC MACT) regulations in 40 CFR 63 Subpart EEE. A copy of the Performance Demonstration Test Plan and the Test Report for RF-2 can be found in Appendix V.

Some of the tank systems referenced in this permit application (including without limitation T-9, T-19, T-11, and wastewater treatment equipment) are not subject to the provisions of 40 CFR Part 264 or 40 CFR Part 270 because they are part of exempt units, including wastewater treatment units and elementary neutralization units. In addition, some of the processes referenced in this permit application (including without limitation the facility's recycle water storage and transport system) are not subject to the provisions of 40 CFR Part 264 or 40 CFR Part 270 because they do not involve the management of a hazardous or solid waste. These tank systems and processes are described in this permit application in order to provide a complete description of the carbon reactivation process and are not intended to be incorporated into the facility's RCRA permit.

D.1.1 FACILITY OVERVIEW

Process flow diagrams of the carbon reactivation process are shown in Drawings PC-1466-PR-003 and 004 located in Appendix VI. It is important to note that drawings referenced in this permit application include many components of the facility that are exempt from permitting under various provisions of RCRA. These components are provided for informational purposes and ease of review only, and they are not intended to become regulated components of the facility. Spent carbon slurry is fed from the Furnace Feed Tank T-18 into a dewatering screw where the carbon is dewatered prior to introduction into the Carbon Reactivation Furnace (RF-2). Water from the dewatering screw is returned to the recycle water storage tank. RF-2 is a multiple hearth furnace consisting of five hearths. The spent carbon is introduced into the top hearth and flows downward through the remaining four hearths. Reactivated carbon exits the bottom hearth through a cooling screw. RF-2 is equipped with a primary combustion air fan and two shaft cooling fans. Natural gas burners are provided to ensure adequate heat input to the reactivation unit for all of the spent carbons that are reactivated at the facility. The hot gases generated in RF-2 are routed to an afterburner to ensure the thermal oxidation of organic matter that is not oxidized in the reactivation unit. The afterburner is equipped with two burners that utilize natural gas as the fuel source. From the afterburner, the gases are quenched by direct water contact and routed through a variable throat venturi scrubber for particulate matter control. From the venturi scrubber, the gases are routed to a packed bed scrubber for acid gas control. From the packed bed scrubber, the gases flow through a wet electrostatic precipitator, used for fine particulate matter and metals control. From the wet electrostatic precipitator, the gases are routed through a stack to the atmosphere. The motive force for moving the gases through the air pollution control system is supplied by an induced draft fan.

A pH-controlled scrubbing medium (water and caustic solution) is supplied to the air pollution control system from the scrubber water system. The pH is continuously monitored to ensure efficient acid gas removal in both the gas cooler/venturi scrubber and the packed bed scrubber. Caustic is added based on the pH of the scrubber water.

The air pollution control equipment uses a recycle water system. A portion of the scrubber water in the system is continuously discharged (blowdown).

Scrubber blowdown from RF-2 air pollution control equipment is treated in an exempt wastewater treatment unit, or discharged directly to the POTW. The discharge to the POTW is continuously monitored for pH, total dissolved solids, flow and temperature to ensure compliance with the discharge limitations found in the facility's industrial wastewater discharge permit.

D.1.2 CARBON REACTIVATION PROCESS

The carbon reactivation process involves various thermal mechanisms that are discussed in the following section:

Following dewatering the spent granular carbon is fed to the top section of the multiple-hearth furnace. In the pre-drying and drying zones (the top hearths) the water retained in the pores and the surface of the carbon is evaporated by the counter-current flow of hot combustion gases coming from the lower hearths. The temperature of the carbon is raised in the top hearths to approximately 210°F. Upon application of heat, water will evaporate freely when the carbon particle temperature goes over 200°F. The adsorbed water is freed at temperatures of approximately 212°F to 230°F.

Upon the application of heat to the carbon particles at temperatures over 600°F, the high molecular weight organic impurities adsorbed in the carbon will crack to produce gaseous hydrocarbons, hydrogen, and water vapor which escape the pores of the granular carbon while some fixed carbon is retained in the pores of the carbon particles. In these pre-heating and decomposition zones (middle hearths) the temperature of the carbon is increased to about 750°F in a virtually oxygen-free atmosphere. Under these conditions the adsorbed organic impurities in the pores of the carbon are pyrolyzed and all volatile materials are driven off.

By the time the carbon reaches 1200°F, there is little or none of the original adsorbed organic impurities remaining. However, the carbon is not fully regenerated at this point. Carbonaceous residue remaining within the pores of the carbon particles restricts the adsorption capacity and must be removed. The carbonaceous residue is treated in the final heat up and gasification zones (lower hearths) in a way which avoids damage to the original pore structure of the carbon. Gas-phase temperatures from 1350°F to 1650°F are typical for this final step of the thermal regeneration process.

D.1.3 FACILITY CONTAINER STORAGE CAPACITY

The container storage capacity designated in the facility's Part A application is 100,000 gallons. The location of this container storage area (S01) is shown on Drawing No. D14789-02 which can be found in Appendix III. Drawing No. D14789-02 depicts the layout of the facility.

D.2 PROCESS SUMMARY

The following sections, along with the piping and instrumentation diagrams and flow diagrams found in Appendix VI, present an overview of the equipment used at the facility and the flow of carbon through the facility. Detailed descriptions of the RCRA-regulated components can be found in specific sections of Section D.

DRAWING NO.	REV. NO.	TITLE	LOCATION PART B
PC-1466-PR-003	P4	Liquid Phase Carbon Process Flow Diagram -- Balance for RF-2	Appendix VI
PC-1466-PR-004	P4	Vapor Phase Carbon Process Flow Diagram -- Balance for RF-2	Appendix VI
D11135-200	3	Legend and Specialty Items	Appendix VI
D11135-201	3	Spent Carbon Storage/H-1	Appendix VI
D11135-202	3	Spent Carbon Storage/H-2	Appendix VI
D11135-203	3	Recycle Water	Appendix VI
D11135-205	3	Process Water Discharge to POTW	Appendix VI
D11135-211	3	Utilities -Natural Gas, Plant Water, Steam	Appendix VI
D11135-213	3	Reactivation Unit No. 2 Feed System	Appendix VI
D11135-214	3	Reactivation Unit No. 2	Appendix VI
D11135-215	3	Reactivation Unit No. 2 Product Handling	Appendix VI
D11135-216	3	Reactivation Unit No. 2 Off Gas Scrubber	Appendix VI
D11135-217	3	Reactivation Unit No. 2 Process Water	Appendix VI

D.2.1 SPENT CARBON RECEIPT AND STORAGE

Spent carbon is received by truck in containers (i.e., drums, vessels, supersacks, roll-off bins, etc.) or in tank trucks. Following inspection and acceptance at the facility, containerized spent carbon is unloaded in the unloading and receiving area where it is inspected and sampled. If the load is accepted for treatment, the containerized spent carbon is transferred into one of the four spent carbon storage tanks (T-1, T-2, T-5, T-6) via a feed hopper or moved to the Container Storage Area.

Spent carbon received in large containers, such as roll-offs, is typically transferred directly to the spent carbon storage tanks via feed hopper H-1. Spent carbon received in smaller containers, such as drums, is typically moved to the container storage area in the

containers in which it was received and subsequently transferred to the spent carbon storage tanks via feed hopper H-2. The containerized spent carbon is transferred to the storage tanks via a hopper because it cannot be pumped directly from the container to the storage tank. Water is added as the carbon passes through the hopper to facilitate removal of the spent carbon from the hopper via an eductor. The carbon is transferred to the storage tanks as a water-carbon slurry. Both H-1 and H-2 are part of the feed system, and are equipped with covers and with a dust collection system. The hoppers and other components of the feed system are constructed of mild steel.

The trucks carrying the bulk loads are retained in the unloading and receiving area and the spent carbon is inspected and sampled. If the shipment is accepted for treatment, the spent carbon is transferred in slurry form to one of the four spent carbon storage tanks, directly or via feed hopper H-1. From the spent carbon storage tanks, the carbon is transferred in slurry form to the Furnace Feed Tank (T-18). Water used in the transfer process is supplied from the recycle water system which consists of a recycle water storage tank (T-9) and associated valves and piping.

D.2.2 CARBON REACTIVATION UNIT (RF-2)

From Furnace Feed Tank (T-18), the spent carbon slurry is fed into a dewatering screw (C-5) where the carbon is dewatered prior to introduction into RF-2. Water from the dewatering screw is returned to the recycle water storage tank. The reactivation unit is a multiple hearth furnace consisting of five hearths. The spent carbon is introduced into the top hearth and flows downward through the remaining four hearths. Reactivated carbon exits the bottom hearth through a cooling screw. RF-2 is equipped with a primary combustion air fan (B-7) and two shaft cooling fans (B-8A and B-8B). For some of the spent carbons reactivated at the facility, the volatile organic matter desorbed from the spent carbon is the primary source of fuel to provide the heat required to reactivate the spent carbon. Natural gas burners are provided to ensure adequate heat input to the reactivation unit for all of the spent carbons that are reactivated at the facility.

D.2.3 REACTIVATED CARBON PACKAGING AND SHIPPING PROCESS

Currently, reactivated carbon product from the cooling screw enters a transporter and is transferred to product storage tanks S-2, S-3 and S-4. The product is transported from a product storage tank to the screening and packaging facilities which are located within the product packaging building.

D.2.4 REACTIVATION UNIT AIR POLLUTION CONTROL PROCESS

RF-2 is equipped with dedicated air pollution control equipment. The hot gases generated in RF-2 are routed to an afterburner (AB-2) to ensure the thermal oxidation of organic matter that is not oxidized in the reactivation unit. The afterburner is designed to provide a minimum destruction and removal efficiency (DRE) of 99.99 percent. The afterburner is equipped with two burners that utilize natural gas as the fuel source. From the

afterburner, the gases are routed through a rapid quench system and variable throat venturi scrubber (SC-11) for particulate matter control.

From the venturi scrubber, the gases are routed to a packed bed scrubber (SC-12) for acid gas control. The design efficiency of the packed bed scrubber is 99 percent for HCl removal. The pH-controlled scrubbing medium is supplied from the scrubber water system which is described below.

From the packed bed scrubber, the gases are routed through a wet electrostatic precipitator (W-11). The design criteria of the wet electrostatic precipitator combined with the venturi scrubber is 0.015 grains per dry standard cubic foot corrected to 7% oxygen. From the wet electrostatic precipitator, the gases are routed by an induced draft fan (B-15) through a stack to the atmosphere.

D.2.5 SCRUBBER WATER PROCESS

The air pollution control equipment for the reactivation unit requires a scrubbing medium for acid gas control. The scrubbing medium is supplied via a recycle system. A portion of the scrubber water in the system is continuously discharged (blowdown) in order to prevent the excessive build-up of total dissolved solids in the scrubber water system.

RF-2 is equipped with a dual loop scrubber water system. Scrubber water for the gas cooler/venturi scrubber (SC-11) is supplied from a tank incorporated in the bottom section of SC-12. Pump P-22 is used to route the scrubber water, from the tank in SC-12, to the gas cooler/venturi scrubber and, periodically, to treatment. Scrubber water for the packed bed scrubber (SC-12) is supplied from tank T-19. A pump is used to route the scrubber water from tank T-19 to the upper section of SC-12.

The pH of the dual loop system is continuously monitored to ensure efficient acid gas removal in both the gas cooler/venturi scrubber and the packed bed scrubber. A metering pump delivers caustic to the gas cooler/venturi scrubber and a pump delivers caustic to the packed bed scrubber. Caustic is added independently to each loop based on the pH of the scrubber water.

D.2.6 WASTEWATER TREATMENT PROCESS

Scrubber blowdown from RF-2 air pollution control equipment is treated in an exempt wastewater treatment unit (as per 40 CFR 264.1(a)(6) and 270.1(c)(2)(v)), prior to discharge to the POTW. The discharge to the POTW is continuously monitored for pH, total dissolved solids, flow, and temperature to ensure compliance with the discharge limitations found in the facility's current industrial wastewater discharge permit.

D.3 CONTAINER MANAGEMENT

D.3.1 CONTAINER STORAGE AREA

The RCRA hazardous spent carbon container storage area is located in the north end of the warehouse building. Containers are off-loaded in the unloading area just outside the container storage area and are transported by forklift into the storage area. Containers are stored no more than three containers high, and sufficient aisle space is provided to allow access to the containers for movement and for inspections. The containment system for the container storage area consists of the floor of the warehouse building. The floor slopes towards concrete drainage trenches which flow into a concrete sump. The periphery of the storage area is bermed to contain any spills which may occur. Spilled materials contain mainly solid materials which are readily cleaned up using a shovel or broom. Residual materials may be hosed to the sump using water. The sump is equipped with a pump that can remove accumulation in the sump to the recycle water storage tank. Spent carbon stored in drums may be placed on pallets and can be stacked three high. Larger containers (2000 pounds or greater), such as adsorber vessels, are not stacked. The container storage area is illustrated on the drawings that can be found in Appendix III.

Since neither corrosive nor reactive spent carbon is accepted at the facility, the concrete surface is impervious to chemical attack from the spent carbon. The concrete surface is inspected daily to ensure the absence of any cracks or gaps. An engineering evaluation of the structural integrity of the container storage area concrete pad can be found in Appendix VII. It is possible that ignitable wastes could be brought into the container storage area. Containers are stored more than 50 feet from the nearest property boundary. The scale drawings in Appendix III show that the nearest location of container storage to the property boundary is approximately 84 feet.

The container storage area is designed to hold up to 100,000 gallons of RCRA spent carbon. The containment system is designed to hold a minimum of 10,000 gallons. Because the container storage area is inside, run-on is not a consideration. If a container leaks, any liquids leaking from the container will drain into the sump via the trench system, where it will be transferred to recycle water tank T-9. Details of the container storage area floor, slope, sump, etc. can be found on the drawings contained in Appendix VII.

Facility history indicates that more than half of the containers received do not contain free liquids. All containers however are managed in the same manner, consistent with practices for containers with free liquids.

Identification of Container Storage Areas

Description	Location	Capacity	Status
Spent Carbon Container Storage	Warehouse	100,000 gal	Permitted

D.3.2 CONTAINERS

Spent carbon is received in several different types of containers. Spent carbon can be received in drums, adsorber vessel, supersacks, slurry (tank) trucks, or roll-off bins. Specifications of the types of containers in which spent carbon is typically received can be found in Appendix VIII. The specifications include typical materials of construction and dimensions, but are not all-inclusive.

Drum-type containers are generally moved by placing them on pallets using a forklift in a manner that will not rupture the container or cause it to leak. The containers are always closed except during inspection and sampling and when the spent carbon is being removed from the containers into the reactivation process. No reactive or incompatible spent carbons are received at the facility. The container storage area is more than 50 feet from the closest property boundary, therefore, no special areas are required for the storage of ignitable spent carbon.

After spent carbon is removed from a container it is rinsed to remove residual material. Spent carbon containers may be reused after they are emptied and rinsed, and a visual inspection ensures that the container is in good physical condition. Since no incompatible wastes are accepted into the facility, there is no concern for contact with the small amount of material which may remain in a container after rinsing.

The container storage area is inspected at least weekly (See inspection schedule in Section F). During this inspection, containers are inspected for leaks and for deterioration of containers. Should a container be found to be leaking or in a deteriorated condition, the materials will be promptly removed to a container that is in good condition, placed in an overpack, or transferred to a spent carbon storage tank. Sufficient aisle space is provided for inspection. Containers are managed in accordance with the requirements of 40 CFR 264 Subpart FF and CC (see Section O and Appendix XX) where applicable.

D.4 TANK SYSTEMS

There are five above ground tanks (T-1, T-2, T-5, T-6, and T-18) at the facility that are regulated under 40 CFR 264 Subpart J. Specific information about these tanks can be found in Table D-1. The location of each of these tanks is shown on Drawing No. D14789-02 that can be found in Appendix III of this document. P&IDs for tanks and the ancillary equipment area provided in Appendix VI. Tank design drawings are provided in Appendix IX.

TABLE D-1 -- HAZARDOUS WASTE TANK INFORMATION			
TANK NUMBER			DESIGN CAPACITY ⁽¹⁾ (GALLONS)
	MATERIALS OF CONSTRUCTION	DIMENSIONS	
T-1	300 Series Stainless Steel	16'-0" Straight Side 10'-0" Diameter 8'-0" 62° Bottom Cone	8,319
T-2	300 Series Stainless Steel	16'-0" Straight Side 10'-0" Diameter 8'-0" 62° Bottom Cone	8,319
T-5	300 Series Stainless Steel	16'-0" Straight Side 10'-0" Diameter 8'-0" 62° Bottom Cone	8,319
T-6	300 Series Stainless Steel	16'-0" Straight Side 10'-0" Diameter 8'-0" 62° Bottom Cone	8,319
T-18	300 Series Stainless Steel	7'-6" Straight Side 10'-4.5" Diameter 9'-4.75" 60° Bottom Cone	6,500

Note:

(1) Design capacity is determined based on a tank height as defined by the level at which a high level alarm and automatic interlock is initiated to discontinue spent carbon transfer.

Any spent carbon received at the facility is eventually routed through one or more of the five spent carbon storage tanks. Placing incompatible or reactive materials in these tanks is not a concern because different spent carbons by their physical nature are not incompatible with each other and reactive wastes are not received at the facility. Spent carbon on a rare occasion may exhibit the characteristic of ignitability, however, because the spent carbon is placed in the tanks in a carbon/water slurry, the resultant mixture is not ignitable. The tanks are operated at atmospheric pressure and ambient temperature.

The tanks are operated under the provisions of Subpart FF and Subpart CC. The Subpart CC compliance plan, the entirety of which can be found in Appendix XX for the facility identifies two types of waste management units:

- Waste management units that are exempt from Subpart CC requirements because they are otherwise regulated under the Benzene Waste Operation NESHAP; and
- Waste management units that have a volatile organic (VO) concentration less than 500 ppmw, and are therefore exempt from the Subpart CC air emissions control requirements ((§§264.1084-10.86). However, record keeping and monitoring requirements under Subpart CC apply to these units §§264 1090.

Under the final Subpart CC regulations, tanks and containers that are equipped with and comply with the Benzene Waste Operations NESHAP (Subpart FF) are exempt from all Subpart CC requirements (see 40 CFR §-264.1080(b)(7)). Therefore, the facility will demonstrate compliance with Subpart CC regulations by assuring that all tanks and containers at the facility used to manage hazardous waste are equipped with and operate in compliance with Subpart FF. (See Section O and Appendix XX of the Permit Application).

Identification of Tank Systems

Description	Location	Capacity	Status
T-1	Tank Storage Area	8,319 gal	Permitted
T-2	Tank Storage Area	8,319 gal	Permitted
T-5	Tank Storage Area	8,319 gal	Permitted
T-6	Tank Storage Area	8,319 gal	Permitted
T-18	Top of RF-2 steel structure	6,500 gal	Permitted
T-9	South of T-1, 2, 5 and 6	10,300 gal	Exempt
T-11	Southeast of RF-2 furnace structure	12,400 gal	Exempt
T-19	Adjacent to packed bed scrubber	660 gal	Exempt
S-1	Outside East wall of main warehouse	44,000 lb	Exempt Product Storage
S-2	Outside East wall of main warehouse	44,000 lb	Exempt Product Storage
S-3	Outside East wall of main warehouse	44,000 lb	Exempt Product Storage

D.4.1 ASSESSMENT OF EXISTING TANK SYSTEMS' INTEGRITY

Appendix IX contains the assessment report for the five hazardous waste tank systems located at the facility.

D.4.2 CONTAINMENT AND DETECTION OF RELEASES

The area in which four (T-1, T-2, T-5, and T-6) hazardous waste tanks are located at the facility is surrounded by a curbed concrete pad which is an external liner providing secondary containment. The fifth tank, T-18, is a double-walled tank which does not require external secondary containment. The concrete pad is impervious to chemical attack from any spent carbon spills from the tank systems.

All components of the regulated tank systems are elevated above the concrete pad that allows for visual inspection of all components. The tank systems and containment area are visually inspected each day to ensure that no leaks from the tank systems have occurred. The containment area is sloped so that any spilled material will flow into a sump. This sump is equipped with a pump that will remove any accumulated water to the recycle water tank. Any solid material removed from the sump is placed in drums and placed in an appropriate storage location. Any precipitation that falls within the containment area is collected in a sump and is either placed in the recycle water tank or discharged (either with or without pre-treatment) to the POTW.

Ancillary equipment consists of 300 series stainless steel pipe with either Victaulic couplings, welded joints or flanged couplings. The ancillary equipment for the hazardous waste storage tanks is inspected once per day. A P&ID of the ancillary equipment can be found in Appendix VI.

The concrete containment pad has a volume of 12,265 gallons which exceeds by 2,415 gallons the volume of the largest tank system (8,319 gallons) within its boundary plus the precipitation from a 25-year, 24-hour rainfall (2.45 inches = 1,531 gallons). The secondary containment volume calculations can be found in Appendix IX. The containment area is inspected daily to ensure that the concrete pad remains free of cracks or gaps.

D.4.3 CONTROLS AND PRACTICES TO PREVENT SPILLS AND OVERFLOWS

All the hazardous waste storage tanks (T-1, T-2, T-5, T-6, and T-18) are equipped with water and carbon high level alarms to alert operators that the tanks are approaching capacity. The hopper discharge valves are interlocked with the spent carbon storage tanks' high carbon level alarms to ensure overfilling of the tanks does not occur. In the event of a high water level alarm, the operator will discontinue introduction of material into the affected tank. Overflow lines are provided from the hazardous waste storage tanks to the recycle water tank (T-9) to prevent spills. Tank system inspections are conducted in accordance with the inspection schedule and checklists provided in Section F and Appendix XII.

D.5 MISCELLANEOUS UNITS

The spent carbon reactivation unit at the Siemens Industry, Inc. facility is a hazardous waste treatment unit and does not fit the current definition of container, tank, surface impoundment, waste pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, underground injection well, containment building, corrective action management unit, or a staging pile and therefore, is classified as a miscellaneous unit as per 40 CFR 260.10.

The reactivation furnace is not a hazardous waste incinerator. “Hazardous waste incinerator” is defined in 40 CFR Part 63, Subpart EEE as a “device defined as an incinerator in § 260.10 of this chapter and that burns hazardous waste at any time.” (40 CFR 63.1201). “Incinerator” is defined in 40 CFR 260.10 as “any enclosed device that: (1) Uses controlled flame combustion and neither meets the criteria for classification as a boiler, sludge dryer or carbon regeneration unit, nor is listed as an industrial furnace; or (2) Meets the definition of infrared incinerator or plasma arc incinerator. (emphasis supplied)” The RF does not qualify as an incinerator and instead is designated by Subpart X of the RCRA regulations as a Miscellaneous Unit. According to 40 CFR 264.601 of the Subpart X regulations, permit terms and provisions for a Miscellaneous Unit must include appropriate requirements of 40 CFR Subparts I through O and Subparts AA through CC, 40 CFR 270, 40 CFR 63 Subpart EEE, and 40 CFR 146. Other portions of this permit application discuss provisions for management of hazardous waste in tanks and containers. Specific to the carbon reactivation furnace and associated equipment, Siemens Industry, Inc. believes that it is appropriate to regulate emissions in accordance with the provisions of 40 CFR 63 Subpart EEE applicable to existing hazardous waste incinerators (although this unit is not an incinerator). Associated equipment such as the dewatering screw, weigh belt, emission control components, pumps, piping, etc. will be managed similarly to equipment associated with a hazardous waste incinerator as provided in Subpart O (Specifically 40 CFR 264.347(b), (c), and (d)). Please refer to Sections F and G, as well as Appendices XII and XIII.

The spent carbon reactivation unit is used to thermally desorb and destroy organic contaminants adsorbed on the carbon. The process reactivates the carbon which allows for its reuse in air and water pollution control equipment. The presence of these organic contaminants on the spent carbon is the reason that some of the spent carbon is a listed and/or characteristic hazardous waste when it arrives at the facility. Removal of these contaminants in the reactivation process renders the reactivated product non-hazardous. Because of the high temperature environment of the reactivation unit and the associated afterburner, the reactivation unit will thermally oxidize in excess of 99.99 percent of the organic contaminants adsorbed on the spent carbon feed.

Descriptions of the RF-2 process and equipment are provided in the PDT Plan in Appendix V, and are summarized in the sections below. Process Flow Diagrams (PFDs) as well as Piping and Instrumentation Diagrams (P&IDs) for the reactivation process are

presented in Appendix VI. A list of available operating and maintenance procedures for the RF-2 system components is provided for informational purposes in Table D-2.

Table D-2. Operating and Maintenance Manuals Equipment *	Manufacturer/Supplier	Purpose
Spent Carbon GAC Probes	Dynatrol**	Spent Tank Level Control
Eductors	Penberthy**	Transferring Spent Carbon
Spent Carbon Storage Tanks	Unknown	Storing Spent Carbon
Carbon Vessels	Siemens/Evoqua**	Vapor Control for Spent Tanks
T-Tank PRV	Tyco**	Spent Tanks Pressure Relief Valve
T-18 Furnace Feed Tank	Modern	Storing Spent Carbon
Furnace Feed Valve	Linatex**	Feed Valve
Dewater Screw	B.W. Sinclair**	Dewater Spent Carbon
Weigh Belt	Merrick**	Measuring Spent Carbon Feed Rate
Rotary Air Lock	Wm. Meyer**	Transfer Spent Carbon
LMI Chemical Pumps	LMI/Neptune**	Off Gas pH control
Magnetic Flow Meters	Rosemount/Siemens**	Off Gas Liquid Flow
Scrubber Pumps	Goulds/Inomag**	Venturi/Packed Bed Pumps
Quench/Venturi Scrubber	Clean Gas Inc.	Air Pollution Control
Packed Bed Scrubber	Clean Gas Inc.	Air Pollution Control
WESP	Clean Gas Inc.	Air Pollution Control
ID Fan	Barron**	Gas
Stack	Warren Environmental	Gas Dispersion
CEMS Carbon Monoxide	TECO**	Measure Carbon Monoxide
CEMS Oxygen Analyzers	Ametek**	Measure Oxygen
Stack Flow Meter	Cemtek**	Measure Stack Flow Rate
Reactivation Furnace (RF-2)	Hankin Environmental	Reactivate Spent Carbon
Afterburner (AB-2)	Hankin Environmental	Destruction of Organics
Natural Gas Burners	North American**	Temperature Control
Thermocouples	Pyco**	Temperature Monitoring

- * Note - This table includes components of the facility that are exempt from permitting. Data related to these components is provided for informational purposes and ease of review only and they are not intended to become regulated components of the hazardous waste facility. .
- ** Note – Manufactures of these identified items are listed for informational purposes only. Facility may elect to use other vendors with comparable products without updating this document. If comparable product vendors are used, applicable O&E manuals will be added to the operating record.

D.5.1 REACTIVATION UNIT (RF-2)

RF-2 is a multiple hearth furnace consisting of five hearths and an afterburner manufactured by Hankin Environmental Systems, Inc. A venturi scrubber, packed bed scrubber, and wet electrostatic precipitator are used to meet applicable emissions regulations. The furnace and afterburner are equipped with a combustion air system. An induced draft fan is used to exhaust combustion gases from the furnace, afterburner, and air pollution control system. The clean gas stream is exhausted to the atmosphere via a stack. Parameters used to ensure good combustion in the furnace and afterburner (carbon monoxide and oxygen) are monitored in the exhaust gases using a continuous emission monitoring system. Materials of construction are listed in Appendix X for all of the major reactivation furnace and air pollution control equipment. The facility may occasionally change materials of constructions that are listed in Appendix X with other materials of construction that are equivalent.

D.5.1.1 MULTIPLE HEARTH FURNACE

The furnace has an outside diameter of 12 feet 10 inches and is 19 feet 8 inches in height. The furnace is raised approximately ten feet off the ground. The furnace shell is manufactured of carbon steel plate. The furnace is continuously seal welded internally to assure an air tight assembly. The furnace is internally lined with block firebrick and block insulation. The hearths and furnace roof are constructed of firebrick. The furnace roof is composed of firebrick backed with block insulation and castable insulation to fill voids under the roof cover plates. The bottom hearth is insulated with block insulation and castable refractory. High strength castable refractory is used to insulate the center shaft and to insulate the rabble arms. Extra strength castable refractory is used for backing of skewbacks. Extreme temperature castable refractory is used for burner settings and insulating castable is used for door linings. Cross-sectional drawings of the furnace and afterburner and materials of construction are located in Appendix X.

Spent carbon is introduced into the top hearth of the reactivation unit and flows downward through the remaining four hearths. The top two hearths are unfired hearths. Hot combustion gases generated in the bottom three hearths are used to complete the dewatering of the spent carbon. The bottom three hearths are fired hearths where the pyrolysis and reaction steps of the reactivation process will occur. Rabble arms, with teeth, each connected to a rotating center shaft, are located above each hearth. The center shaft is air cooled. The rabble teeth will plow the carbon material across the hearth surface and towards drop holes. The carbon will fall through the drop holes to the next

lower hearth, and eventually to the outlet of the reactivation unit. Reactivated carbon will exit the bottom hearth through a cooling screw. RF-2 is equipped with a primary combustion air fan (B-7), and two center shaft cooling fans (B-8A and B-8B). Natural gas burners are provided to ensure adequate heat input to the reactivation unit for all carbons that are reactivated at the facility.

D.5.1.2 AFTERBURNER (AB-2)

The afterburner is a self supporting vertical cylindrical chamber approximately 33 feet high with an inside refractory diameter of 5 feet. The design incorporates a mixing zone, choke ring, and a minimum residence time at temperature of greater than one second. The afterburner shell is constructed of steel plate and is internally lined with firebrick and castable insulation. The afterburner is equipped with two low NO_x burners, which utilize heated combustion air. The afterburner chamber is fitted with a total of six air injection nozzles which are placed to provide combustion air and turbulence to promote the oxidation of organic materials in the flue gas.

The afterburner is designed to thermally oxidize greater than 99.99 percent of all organic matter entering the afterburner in the furnace off gas. A cross-section of the afterburner and a list of materials of construction can be found in Appendix X.

D.5.1.3 NOZZLES AND BURNERS

Six North American Manufacturing Company burners (NA 6422-6) are installed in RF-2, two per hearth on hearths 3, 4, and 5. Two North American Manufacturing Company burners (NA 6514-8-B) are installed in the afterburner. Literature describing these burners can be found in Appendix X. Materials of construction of these burners are those listed in the manufacturer's literature or their functional equivalent.

D.5.1.4 QUENCH/VENTURI SCRUBBER (SC-11)

The Quench/Venturi Scrubber is a dual-purpose device used to rapidly quench the hot combustion gases exiting the afterburner and to remove particulate matter. The quench section uses water sprays to cool the afterburner exit gas to the point of adiabatic saturation (approximately 170 to 190°F). The venturi scrubber has an adjustable throat, and is a low energy, vertical down flow type. The throat area is adjusted by a pneumatic cylinder actuator and an electro/pneumatic positioner. The remotely adjustable throat is automatically controlled to maintain a constant pressure differential. The venturi scrubber is located directly below the quench section and is connected by a flooded elbow to the packed bed scrubber. The elbow incorporates a water-filled gas impact section directly beneath the throat to prevent erosion of the shell. The water supply for quench and venturi irrigation is recirculated scrubber water at a total flow of approximately 7.5 gpm/1000 ACFM.

The design drawing for the venturi scrubber as well as a description of the physical

dimensions and materials of construction of the venturi scrubber can be found in Appendix X.

D.5.1.5 PACKED BED SCRUBBER (SC-12)

The packed bed scrubber consists of a vertical upflow and cylindrical disengaging section followed by a packed bed section and mist eliminator. The bottom portion of the scrubber is used to remove entrained water droplets from the gas prior to entering the packed section of the scrubber. The packed bed scrubber is designed to remove a minimum of 99 percent of the incoming hydrogen chloride.

The design drawing for the packed bed scrubber as well as a description of the physical dimensions and materials of construction of the packed bed scrubber can be found in Appendix X.

D.5.1.6 WET ELECTROSTATIC PRECIPITATOR (W-11)

The wet electrostatic precipitator (WESP) is a vertical hexagonal tube design with self-irrigating tubes. The WESP consists of inlet gas distribution to promote even distribution of the process gas flow entering the WESP, inlet and outlet plenums and a collecting electrode tube bundle. The WESP is equipped with outboard high voltage insulator compartments which include a purge air system, high voltage distribution-support grids, high intensity rigid tube type charging/precipitating discharge electrodes, high voltage power supply (transformer/rectifier and controller) system, ground sticks, safety key interlocks, warning labels, and electronic control logic equipment and valving.

The WESP, in conjunction with the venturi scrubber, is designed to achieve a maximum outlet particulate matter grain loading of 0.015 grains/dscf adjusted to 7 percent oxygen.

The design drawing for the WESP as well as a description of the physical dimensions and the materials of construction of the WESP can be found in Appendix X.

D.5.1.7 FEED SYSTEM

The spent carbon feed system to RF-2 consists of a furnace feed tank (T-18), a dewatering screw (C-5), and a weigh belt conveyor (C-16). The spent carbon/recycle water slurry is discharged from T-18 to C-5 via a control valve. The dewatered spent carbon is discharged from C-5 on to the weigh belt conveyor which is used to measure the feed rate to RF-2. Feed to RF-2 is stopped by stopping the weigh belt. Equipment design information is provided in Appendix X. Instrumentation and controls are depicted on the P&IDs in Appendix VI.

D.5.1.8 INDUCED DRAFT FAN AND STACK

A variable speed induced draft fan is provided to exhaust combustion gases from the furnace and afterburner and through the air pollution control system. Design information and materials of construction for the fan can be found in Appendix X. The clean gas stream is exhausted to the atmosphere via a 110 foot high stack with an inside diameter of 19.75 inches. Design information and a stack layout drawing are provided in Appendix X.

D.5.1.9 CONTINUOUS EMISSION MONITORING SYSTEM

A continuous emission monitoring system (CEMS) is installed in the stack to monitor the carbon monoxide and oxygen concentrations in the exhaust gas. Dual carbon monoxide analyzers are installed. The CO monitors are a Thermo Environmental Model 48i (or equivalent). Dual oxygen analyzers are also installed. The oxygen analyzers are an Ametek (or equivalent). Performance specifications for the CEMS as well as a drawing of the sampling system can be found in Appendix X.

D.5.2 CONTROL SYSTEMS

The facility is equipped with a programmable logic control (PLC) system which monitors process variables to ensure proper facility operation. The instrumentation associated with Automatic Waste Feed Cutoffs and other regulatory compliance is summarized in Table D-3, below. Information related to these instruments is summarized in Appendix X. Operating manuals for each instrument are maintained at the facility. As additional safeguards, the facility has implemented a dedicated, high-priority alarm and visual banner within the facility's existing control room alarm application to immediately notify operators of any loss of communication between the Dynac historian server and the Compliance PLC. In addition, a hardwired waste feed cutoff (WFCO) relay circuit has been installed that operates independently of the PLC and Dynac historian server software logic. Upon loss of communication between the Dynac historian server and the Compliance PLC, the hardwired WFCO circuit automatically stops the spent activated carbon feed to RF-2 without requiring operator action or confirmation of an operating parameter exceedance.

Table D-3. REGULATORY COMPLIANCE INSTRUMENTATION.

Parameter	Identification Number of Sensor/Transmitter (a)	Instrument Type	Units	Range	Expected Operating Point or Range	Calibration frequency	Averaging	AWFCO (Y/N)
Feed rate of spent activated carbon	WE/WT-427	Weigh cell	lb/h	0-6000	< 3049	Semi-annually	1-hr Block	Y
Total feed rate of mercury	Computer	Calculated	lb/h	NA	0 – 1.9E-03	NA	12-hr RA	N
Total feed rate of SVM	Computer	Calculated	lb/h	NA	0 – 1.0	NA	12-hr RA	N
Total feed rate of LVM	Computer	Calculated	lb/h	NA	0 – 1.2	NA	12-hr RA	N
Afterburner gas temperature	TE-464A/B	T/C	F	0-2400	>1750	Semi-annually	1-hr RA	Y
Venturi scrubber pressure differential	PDIT-556	Pressure sensor	in w.c.	0-50	>15	Annually	1-hr RA	Y
Venturi/Quench scrubber recycle liquid flow rate (Total Flow)	FI-562 (Total of FE/FIT-553, 554, & 555)	Sum of Magnetic flow meters (Dynac Function)	gpm	0-656	>75	Annually	1-hr RA	Y
Packed bed scrubber pH	AE/AIT-590	pH probe	pH	0-14	5	Quarterly	1-hr RA	Y
Packed bed scrubber recycle liquid flow rate	FE/FIT-552	Magnetic flow meter	gpm	0-200	>60	Annually	1-hr RA	Y
Packed bed scrubber pressure differential	PDIT-560	Pressure sensors	in w.c.	0-10	>0.1	Annually	1-hr RA	N
Scrubber blowdown flow rate	FE/FIT-605	Magnetic flow meter	gpm	0-691	>30	Annually	1-hr RA	Y
WESP secondary DC voltage	EI-558	Voltmeter	kVDC	0-80	14-22	NA	1-hr RA	Y
Stack gas flow rate	FE/FIT-700	Ultrasonic meter	acfm	Not available	<10,000	Semi-annually	1-hr RA	Y
Stack gas carbon monoxide (b)	AE-575	Nondispersive infrared CEMS	ppmvd @7% O ₂	0-100 0-1000	< 100	Daily/ Quarterly/ Annually	1-hr RA	Y
Stack gas oxygen (b)	AE-576	Paramagnetic CEMS	vol%, dry	0-25	7	Daily/ Quarterly/ Annually	None	N

RA = Rolling average.

(a) Instrument identification from P&IDs.

(b) CEMS calibrations include daily zero and span check, quarterly cylinder gas audit, and annual performance specification test.

D.5.3 MISCELLANEOUS UNIT WASTES

The waste introduced into the reactivation furnaces is spent carbon. This spent carbon is contaminated with various compounds. Refer to Section C for a discussion of the types of wastes accepted for treatment at the facility.

D.5.4 TREATMENT EFFECTIVENESS

The purpose of the facility process is to treat spent carbon by reactivation so that the carbon can be reused. The treatment process consists solely of reactivation, consequently, reactivated carbon exiting the unit is not subject to hazardous waste regulation. The reactivated carbon is screened to separate sizes for various use applications and to remove oversized material, and subjected to quality assurance testing to confirm that it is suitable for reuse.

The quality assurance testing that is conducted depends upon the type of reactivated carbon and the anticipated use of the carbon. On reactivated carbons to be used in vapor applications, a Butane test may be performed. On reactivated carbons used in liquid applications, an iodine number may be calculated. These tests are used to measure the surface area of the reactivated carbon and demonstrate the adsorptive capacity of the product. The facility may also perform tests for size distribution. This testing confirms that the reactivated carbon is suitable for reuse.

D.5.5 ENVIRONMENTAL PERFORMANCE STANDARDS

As per 40 CFR 264.601 and discussions with EPA Region IX, RF-2 underwent a Performance Demonstration Test that incorporated emission standards from the Hazardous Waste Combustor Maximum Achievable Control Technology (HWC MACT) regulations in 40 CFR 63 Subpart EEE. A copy of the approved Performance Demonstration Test Plan, and the Performance Demonstration Test Report for RF-2 can be found in Appendix V. Table D-4 is a listing of the performance standards that RF-2 will be required to meet.

TABLE D-4. PERFORMANCE STANDARDS FOR RF-2

Parameter	Purpose	Standard (1)
Destruction and Removal Efficiency	To limit organic emissions	99.99%
Particulate matter	To limit particulate matter emissions	0.015 gr/dscf (2)
HCl/Chlorine	To limit HCl/chlorine emissions	77 ppmv (3)
Mercury	To limit mercury emissions	130 µg/dscm (4)
Semi volatile metals (5)	To limit Pb and Cd emissions	240 µg/dscm
Low volatile metals (6)	To limit As, Be and Cr emissions	97 µg/dscm
Dioxin and furans	To limit dioxin and furan emissions	0.4 ng/dscm (7)
Carbon monoxide (8)	To ensure good combustion	100 ppmv
Total hydrocarbons (9)	To limit organic emissions	10 ppmv

Note: Siemens and EPA agreed that although the RF-2 unit is not a hazardous waste combustor, but is a RCRA Subpart X Miscellaneous Treatment Unit, the performance standards applicable to existing hazardous waste incinerators in 40 CFR 63 Subpart EEE would be used as guidance. At the time of the PDT, the appropriate standards were found in 40 CFR 63.1203, and are reflected in the table above. Since completion of the PDT, the regulations at Subpart EEE have been changed, and revised standards have been added at 40 CFR 63.1219. A review of the RF-2 PDT results indicate that the unit meets the new standards at 40 CFR 63.1219.

- (1) All values except DRE are corrected to 7% oxygen in the stack gas
- (2) gr/dscf is grains per dry standard cubic foot of stack gas
- (3) ppmv is parts per million on a dry volumetric basis in the stack gas
- (4) µg/dscm is micrograms per dry standard cubic meter of stack gas
- (5) Semi-volatile metals are lead and cadmium
- (6) Low volatile metals are arsenic, beryllium and chromium
- (7) ng/dscm is nanograms 2,3,7,8-TCDD toxicity equivalents per dry standard cubic meter
- (8) 100 ppm by volume on a dry gas basis using a one hour rolling average
- (9) Measured only during the Performance Demonstration Test

D.5.6 DEVELOPMENT OF OPERATING LIMITS

The Siemens Industry, Inc. Carbon Reactivation Furnace RF-2 system demonstrated compliance with all applicable regulatory requirements during a Performance Demonstration Test (PDT) program conducted during 2006, in conformance with the approved PDT Plan (See Appendix V for a copy of the PDT Plan). Operating parameter limits and associated automatic waste feed cutoff setpoints (as applicable) have been established as described in the approved PDT Plan and in the appropriate regulations of 40 CFR 63 Subpart EEE. Most operating parameter limits are based on demonstrations made during the PDT. For some parameters, such as maximum stack gas CO

concentration, and minimum packed bed scrubber pressure differential, the limits are based either on regulation, guidance, or equipment manufacturer's recommendations (rather than the PDT demonstrated values).

Limits on a number of operational control parameters must be maintained as an indication that the RF-2 system continues to operate in compliance with the applicable emission standards. Table D-5 summarizes the discussion of the operational parameter limits for the RF-2 unit. To facilitate review, the operating parameters are grouped into the following categories:

- Group A1 parameters are continuously monitored and recorded, and are interlocked with the automatic waste feed cutoff system. Group A1 parameter limits are established from test operating data, and are used to ensure that system operating conditions are equal to or are more rigorous than those demonstrated during the test.
- Group A2 parameters are continuously monitored and recorded, and are interlocked with the automatic waste feed cutoff system. Group A2 parameter limits are established based on regulatory requirements rather than on the test operating conditions, e.g., the maximum stack CO concentration.
- Group B parameters are continuously monitored and recorded, but are not required to be interlocked with the automatic waste feed cutoff system. Operating records are required to ensure that established limits for these parameters are not exceeded. The Group B parameter limits are established based on the operation of the system during the test.
- Group C parameters are continuously monitored and recorded, but are not required to be interlocked with the automatic waste feed cutoff system. Group C parameter limits are based on manufacturer's recommendations, operational safety, and good operating practice considerations rather than on the test operating conditions, e.g., the minimum packed bed scrubber pressure differential.

Table D-5. Operating Parameter Limits

Control Parameters ^a	Anticipated Permit Limit	Comments ^b
GROUP A1 PARAMETERS		
Maximum spent carbon feed rate (lb/hr)	3049	Block hour AWFCO
Minimum afterburner temperature (°F)	1760	Hourly rolling average AWFCO
Minimum hearth #5 temperature (°F)	1350	Hourly rolling average AWFCO
Minimum venturi scrubber pressure differential (in. w.c.)	18	Hourly rolling average AWFCO
Minimum quench/venturi scrubber total liquid flow rate (gpm)	75	Hourly rolling average AWFCO
Minimum packed bed scrubber pH	4.4	Hourly rolling average AWFCO
Minimum packed bed scrubber liquid flow rate (gpm)	63	Hourly rolling average AWFCO
Minimum wet scrubber blowdown flow rate (gpm)	58	Hourly rolling average AWFCO
Minimum WESP secondary voltage (kVDC)	22	Hourly rolling average AWFCO
Maximum stack gas flow rate acfm	9,550	Hourly rolling average AWFCO
GROUP A2 PARAMETERS		
Maximum stack gas carbon monoxide (ppmvd, @7% oxygen) ^c	100	Hourly rolling average AWFCO
GROUP B PARAMETERS		
Allowable hazardous constituents	All except dioxin wastes and TSCA PCBs	Class 1 POHC demonstrated
Maximum total chlorine and chloride feed rate (lb/hr)	60	12-hour rolling average
Maximum mercury feed rate (lb/hr)	1.8E-03	12-hour rolling average
Maximum semivolatile metal (Cd + Pb) feed rate (lb/hr)	1.0E-01	12-hour rolling average
Maximum low volatility metal (As + Be + Cr) feed rate (lb/hr)	1.5E+00	12-hour rolling average
GROUP C PARAMETERS		
Minimum packed bed scrubber pressure differential (in. w.c.)	0.1	Hourly rolling average

- (a) Group A1 parameters are continuously monitored and recorded, and are interlocked with the automatic waste feed cutoff system. The values for the Group A1 parameters are based on the performance demonstration test operating conditions.

Group A2 parameters are continuously monitored and recorded, and are interlocked with the automatic waste feed cutoff system. The values for the Group A2 parameters are based on regulatory standards or good operating practice rather than performance demonstration test operating conditions.

Group B parameters are continuously monitored and recorded, but are not interlocked with the automatic waste feed cutoff system. Values for the group B parameters are based on the performance demonstration test operating conditions.

Group C parameters are continuously monitoring and recording, but are not interlocked with the automatic waste feed cutoff system. The values for the Group C parameters are based on manufacturer's specifications and/or operational and safety considerations rather than performance demonstration test operating conditions.

- (b) AWFCO = Automatic waste feed cutoff.
- (c) AWFCO interlock will not be active during the daily CEM calibration period.

D.5.6.1 Specific Operating Parameters

Operating parameter limits for each of the control parameters have been established as specified in the HWC MACT regulations given in 40 CFR 63.1209 and the approved PDT plan. The following sections describe how each operating parameter limit has been established.

In addition to establishing specific operating limits, the facility has limits on the types of waste that can be treated in RF-2. Since the facility has demonstrated greater than 99.99% DRE during the PDT while treating chlorobenzene, a Class 1 (most thermally stable) compound, the facility will be permitted to treat all of the materials represented by the waste codes in the facility's most recent RCRA Part A permit application. Specific prohibitions are in place for feed materials containing greater than 50 ppm of PCBs and those listed with the waste codes F020, F021, F022, F023, F026 or F027.

D.5.6.2 Parameters Demonstrated During the Test (Group A1 Limits)

Group A1 parameter limits are based on the results of the testing. The following operating parameters have been established as Group A1 parameters for the RF-2 system.

Maximum Spent Carbon Feed Rate [40 CFR 63.1209(j)(3), and 63.1209(k)(4)]

The PDT was conducted in order to demonstrate the maximum feed rate of spent carbon. The spent carbon feed rate is monitored on a continuous basis. The maximum allowable spent carbon feed rate has been established as a block hour average limit from the average of feed rates demonstrated during each of the three runs of the PDT.

Minimum Afterburner Temperature [40 CFR 63.1209(j)(1), and 63.1209(k)(2)]

The PDT was conducted at the minimum afterburner temperature with maximized combustion gas flow rate (minimum residence time), since these are the conditions least favorable for DRE. Organic emissions were also measured under these conditions for risk assessment purposes. Based on successful demonstration of DRE during the PDT, the minimum temperature limit has been established as an hourly rolling average equal to the average of the demonstrated test run average values.

Minimum and Maximum Hearth #5 Temperature

As part of EPA's approval of the PDT Plan, the facility was required to establish both a minimum and maximum temperature limit for Hearth #5 of the reactivation furnace. Since both a minimum and maximum temperature could not be demonstrated in the single test condition approved for the test, the facility operated Hearth #5 at a maximum temperature during the PDT and has established a minimum temperature limit based on a study of the boiling points of the organic constituents found in the spent activated carbon received at the facility.

Since completion of the PDT, the facility has provided documentation from EPA that was developed as part of the HWC MACT regulations, demonstrating that establishing a maximum temperature limit is no longer deemed necessary for thermal treatment

systems. Accordingly, no maximum temperature limit is included in Table D-5.

The minimum Hearth #5 temperature limit has been established as an hourly rolling average based on the results of the facility's study of organic constituent boiling points.

Minimum Venturi Scrubber Differential Pressure [40 CFR 63.1209(m)(1)(i)(A), 63.1209(o)(3)(i), and 63.1209(n)(3)]

The performance test was conducted to demonstrate the minimum venturi scrubber differential pressure. Venturi scrubber differential pressure is monitored on a continuous basis. Based on successful demonstration of particulate and metals control during the performance test, the minimum venturi scrubber differential pressure limit has been established as the average of the hourly rolling average values demonstrated during each run of the performance test. This limit is implemented as an hourly rolling average value.

Minimum Quench/Venturi Scrubber Recycle Liquid Flow Rate [40 CFR 63.1209(m)(1)(C), 63.1209(o)(3)(v), and 63.1209(n)(3)]

The performance test was conducted to demonstrate the minimum quench/venturi scrubber recycle flow and maximum stack gas flow, thus establishing a *de facto* minimum liquid to gas ratio. Quench/Venturi scrubber flow and stack gas flow are both monitored on a continuous basis. Based on successful demonstration during the performance test, the minimum quench/venturi scrubber recycle liquid flow rate limit has been established based on the average of the hourly rolling average values demonstrated during each run of the performance test. This limit is implemented as an hourly rolling average.

Minimum Packed Bed Scrubber pH [40 CFR 63.1209(o)(3)(iv)]

The performance test was conducted to demonstrate the minimum packed bed scrubber pH at maximum total chlorine/chloride feed rate. Scrubber pH is monitored on a continuous basis. Based on successful demonstration of HCl and Cl₂ control during the performance test, the minimum packed bed scrubber pH limit has been established as the average of the hourly rolling average pH values demonstrated during each run of the performance test. The permit limit is implemented as an hourly rolling average.

Minimum Packed Bed Scrubber Recycle Liquid Flow Rate [40 CFR 63.1209(m)(1)(C), 63.1209(o)(3)(v), and 63.1209(n)(3)]

The performance test was conducted to demonstrate the minimum packed bed scrubber recycle flow rate and maximum stack gas flow, thus establishing a *de facto* minimum liquid to gas ratio. Packed bed scrubber recycle flow and stack gas flow are both monitored on a continuous basis. Based on successful demonstration of HCl and Cl₂ control during the performance test, the minimum packed bed scrubber recycle liquid flow rate limit has been established as the average of the hourly rolling average values demonstrated during each run of the performance test. This limit is implemented as an hourly rolling average.

Minimum Scrubber Blowdown Flow Rate [40 CFR 63.1209(m)(1)(i)(B), and 63.1209(n)(3)]

The performance test demonstrated a minimum scrubber blowdown flow rate, in order to demonstrate worst case conditions for solids buildup in the scrubbing system. In order to conserve water, the facility recycles most of the liquid from the air pollution control system. However, in order to prevent the buildup of dissolved solids in the recycled water, a certain amount of the water must be purged (or blown down) from the system. As water is purged from the system, fresh makeup water is added. The minimum scrubber blowdown flow rate limit has been based on the average of the hourly rolling average values demonstrated during each run of the performance test. This limit is implemented as an hourly rolling average.

Minimum WESP Secondary Voltage [40 CFR 63.1209(m)(1)(iv), and 63.1209(n)(3)]

Although the HWC MACT regulations do not require any indicator of performance in an electrically enhanced emissions control device, the facility believes that it is appropriate to establish a performance indicator. Accordingly, WESP secondary voltage (expressed as KVDC) is used as the indicator of continuing WESP performance. The minimum value has been established as the average of the minimum hourly rolling average secondary voltage values demonstrated during each run of the performance test. The secondary voltage limit is implemented as an hourly rolling average.

Maximum Combustion Gas Velocity (Stack Gas Flow Rate) [40 CFR 63.1209(j)(2), 63.1209(k)(3), 63.1209(m)(2), 63.1209(n)(5), and 63.1209(o)(2)]

The stack gas flow rate (expressed as actual cubic feet per minute) is used as the indicator of combustion gas velocity. The maximum stack gas flow rate was planned to be established from the mean of the maximum hourly rolling average stack gas flow rates measured by a stack gas flow rate monitor during each run of the performance test. As stated in the PDT Report (contained in Appendix V), the stack gas flow rate monitor experienced difficulties during the PDT such that the measurements were not reliable. Each isokinetic sampling system used for stack gas emissions measurements during the PDT also included the measurement of stack gas flow rate. Thus, the average stack gas flow rate determinations for each run, derived from the stack gas sampling systems, has been used to establish a maximum stack gas flow rate limit. The maximum stack gas flow rate limit is implemented as an hourly rolling average.

D.5.6.3 Group A2 Parameters

Maximum Stack Gas CO Concentration [40 CFR 63.1203(a)(5)(i)]

The maximum hourly rolling average stack gas CO concentration was maintained at or below 100 ppmv corrected to 7% oxygen (dry basis) during the test. An operating parameter limit for maximum stack gas carbon monoxide concentration of 100 ppmv hourly rolling average corrected to 7% oxygen has been established in according to the applicable regulations.

Fugitive Emissions Control [40 CFR 63.1206(c)(5)(i)(A)]

The HWC MACT regulations require controlling combustion system leaks. By design (no

open feed systems), the combustion chamber constitutes a sealed system. There are no locations for combustion system leaks to occur. Therefore, the RF-2 system is in compliance with 40 CFR 63.1206(c)(5)(i)(A).

D.5.6.4 Group B Parameters

Maximum Total Chlorine/Chloride Feed Rate [40 CFR 63.1209(n)(4), and 63.1209(o)(1)]

During the PDT, the facility maximized the feed rate of total chlorine/chloride through the spiking of tetrachloroethene and other chlorinated organic compounds. Since the HCl and Cl₂ emissions measured during the PDT were less than the applicable standard, the limit for total chlorine/chloride feed rate has been set as a 12-hour rolling average, equal to the average of the average total chlorine/chloride feed rate during the three runs of the PDT. Total chlorine/chloride includes the native chlorine/chloride in the spent activated carbon feed plus the spiked chlorine/chloride. Records of feed analyses, and the calculated 12-hour rolling average total chlorine/chloride feed rate values will be maintained to demonstrate compliance with the chlorine/chloride feed rate limit.

Maximum Mercury Feed Rate [40 CFR 63.1209(l)(1)(iii)(D)]

Due to the low amounts of mercury expected in the spent activated carbon, the facility has elected to comply with the mercury standard by calculating and complying with a 12-hour rolling average Maximum Theoretical Emission Concentration (MTEC), conservatively assuming no mercury removal across the APC system. The MTEC is complied with as a maximum mercury feed rate limit. This limit has been calculated from the performance test data by using the stack gas flow rate and oxygen concentration, and the maximum allowable stack gas mercury concentration based on the HWC MACT regulations. The feed rate limit is determined assuming that all mercury is emitted, and is complied with as a maximum 12-hour rolling average mercury feed rate limit.

Maximum Semivolatile Metals Feed Rate [40 CFR 63.1209(n)(2)]

The facility demonstrated compliance with the semivolatile metal emission standard while spiking lead during the test. Therefore, the permitted feed rate limit for semivolatile metals (total cadmium plus lead) has been set as a 12-hour rolling average value equal to the average semivolatile metal feed rate demonstrated during the three runs of the PDT. Records of feed analyses, and the calculated 12-hour rolling average semivolatile metal feed rate values will be maintained to demonstrate compliance with the semivolatile metal feed rate limit.

Maximum Low Volatility Metals Feed Rate [40 CFR 63.1209(n)(2)]

The facility demonstrated compliance with the low volatility metal emission standard while spiking chromium during the test. The emissions measured during the test were significantly lower than the allowable limit. Therefore, the feed rate limit for low volatility metals (total arsenic, plus beryllium, plus chromium) has been set as a 12-hour rolling average extrapolated upward to the HWC MACT standard based on the average low

volatility metal feed rate and the average low volatility metal System Removal Efficiency (SRE) during the three runs of the CPT. Extrapolation has been conducted as described in the approved PDT Plan. Records of feed analyses, and the calculated 12-hour rolling average low volatility metal feed rate values will be maintained to demonstrate compliance with the low volatility metal feed rate limit.

D.5.6.5 Group C3 Parameters

Group C parameter limits are based on manufacturer's recommendations, operational safety and good operating practice considerations. The following parameters are proposed as Group C parameters.

Minimum Packed Bed Scrubber Pressure Differential [40 CFR 63.1209(o)(3)(ii)]

The minimum packed bed scrubber pressure differential is based on past operating experience. This limit has been established as an hourly rolling average limit.

D.5.7 PROTECTION OF GROUNDWATER AND SUBSURFACE ENVIRONMENT

The facility is designed with a containment system that contains any spills of hazardous materials and precipitation that falls on the process areas of the facility. Process wastewater generated at the facility is permitted to be discharged to the local publicly-owned treatment works.

D.5.7.1 GROUNDWATER

Because of the physical properties of activated carbon and the location and design of the facility, the risk of contamination of groundwater and/or the subsurface environment in the areas surrounding the facility is very low.

The primary source of potential contamination from the facility would be the contaminants adsorbed on the spent carbon received and reactivated at the facility. However, because of the physical properties of the carbon (the contaminants are held in the pore structure of the carbon by strong intermolecular forces), these contaminants do not desorb from the carbon until the carbon is introduced into a high temperature environment such as the reactivation unit located at the facility. At these high temperatures, the contaminants are in a gaseous state and are thermally destroyed in the high temperature environment of the reactivation unit and, therefore, do not pose a risk to the groundwater and/or subsurface environment. The facility is designed to contain (see Sections D.3 and D.4) the potential releases that could impact groundwater and/or the subsurface environment. In addition, the potential impacts associated with a release would be minimal at this site because of the depth to the groundwater table and the absence of any drinking water wells, either public or private, in proximity to the facility. The closest potential exposure point is an irrigation supply well which is located more than 2,500 feet away from the facility boundary.

An exposure pathway is not complete for exposure through the groundwater and/or subsurface environment for the reasons stated above (physical characteristics of spent carbon, facility location, and design). Because the exposure pathway is not complete, the facility poses negligible risk to human health or the environment from contamination of groundwater and/or the subsurface environment.

D.5.8 PROTECTION OF SURFACE WATER, WETLANDS, AND SOIL SURFACE

There are no springs, drinking water wells, surface water bodies, or wetlands within one quarter mile of the facility. Outside operating areas of the hazardous waste management facility are paved and are provided with run-on and run-off protection. Container storage is indoors and the floor is sloped and trenched to capture any spills. All containment is free of gaps or cracks which would allow waste materials or contaminated rainwater to leak into the underlying or surrounding soil.

D.5.9 PROTECTION OF THE ATMOSPHERE

Air pollution control equipment has been installed on the reactivation units to limit the potential emissions from the facility. Emissions testing has been conducted and a health risk assessment has been approved to assess the potential risks associated with facility emissions.

D.5.9.1 RISK ASSESSMENT

EPA Region IX has approved a Risk Assessment Work Plan (RAW) for a Human Health and Ecological Risk Assessment of the facility. Using this work plan and the PDT results, a risk assessment was conducted and subsequently accepted by EPA. A copy of the Risk Assessment Report is included in this application in Appendix XI.

DESOTEC US LLC**PARKER REACTIVATION FACILITY – RCRA PERMIT MODIFICATION****FLY SHEET 3 – RCRA PERMIT CONDITIONS**

Document Status	CLEAN COPY – proposed revisions highlighted
Revision	RCRA Permit Condition V.C.5 – Communication Loss Protective Measures
	V.C.5.b.iii – revised language
	V.C.5.i – <i>addition</i> , “AWFCO Interlock Procedure for Loss of Communication”.
Facility	Desotec US LLC – Parker, Arizona
Purpose	Permit modification submittal fly sheet documenting proposed revisions

REVISED: September 21, 2026

FINAL RCRA PERMIT
 Evoqua Water Technologies, LLC
 Colorado River Indian Tribes
 EPA ID # AZD982441263
 Module V, Page 14
 September 2018

V.C.5. Automated Waste Feed Cutoff Requirements

V.C.5.a. The Permittees shall operate RF-2 with an automatic waste feed cutoff (AWFCO) system that immediately and automatically cuts off the feed to RF-2 in accordance with this Permit. [See 40 CFR § 63.1206(c)(3).]

V.C.5.b. The Permittees shall set the automatic waste feed cutoff system to stop the feed to RF-2 if any of the following occurs:

V.C.5.b.i. The emission limit for Carbon Monoxide listed in Table V1, the limit for the maximum spent carbon feed rate, or the maximum stack gas flow rate listed in Table V-2 are exceeded, or any of the other Group A-1 or Group A-2 parameters specified in Table V-2 are not met.

V.C.5.b.ii. When the span value of any continuous monitoring system (CMS)detector, except a continuous emissions monitoring system (CEMS), is met or exceeded; [See 40 CFR § 63.1206(c)(3)(i)(B).]

[Note: Parameter CMSs are process instruments that continuously monitor and record parameter data from the operation of the carbon reactivation process. The instruments consist of weigh belts, flow meters, pressure transducers, thermocouples and other devices that collect process information on key regulatory parameters.]

V.C.5.b.iii. Upon malfunction of a CMS, including but not limited to loss of communication or signal validity between a CMS and the Compliance PLC or Dynac historian server (e.g., disconnected or damaged communication wiring), regardless of whether a monitored parameter is confirmed to be outside its operating limit; [See 40 CFR § 63.1206(c)(3)(i)(C).] or

V.C.5.b.iv. When any component of the AWFCO system fails. [See 40

CFR § 63.1206(c)(3) (i)(D).]

V.C.5.c. During an AWFCO event, the Permittees must continue to duct combustion gases to the air pollution control equipment while spent carbon remains in RF-2 (*i.e.*, if the residence time has not transpired since the AWFCO system was activated). After an AWFCO event, the remainder of the system shall continue to FINAL RCRA PERMIT

operate until the residence time has transpired to ensure all spent carbon remaining in the system has been processed with the APCE still operational. [See 40 CFR § 63.1206(c)(3)(ii).]

V.C.5.d. In the event of an AWFCO event, the Permittees shall implement the SSMP and operate RF-2 under the provisions of the SSMP. [See 40 CFR §§ 63.1206(c)(2) and (c)(3).]

V.C.5.e. During malfunctions, the Permittees shall comply with the AWFCO requirements of the SSMP and this Permit. [See 40 CFR § 63.1206(c)(2)(v)(A)(1) and Permit Attachment Appendix XXII.]

V.C.5.e.i. The AWFCO requirements continue to apply during a malfunction. If the Permittees exceed the emission limit for Carbon Monoxide listed in Table V-1, the limit for the maximum spent carbon feed rate or the maximum stack gas flow rate listed in Table V-2, or fail to meet any of the other Group A-1 or Group A-2 parameters specified in Table V-2, the Permittees shall undertake the corrective measures prescribed in the SSMP. [See 40 CFR § 63.1206(c)(2)(v)(A)(2).]

V.C.5.e.ii. For the purposes of determining the duration of an exceedance as a result of a malfunction (including power outages), the exceedance will begin once an emission standard or operating limit is exceeded while spent carbon is in RF-2. The exceedance will end once the spent activated carbon has cleared RF-2 or once the emissions and operating parameters are reestablished within their respective permit limits, whichever occurs sooner. Thus, one incident may constitute one exceedance, which may include multiple emissions or operating parameters not being met.

V.C.5.e.iii. For each set of 10 exceedances of an emission standard or operating requirement while spent carbon remains in the combustion chamber (*i.e.*, when the residence time has not transpired since the feed was cut off) during a 60-day block period, the Permittees must:

V.C.5.e.iii.(1). Within 45 days of the 10th exceedance, (1) complete an investigation of the cause of each exceedance; (2) complete an evaluation, to include approaches to minimize the frequency, duration, and severity of each exceedance, and whether any revisions to the SSMP are warranted to minimize the frequency, duration, and severity of such exceedances; and (3) record the results of the investigation and evaluation in the Operating Record. [See 40 CFR § 63.1206(c)(2)(v)(A)(3)(i) and (ii).]

V.C.5.e.iii.(2). Within 60 days after each 10th exceedance, include a summary of the investigation and evaluation, and any recommended changes to the SSMP in an excess emissions report submitted to the Director for approval in accordance with Permit Condition I.G.5. [See 40 CFR § 63.1206(c)(2)(v)(A)(3)(ii).]

V.C.5.e.iv. If, after any AWFCO event, there is an exceedance of a parameter in Table V-2 required to be interlocked with the AWFCO system, or when an exceedance of a Group A-1 or Group A-2 parameter specified in Table V-2 occurs, irrespective of whether the exceedance occurred while spent carbon remained in the combustion chamber (*i.e.*, whether the residence time has transpired since the AWFCO system was activated), the Permittees must investigate the cause of the AWFCO event, take appropriate corrective measures to minimize future AWFCO events, and record the findings and corrective measures in the Facility's operating record. [See 40 CFR § 63.1206(c)(3)(v).]

V.C.5.f. The Permittees shall not feed spent carbon during startups and shutdowns. [See 40 CFR § 63.1206(c)(2)(v)(B).]

V.C.5.g. Restarting Feed

The Permittees must not start feeding spent carbon until the operating parameters specified in Table V-2 and the CEMS have returned to within the operating limits. [See 40 CFR § 63.1206(c)(3)(iii).]

V.C.5.h. Testing the AWFCO System

The Permittees must test the AWFCO system in accordance with Permit Attachment Section F. The Permittees must document and record AWFCO system operability test results in the Facility's Operating Record and maintain such records for 5 years. [See 40 CFR §§ 63.1206(c)(3)(vii) and 264.347(c) and (d).]

V.C.5.i AWFCO Interlock Procedure for Loss of Communication

In addition to the parameter-based AWFCO described in Table V-2, the Permittee shall maintain a hardwired waste feed cutoff relay circuit, independent of the Compliance PLC and Dynac historian server software logic. This relay circuit will automatically stop spent carbon feeds to RF-2 upon loss of communication between the Dynac historian server and the Compliance PLC.

V.C.6. Burning of Natural Gas

- V.C.6.a.** RF-2 (including all its APCE and ancillary equipment) shall be powered by natural gas only. Alternative fuel cannot be used unless this Permit is modified. Any such modification request may require additional performance testing and/or an updated risk analysis.
- V.C.6.b.** The amount of natural gas burned in RF-2 (including all its APCE and ancillary equipment) shall be recorded monthly in the Operating Record. Such monthly records shall be maintained in accordance with this provision, even for months when startup, shutdown, or malfunction events occur.
- V.C.6.c.** Each month, the Permittees shall calculate and record in the Operating Record, the 12-month rolling sum in tons per year of nitrogen oxides (NO_x) emissions from RF-2 (including all its APCE and ancillary equipment), based on: (1) the amount of natural gas burned; (2) the emission factor in accordance with this Permit Condition; (3) flow rate out the stack; and (4) the hours of operation of RF-2. Prior to the first PDT to be performed in accordance with this Permit, the Permittees shall use the most recent available emission factor for NO_x to calculate the 12-month rolling sum of NO_x in tons per year. After approval of the first