Prepared for:
Heritage-WTI, Inc.
1250 St. George Street
E. Liverpool, Ohio 43920

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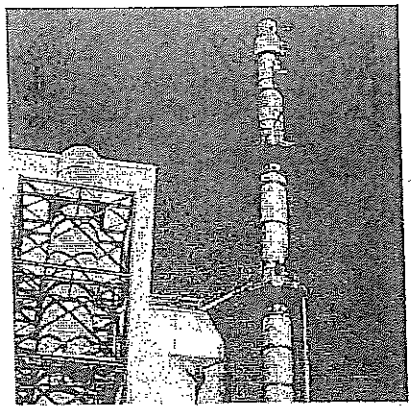
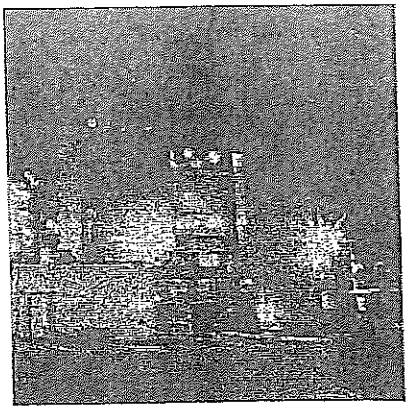
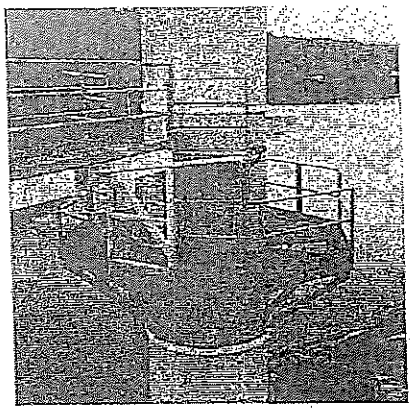

MACT Confirmatory Performance Test Plan for the Rotary Kiln Hazardous Waste Incineration System

Revision 1

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EPA-R5AECAB-AE2010-448

AECOM, Inc.
June 2012
Document No.: 60264806-1

Prepared for:
Heritage-WTI, Inc.
1250 St. George Street
E. Liverpool, Ohio 43920

MACT Confirmatory Performance Test Plan for the Rotary Kiln Hazardous Waste Incineration System

Revision 1

[PUBLIC COPY]

Prepared By David Moll

Reviewed By Douglas Roeck

AECOM, Inc.
June 2012
Document No.: 60264806-1

EPA-R5AECAB-AE2010-449

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1.0 Introduction

1.1 Program Summary

This document represents a MACT Confirmatory Performance Test (CFPT) Plan for the rotary kiln incineration system operated by Heritage-WTI, Inc. (WTI) at its East Liverpool, Ohio facility. Since the WTI incinerator treats certain waste that are classified as hazardous under state and/or federal regulations, this unit is subject to the requirements of the HWC MACT Rule.

This Plan has been prepared in accordance with requirements promulgated in **NESHAPS: Final Standards for Hazardous Waste Air Pollutants for Hazardous Waste Combustors**, (generally referred to as the Hazardous Waste Combustor [or "HWC"] MACT Rule). These regulations were initially published by US EPA on September 30, 1999 in 40 CFR 63 Subpart EEE. However, these initial regulations were vacated based on a DC Circuit Court ruling, were subsequently replaced by "Interim Standards" in February of 2002 and then re-promulgated again in the Permanent Replacements Standards published in the Federal Register on October 12, 2005.

This document addresses the requirements to develop and submit a CTP Plan set forth in 40 CFR § 63.1207 and § 63.7 and the requirements to develop and submit a Continuous Monitoring System (CMS) Performance Evaluation Plan under 40 CFR § 63.1207(b)(1) and § 63.8(e)(4). This CPT Plan is written to address all applicable Subpart EEE (and General Provisions) requirements incorporated into the regulations through promulgation of the Final Replacement Standards published in the Federal Register on October 12, 2005.

1.2 Facility / Unit Identification

1.2.1 General

As mentioned above, this CFPT Plan has been developed to evaluate the incinerator at the WTI facility in East Liverpool, OH. This is a commercial hazardous waste incineration facility that treats liquid and solid wastes that are classified as hazardous and also treats process vent streams from operations at the facility as part of the overall air emissions control program.

1.2.2 Facility ID, Mailing Address and Primary Contact

The facility ID and mailing address is:

Heritage-WTI, Inc.
1250 St. George St.
East Liverpool, Ohio 43920
U.S. EPA RCRA ID # : OHD 980 613 541
Ohio Title V Permit No. 02-15-02-0233
Ohio Permit to Install No. 02-18743

The primary contact is:

EPA-R5AECAB-AE2010-456

Mr. Vince Waggle
Environmental Engineer
Phone: (330) 386-2182

1.2.3 Incinerator Overview

The WTI incinerator is a rotary kiln incineration system with primary and secondary combustion chambers that treats solid wastes as well as aqueous and organic liquids. The process is monitored and controlled by a distributed control system (DCS) capable of continuously monitoring the process to assure all operational parameters are within regulatory and permit limits while waste is being fed to the unit. In addition, this incinerator is equipped with a Continuous Emissions Monitoring System (CEMS) that continuously samples the exhaust gases for oxygen and total hydrocarbons in the stack gas exhaust stream.

1.3 Purpose and Objectives of the CFPT

The purpose of the CFPT is to validate the performance level of the incinerator against the requirements in 40 CFR Part 63, Subpart EEE. To this end, the specific objectives of this CFPT are to:

- Demonstrate compliance with the dioxin/furan emission standard of ≤0.20 ng/dscm TEQ basis (40 CFR § 63.1219(a)(1)(ii)) while the incinerator operates under normal conditions.
- Conduct a performance evaluation of the Continuous Monitoring Systems (CMS) required for compliance with the dioxin/furan standard (40 CFR § 63.1209(k)).

The CFPT will include feeding a variety of liquid and solid waste materials to the incinerator, sampling and analyzing the feed streams, monitoring certain process parameters and conducting emissions testing. The emissions standards that will be evaluated under the HWC MACT regulations are summarized in **Table 1-1**.

1.4 CPT Plan Organization

This test plan has been organized in a format typically used for compliance demonstration test programs. **Table 1-2** is included so that the CFPT requirements in the HWC MACT rule can be cross-referenced with the sections in this Plan. The remainder of the document has been organized as follows:

- **Section 2.0** provides a general physical description of the rotary kiln incineration system and associated unit operations (including the air pollution control system) as well as an overview of the automatic waste feed cutoff (AWFCO) system and maintenance procedures.
- **Section 3.0** presents a brief discussion of the wastes to be treated in terms of physical and chemical parameters which impact thermal oxidation and summarizes the hazardous air pollutants presently identified in the waste streams.
- **Section 4.0** presents the Test Protocol including planned feed and test conditions, rationale for the test design, anticipated test schedule and final report format.
- **Section 5.0** fully describes all sampling and analysis procedures and associated QA/QC protocols following the latest EPA guidance. This section essentially serves as the Quality Assurance Project Plan (QAPP) for this project.
- **Section 6.0** includes the Continuous Monitoring System (CMS) Performance Evaluation Test (PET) Plan that is required to be performed as part of addressing the overall MACT testing requirements.

The Appendices contain pertinent correspondence with the regulatory agencies and/or relevant information regarding control equipment operation (**Appendix A**); detailed facility process and instrumentation diagrams (P&IDs) (**Appendix B**); examples of performance test field data sheets, (**Appendix C**); and isokinetic sample train setup and recovery schematics (**Appendix D**).

Table 1-1 Summary of Applicable MACT Emission Standards for the CFPT

Emissions Parameter	Limit	Citation
PCDDs/PCDFs (TEQ basis)	≤ 0.20 ng/dscm	40 CFR 63.1219(a)(1)(i)(A)

Note: All emission concentrations are corrected to 7% oxygen

Table 1-2 Cross Reference of CFPT Requirements

Topic	Regulatory Citation	Section No. in this Document
Program Summary	40 CFR § 63.1207(f) and § 63.7(c)(2)(i)	1.1
Test schedule	40 CFR § 63.1207(f), (f)(1)(v) and § 63.7(c)(2)(i)	4.7 and Table 4-6
Data Quality Objectives (DQOs)	40 CFR § 63.1207(f) and § 63.7(c)(2)(i)	5.5
Internal and External Quality Assurance Plan	40 CFR § 63.1207(f) and § 63.7(c)(2)(i)	5.9 & 5.13
Analysis of feedstreams (as fired)	40 CFR § 63.1207(f)(1)(i)	3.0
Heating value, ash content, semi-volatile metals, low volatile metals, mercury and total chlorine	40 CFR § 63.1207(f)(1)(i)(A)	
Viscosity	40 CFR § 63.1207(f)(1)(i)(B)	
Identification and quantification of reasonably expected HAPs	40 CFR § 63.1207(f)(1)(ii)(A) & (B)	
Detailed engineering description of combustor		2.0
Manufacturer/make/model of HWC	40 CFR § 63.1207(f)(1)(iii)(A)	2.2
Type of HWC	40 CFR § 63.1207(f)(1)(iii)(B)	2.2
Maximum design capacity	40 CFR § 63.1207(f)(1)(iii)(C)	2.2
Feed systems	40 CFR § 63.1207(f)(1)(iii)(D) & (E)	2.3
Location of combustion zone temperature device	40 CFR § 63.1207(f)(1)(xix)	2.2.6
Hazardous waste AWFCO system	40 CFR § 63.1207(f)(1)(iii)(F)	2.5.1
Design, operation and maintenance of APC	40 CFR § 63.1207(f)(1)(iii)(G)	2.4.11
Justification of alternative gas flow rate measurement technique	40 CFR § 63.1207(f)(1)(xvii)	N/A
Design, operation and maintenance of stack gas monitoring systems	40 CFR § 63.1207(f)(1)(iii)(H)	2.6
Description of Waste handling and blending Operations	40 CFR § 63.1207(f)(1)(ii)(C)	2.3.5
Detailed test protocol including:		
Description of sampling, monitoring and analytical procedures	40 CFR § 63.1207(f)(1)(iv)	5.6 & 5.8
Description of Planned Feed and Operating conditions during the CPT	40 CFR § 63.1207(f)(1)(vi) & (vii)	4.3, 4.4 & 4.5
Procedures for rapidly stopping hazardous waste feed and controlling emissions during malfunction	40 CFR § 63.1207(f)(1)(viii)	2.3.6
Determination of hazardous waste residence time	40 CFR § 63.1207(f)(1)(ix)	2.2.7
Metal feed rate limit extrapolation (if used)	40 CFR § 63.1207(f)(1)(x)	4.4.2 and Table 4-5
CMS and CEMS performance evaluation plans	40 CFR § 63.8(e)(4) and 1207(b)(1)	6.0
Documentation of expected levels of regulated constituents in other feed streams that are not analyzed	40 CFR § 63.1207(f)(1)(xi)	3.0
Documentation of conditioning time needed to reach steady state prior to testing	40 CFR § 63.1207(f)(1)(xii)	4.6
Alternative monitoring frequency for wet scrubbers (if used)	40 CFR § 63.1207(f)(1)(xxiii)	N/A
Other information deemed necessary by the agency	40 CFR § 63.1207(f)(1)(xxvii)	-

Table 1-3 Specific Confirmatory Test Plan Requirements

Topic	Regulatory Citation	Section No. in this Document
Confirmatory Dioxin/Furan Testing to demonstrate compliance	40 CFR § 63.1207(b)(2)(i)	CFPT Plan
Conduct performance evaluation of CMS	40 CFR § 63.1207(b)(2)(ii)	Section 6
Normal Hydrocarbon operating levels	40 CFR § 63.1207(f)(2)(i)	4.1
Normal operating parameter levels	40 CFR § 63.1207(f) (2)(ii)	4.1
Normal chlorine operating levels	40 CFR § 63.1207(f)(2)(iii)	4.1
Normal cleaning cycle for carbon injection and particulate control device operations	40 CFR § 63.1207(f)(2)(iv) and 1207(g)(2)(iv)	2.4.9 & 2.4.11
Description of sampling and monitoring procedures	40 CFR § 63.1207(f)(2)(v)	Section 5
Average, Minimum, maximum hydrocarbon values	40 CFR § 63.1207(f)(2)(vii)	Table 4-3
Average, Minimum, maximum hydrocarbon values	40 CFR § 63.1207(g)(2)(i)	Table 4-1
Average, Minimum, maximum operating parameter values	40 CFR § 63.1207(g)(2)(ii)	Table 4-1
Average, Minimum, maximum chlorine values	40 CFR § 63.1207(g)(2)(iii)	Table 4-1

2.0 Engineering Description

2.1 Process Overview

This section presents a summary description of the WTI incinerator train. A general process flow schematic is provided in **Figure 2-1**. Detailed process and instrumentation diagrams (P&IDs) for individual system components as well as the overall treatment train are provided in **Appendix B** of this Plan.

2.2 Combustor Design Specifications

Descriptions for each major section of the combustion system are provided below.

2.2.1 Rotary Kiln Primary Combustion Chamber (PCC)

The PCC is capable of incinerating containerized, bulk, and pumpable waste in solid, liquid, gaseous and sludge form. The rotary kiln is 16 ft (5.0 m) in diameter, and is 43 ft (13.1 m) in length. The kiln is constructed of carbon steel with a refractory inner lining. Seals located at each end of the kiln are designed to minimize leakage of air into the kiln. Fugitive emissions from the kiln are prevented through two mechanisms. First, negative pressure is maintained in the kiln by the I.D. fan and the pressure is measured at the discharge end of the kiln. [redacted]

Under normal operating conditions the induced draft fan maintains the pressure in the combustion chamber below ambient conditions. During pressure spikes, the shrouds act as an alternative means of controlling combustion system leaks. This is equivalent to maintaining the pressure in the combustion zone below ambient pressure. (Please refer to Appendix A for a copy of the U.S. EPA letter dated Sept, 4 2003 for details on the AWFCO as it pertains to the combustion chamber pressure.)

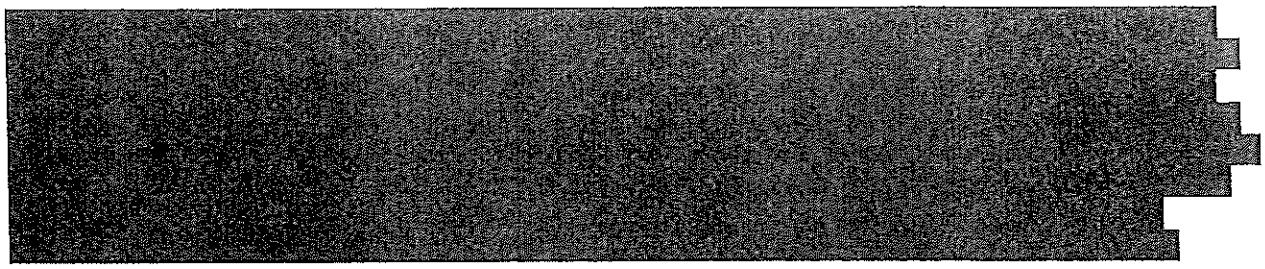
Normally, kiln temperature is controlled by varying the flow of high Btu liquids to the kiln. Ash or slag from the kiln flow into an ash quench tank below the secondary combustion chamber (SCC). Gases from the kiln pass to the SCC for continued retention time.

2.2.2 Secondary Combustion Chamber (SCC)

The SCC provides for continued burning and retention time. Solid particles passing to the SCC and residue from the kiln drop into a water filled quench tank below the SCC. The SCC achieves complete burnout of incinerator off-gases by maintaining an elevated temperature for sufficient time and by ensuring turbulent mixing through introduction of steam, secondary combustion air and/or oxygen. The SCC is refractory lined,

and has an insulated outer shell to minimize heat losses. Flue gas from the SCC flows into the heat recovery boiler. The dimensions of the SCC are 18'2" wide x 18'7" long x 56'6" high.

2.2.3 Oxygen Injection



2.2.4 Waste Heat Recovery Boiler

The waste heat recovery boiler (HRB) utilizes heat generated from waste incineration to produce steam for plant use. Flue gas temperatures entering the boiler are approximately 1380°F; flue gas leaving the boiler is approximately 700°F. Particulate accumulation on tube surfaces is removed by mechanical rapping, which occurs every 30 minutes during normal operation. Gases from the boiler section pass on to the evaporative quench section (spray dryer).

2.2.5 Evaporative Quench (Spray Dryer)

The Spray Dryer performs two functions; (1) the cooling of the flue gas; and (2) the evaporation of effluent or blowdown from the four stage wet scrubber. The spray dryer is constructed of carbon steel and is heated and insulated to prevent corrosion. The cylindrical-shaped unit is approximately 36 feet in diameter and 104.5 feet tall. At the base of the unit is a cone-shaped hopper that collects salts and fly ash. The inlet temperature of the flue gas is approximately 700 to 750°F; the temperature at the outlet is approximately 400°F.

Flue gas leaving the HRB is introduced through a gas disperser at the top of the spray dryer. Neutralized scrubber effluent or blowdown is injected into the spinning flue gas and atomized by means of high-speed rotary atomizers. The atomized scrubber blowdown cools the flue gas by evaporation in the drying chamber. The volume and temperature of the flue gas as it enters and leaves the spray dryer will determine the amount of scrubber blowdown that can be evaporated. The scrubber blowdown is gravity fed to the atomizers from a small head tank located on the top of the spray dryer. The head tank is fed from the neutralization system feed tank.

The Spray Dryer is designed to evaporate the water in the atomized scrubber blowdown before any droplets can impinge upon the vessel walls and cause buildup and corrosion. To prevent corrosion, the temperature of the flue gas leaving the spray dryer will be maintained at approximately 400°F by modulating the amount of scrubber blowdown that is atomized.

Solids in the scrubber blowdown will be dried and entrained in the flue gas. Large particles will be removed in the spray dryer by the centrifugal force resulting from a change in direction of the flue gas flow as it leaves the vessel. Smaller particles will be entrained in the flue gas and transferred to the ESP for removal. Particulate matter separated from the flue gas in the spray dryer will be collected in the hopper at the base of the unit.

Vibrating mechanisms prevent the build-up of particulate on the hopper. The fly ash in the hopper is transferred to the ash conveyor that eventually discharges it to a pneumatic tanker for off-site disposal.

The complete operating atomizer assembly is made up of an abrasion and corrosion resistant centrifugal atomizer (wheel) with nozzle inserts. The atomizer is driven by a highly advanced liquid and air-cooled induction motor with frequency inverter speed control. This design allows infinite control of the wheel speed up to 16,200 rpm. Normal operating speed is 13,000-15,000 rpm. All connections to the atomizer (oil, air, cooling water, feed, electrical controls) are through one central terminal stand which is located in the spray dryer penthouse. A continuous air/oil cooling and lubrication system is used for the upper and lower bearings. Cooling water is circulated through the atomizer jacket. Wet scrubber effluent in fed through an integral disperser in the atomizer prior to injection to the rotating wheel.

The spray dryer has undergone some minor changes since the original construction. These changes include the installation of several vibrators to the exterior of the spray dryer cone to minimize ash build up on the walls of the cone.

2.2.6 Location of Combustion Zone Temperature Devices

Temperature refers to the temperature of the flue gas from a point midway down the rotary kiln to a point within the SCC. It is in this region that volatilized organic compounds are thermally destroyed. The normal operating temperature range for the flue gas in the SCC is 1,795°F to 2,250°F. Flue gas temperature measurements in the SCC are made by temperature monitoring devices (TMDs) located as follows:

Elevation	Identification No.	Location
El.724'0"	TI-4300 A	North side of SCC
El.724'0"	TI-4300 B	South side of SCC
El.743'0"	TI-4310 A	North side of SCC
El.743'0"	TI-4310B	South side of SCC
El.765'0"	TI-4503 A	North Side of SCC Roof
El.765'0"	TI-4503 B	North Side of SCC Roof

These TMDs are used to maintain constantly updated temperature readings to allow for optimum destruction of the volatilized organic compounds and for optimum kiln operating conditions.

The temperature after the SCC remains constant for a given set of operating conditions. The temperature is controlled by modulating the rate at which high Btu liquids are injected into the kiln to maintain proper permitted temperature conditions. The concentration of oxygen in the flue gas leaving the ESP and/or the temperature of the flue gas in the SCC is used to control the waste flow to the high Btu liquid lance on the front wall of the rotary kiln. The primary air fan damper controls the oxygen concentration for proper combustion and is modulated as necessary to maintain proper oxygen concentrations to achieve optimum combustion conditions in the kiln. Maintaining the proper fuel to air ratio in the combustion zone using the high Btu lance and primary air fan damper, optimal operation will be achieved.

WTI refers to the "kiln temperature" from TI-4300A or TI-4300B because both TMDs are located at the same elevation in the SCC (El 724'0" north and south sides). The logic used with these two devices is the one obtaining the lowest temperature reading is used to determine compliance with the current temperature limits. The use of redundant TMDs allows for failure of one device and provides time for repair without stopping waste feed. The current measuring points for the kiln and SCC temperatures are located within a few feet of each other (see **Figure 2-2**).

2.2.7 Hazardous Waste Residence Time

The HWC MACT rule defines hazardous waste residence time as *"the time elapsed from cutoff of the flow of waste into the combustor until solid, liquid and gaseous materials from the hazardous waste exit the combustion chamber."* This is a regulatory term used to define when a unit is operating under a hazardous waste combustion mode. For the purposes of establishing the residence time for WTI's rotary kiln system, this calculation is based on the time required for solid materials to pass through the kiln. This computation is a function of the diameter and length of the kiln, the angle of inclination and the kiln rotational speed. The equation for residence time is as follows:

RT = KL / [(Tan IA) x (KS) x (Pi) x (KID)]

where,

RT = residence time, minutes

KL = Kiln length = 43 ft.

IA = Inclination angle = 3 degrees = 0.05236 radians

KS = Kiln rotation speed, which varies from 0.05 to 0.5 rpm

Pi = constant = 3.14159

KID = Kiln inside diameter = 14.5 ft.

At a kiln speed of 0.05 rpm, the solid phase residence time would be 360 minutes or 6 hours. At a rotational speed of 0.5 rpm, the residence time would be 36 minutes. Based on the RPM curve above, a computation is preformed to provide the operator with a "counter" representing the amount of time left until the kiln is burned out and no longer is under the MACT Subpart EEE regulations. The counter is reset to 360 after every bulk or drum feed. When the counter counts down from 360 to 0 and there are no lances established, the waste retention flag is no longer set.

2.3 Feed Systems Description

2.3.1 Liquid Waste Feeds

The front wall of the kiln is equipped with six (6) steam or air-atomized pumpable waste lances referred to as the organic lance, the high Btu lance the aqueous lance, the slurry lance, the sludge lance, and the secondary sludge lance:

Designed by – Von Roll Inc.; Manufactured by – North American Manufacturing Inc.

- High Btu Lance Tag No. X3110 (Maximum flow rate – 10,000 lb/hr)
- Organic Lance Tag No. X3120 (Maximum flow rate – 10,000 lb/hr)
- Aqueous Lance Tag No. X3140 (Maximum flow rate – 10,000 lb/hr)

Designed and Manufactured by – Wolfensberger/Southwire Inc.

- Sludge Lance - Tag No. X3130 (Maximum flow rate – 10,000 lb/hr)
- Sludge (secondary) Lance Tag No. X3160 (Maximum flow rate – 10,000 lb/hr)
- Slurry Lance - Tag No. X3150 (Maximum flow rate – 10,000 lb/hr)

Designed and Manufactured by – North American Manufacturing, Inc.

- Natural Gas Front Wall Burner - Tag No. X3510 (Maximum Btu rate – 60 x 10^6 Btu/hr)

The sources of the waste for these lances can vary depending on the operation plan for any specific day. Typically, one or two of those lances are being used for material being directly fed from a tanker, and one of those lances is being used for material being fed directly from a drum. The lances that are assigned to these streams will vary. The remaining lances are being fed from the liquid waste tank farm or the pump-out tanks.

The front wall natural gas burner is provided for startup and firing to maintain kiln temperature when necessary.

Drawing M-06-2-04302 (**Appendix B**) shows the sludge, secondary sludge, and slurry lance details. Drawing C7-2872 (**Appendix B**) shows the high Btu, organic, and aqueous lance details. All lances, with the exception of the secondary sludge lance are therminol-cooled. The secondary sludge lance is water- cooled.

2.3.2 Solid Waste Feeds

Solid wastes are fed into the incinerator through a common feed chute from three different sources: containerized material, the skip hoist, and the bulk solid pits. The containerized feed system can feed any container that will physically fit through the feed chamber. Currently, 55 gallon drums (paper and metal), 85 gallon over packs, boxes of various sizes, 5 gallon buckets, and various cans are fed via this system. There are no individual weight restrictions, however there is a total solid feed limit which encompasses all solid feed mechanisms and does not restrict feeds from either mechanism. The solids feed to the kiln may be a combination of the three mechanisms or entirely from one of the feed mechanisms as long as the feed limit is maintained. Currently, the frequency of pushes is set at approximately 50 seconds per push. A drawing detailing this system (Drawing No. I-02-1-00004) is enclosed in **Appendix B.**

2.3.2.1 Feed Chute

The kiln feed chute extends into the kiln so that containers and loose solids are injected well into the first zone of the kiln. The chute is liquid-cooled.

2.3.2.2 Containerized Feed System

The containerized material consists of drums, over-packs, boxes, buckets, and cans. This material is either prepared in the container processing area for incineration or is incinerated as it is received. This material is placed onto a conveyor carriage where it is transported to the front wall of the kiln. Each container is pushed onto a short roller conveyor and then enters the drum pre-chamber. Drums and containers fed to the kiln are weighed by a scale built into the conveyor prior to entry into the kiln. Once the container is inside the pre-chamber, an inner door to the kiln opens, and the container is pushed down the feed chute.

2.3.2.3 Bulk Solid Waste Feed Systems

Two systems are provided for feeding bulk solids to the kiln: an overhead crane and a skip hoist.

Bulk solid material is accumulated in two bulk solid pits. This material is placed into these pits from a variety of containers including drums, boxes, waste sacks, roll-off boxes, and dump trailers. These solids are then fed to the feed chute using a clamshell crane. The solids are dropped from the crane onto a set of inner doors. Once the outer doors have closed, these inner doors open allowing the solids to feed down the chute to the incinerator. An overhead crane and bucket mixes loose solids prior to feeding the material into the rotary kiln feed chute. Up to 2 $^1/_2$-ton lifts can be delivered to the kiln using the overhead crane. Solids fed to the kiln via the bucket are weighed by a load cell.

The skip hoist loading platform and conveyance system is located outside and on the south side of the incinerator feed building next to the direct drum pump-out stations. The skip hoist is used to convey waste material in metal containers from ground level directly into the feed chute hopper for the incineration system. This container is lifted to the fourth floor of the incinerator feed building where it is automatically placed onto a tipper assembly. The tipper then inverts the container over the bulk solid feed chute and deposits the material onto a set of inner doors. Once the outer doors have closed, the inner doors open allowing the skip hoist material to feed down the chute into the incinerator. The skip hoist is capable of ten, one ton feed cycles per hour.

2.3.3 Process Vent Streams

The process vent system is supplied by the waste storage and waste processing areas throughout the facility. The waste storage areas include the organic tank farm, the pump-out tanks, the drum warehouse, and the bulk solids pits. The process areas include the external truck wash, the drum sampling area, the drum splitting area, the drum pump-out area, the drum extruder, the two direct tanker feed bays, and the direct drum feed system.

[redacted]

2.3.4 Supplemental Fuels

Fuel oil and natural gas are two supplemental fuels that are used in the incineration process. There are gas burners present in the front wall of the rotary kiln which are used during heat up and cool down periods and when incineration conditions require additional fuel. The fuel oil is fed to the organic lance from a dedicated fuel tank in the Tank Farm. This material is used during heat-up and cool-down periods and to maintain

temperature while waste is not being fed to the kiln. There are also gas burners present in the secondary combustion chamber but the gas lines have blind flanges installed and therefore the burners are not functional.

2.3.5 Waste Handling and Blending Operations

When containerized materials are received at the facility, they are off-loaded from trucks to the processing area. A unique bar code is assigned to each container and the materials are sampled, inspected, and palletized. By permit, at least 10% of containers are sampled for "fingerprint" analysis. This is to assure that the waste that is received is the same as the waste that was approved initially. All containers (unless there is a safety reason not to) are inspected. In addition to the fingerprint analysis, WTI performs compatibility testing for all bulk loads and drummed waste that is pumped into tanks. Wastes having similar compatibility ratings are mixed and blended into the appropriate tanks.

Once the material has been approved by the lab (based on the 10% sample), one of the operations planners schedules the waste for processing. A treatment process is assigned to each container. The containers are pulled from the warehouse and, based on the assigned treatment process, the material will go in one of several directions:

- It can go to be dumped into the bulk solids pits;
- It can go to be pumped out into a tank;
- It can go to the extruder, (devise that punches a hole in the bottom of the drum and crushes the drum to remove the material);
- It can go directly to one of the 5 queuing lanes;
- It can be sent to be pumped directly to one of the lances;
- It can be sent to a materials preparation area called the "splitting station"; or
- It can be loaded into the skip hoist.

Wastes that are fed to lances from the liquid waste tank farm are blended according to operational needs. Blending is done to meet specifications for heating value, water content, halogen content and other feed parameters. This waste is pumped into the tank farm from bulk liquid tankers and the pump-out tanks. The material in the pump-out tanks is received in drums and totes. This material is accumulated in one of the pump-out tanks, which can either be fed directly to the incinerator or pumped to the liquid waste tank farm for blending.

2.3.6 Procedures for Rapidly Stopping Hazardous Waste Feed During Equipment Malfunction

If the facility experiences an equipment malfunction or catastrophic equipment failure that is not directly related to the existing automatic waste feed cut off system, the control room operator would take action to manually shut down waste feeds. The control room operator has total control over all waste feed controls. This includes all waste feed lances as well as bulk solids. [redacted] In the event of a catastrophic equipment malfunction, the control

room operator will initiate the function that will systematically shutdown all waste feeds, virgin fuel feeds, as well as all combustion air fed to the incinerator.

2.4 Air Pollution Control Equipment

The flue gas cleaning system (FGCS) consists of a NO_x control system and an electrostatic precipitator (ESP) followed by a quench and multistage wet scrubber. The system is also equipped with a proprietary activated carbon injection system for controlling PCDD/PCDF and mercury emissions. The overall FGCS also includes an induced draft fan, a plume suppression system and exhaust stack, each of which is described below.

2.4.1 Electrostatic Precipitator

A three field ESP (manufactured by Environmental Elements Corporation) is used as the primary stage of particulate emission control. The precipitator is of rigid electrode design and each field in the unit is electrically independent. Total collection plate area for the ESP is 42,075 ft^2. The ESP has three separately controlled, electrically isolated fields. The design parameters for these fields are as follows:

Field Number	Primary Voltage	Maximum Primary Current	Secondary Voltage	Maximum Secondary Current
1	480 V	85 AAC	55 kV	500 mADC
2	480 V	85 AAC	55 kV	500 mADC
3	480 V	128 AAC	55 kV	750 mADC

The control console for each field regulates the power supplied by the transformer/rectifier set to the collection electrodes for highest collection efficiency. The controls can be set based on spark rate or secondary voltage limit. The operating parameters vary as dust loading or precipitator conditions change. The minimum ESP secondary current OPL listed in Table 2-1 applies to each field of the ESP. The automatic voltage controller (AVC) is manufactured by Environmental Elements and it is a Digicon Optipulse Controller #PN0803.

The precipitator is conservatively designed for 99.7% removal efficiency at the design dust loading, which includes dust from the spray dryer system. The ESP operates with all three fields online. The ESP is sized for an approximate inlet dust load of 11.2 gr/dscf of flue gas. The anticipated actual average loading is approximately 5.2 gr/dscf.

The precipitator is equipped with an electric impulse rapping system to remove fly ash from collecting surfaces. This rapping system is automatically controlled by a PLC. The PLC controls the frequency with which the rappers are utilized. This rapping system will be operated during the CPT in the same manner in which it is operated during normal operation. Hoppers are provided under the collecting surfaces of the precipitators. These hoppers automatically accumulate and feed the spray dryer salts and fly ash to a conveying system. The hoppers are insulated to prevent condensation of the flue gas on the interior of the hoppers. Fly ash from the precipitator is combined with fly ash from the boiler and accumulated in a closed elevated silo prior to disposal. Flue gas from the ESP passes to the quench section for cooling and further cleaning.

2.4.2 Flue Gas Quench

The flue gas discharged from the ESP is cooled further by a quench to protect the downstream scrubbing equipment. In the quench section, the flue gas is cooled from approximately 380°F to the saturation temperature of approximately 170°F using recycled process water. During the quench step some of the hydrogen halides in the flue gas are removed. The flue gas pressure drop across the quench is approximately one inch water column. Bleed off from the quench section is sent to the neutralization system and ultimately to the spray dryer. The quench sump level is maintained with scrubber bleed off from the first packed bed stage.

2.4.3 Low Energy Packed Bed Scrubber

The removal of SO_2 and hydrogen halides is accomplished with a multistage, packed bed flue gas scrubber. The packed bed tower consists of two packed bed absorbing sections followed by a venturi (Ring Jet ™) stage and associated mist eliminators (refer to drawing I-06-2-31215). Hydrogen halides are removed in the first packed bed stage of the scrubber. Spray nozzles are used to distribute scrubber liquor evenly over the first packed bed. The first packed bed consists of vonRoll packing (or equivalent) packing with a bed depth of 1.6 meters (refer to the attached data sheet for the scrubber packing). The extensive surface are of the packing material maximizes absorption of the hydrogen halides. The scrubber liquor is collected in a sump beneath the packed bed and is recirculated to the spray nozzles. The recirculation flow rate remains constant during normal operation and the liquid to gas ratio (gpm scrubber liquor per 1000 acfm flue gas) varies depending on the exact scrubber inlet gas flow rate.

Bleed off from the first packed bed section is sent to the quench stage as makeup. Makeup to the first packed bed stage is supplied as required to maintain sump level from the second packed bed recirculation bleed off.

Sulfur dioxide is removed in the second packed bed of the scrubber. The process is very similar to the one described for the first packed bed with the exception that sodium hydroxide is injected into the recirculated scrubber liquor to maintain the pH of the second packed bed stage at the proper level. The second packed bed consists of vonRoll Hiflow Ring 50-6 Plastic packing (or equivalent) at a depth of 2.9 meters. The scrubber liquor is collected in a sump beneath the packed bed and is recirculated to the spray nozzles. Makeup to the second packed bed is supplied as required to maintain sump level from the venturi stage recirculation bleed off.

2.4.4 High Energy Venturi Scrubber Stage

Flue gas leaving the second packed stage passes through a mist eliminator before entering the final stage of the scrubber system. The venturi stage is comprised of a multitude of venturi-type, Ring Jets™ for the removal of sub-micron-sized particles and aerosols from the flue gases. A dedicated sump and recirculation pump provides scrubbing liquor flow to the manifold feeding the Ring Jets.

The flue gas stream is divided into a number of smaller streams, which are forced through the individual Ring Jets. Due to the shape of the Ring Jets, the flue gas is accelerated to high velocities. At this point the scrubbing liquid is injected into the gas stream. The significant difference in velocity of the gas and the liquid droplets causes the particles entrained in the flue gas stream to impact on the water droplets. This causes the small particles to be absorbed and thus removed by the scrubbing liquid droplets. Separation of the droplets occurs in the mist eliminator section following the Ring Jets.

The liquid flow rate to the Ring Jets stage is controlled in response to the gas side pressure drop. This feature allows for a constant operating pressure differential across the stage and, therefore, constant removal efficiencies at different flue gas flow rates. A final mist eliminator system follows the venturi stage in the scrubber. Cleaned flue gas exits the scrubber and is drawn into the ID fan.

A continuous blowdown of scrubber liquor from the scrubber neutralization system is pumped as makeup to the spray dryer feed tank. The blowdown liquor is evaporated and salts are purged in the bottom ash system. The cascaded bleed off and makeup process described above for the packed bed and venturi scrubber stages provides liquor for makeup for the separate scrubber sumps, and purges salt accumulations from the scrubbing liquor.

Mist eliminators are installed at the outlet of all four stages of the scrubber in order to remove entrained moisture droplets. Chevron type mist eliminators are utilized that are constructed from polypropylene injection elements on a building block system. The mist eliminators are rinsed intermittently with scrubber liquor. The rinse water is collected with the scrubber liquor in the sump for each stage.

The design of the quench tower also includes provisions for emergency cooling water in the event of an increase in the temperature of the flue gas entering the scrubber tower.

2.4.5 Induced Draft Fan

The ID fan removes gases from the scrubber and discharges the gas stream through a plume suppression system (reheater) to the stack. The ID fan is sized to convey up to 96,500 acfm at a static pressure rise of 58 inches w.c.

2.4.6 Plume Suppression System

Saturated flue gas from the ID fan is discharged through a mixing chamber in which hot air is added to the flue gas to reheat the stack gas to approximately 190°F. The objective is to suppress the visible plume so that opacity can be measured. The plume suppression system is operational during normal operation. Reheat air from the plume suppression system has no effect on emission results since the concentrations are corrected to a standard oxygen or carbon dioxide concentration for evaluation, thereby eliminating the effects of stack gas dilution.

In order to comply with the permitted process air limit, WTI must account for the amount of reheat air added to the system. This is accomplished by subtracting the reheat flow from the measured stack flow as follows. FI-7510A/B is the calculated process flow in scfm through the Incinerator. The stack flow monitor (FI-7805) is the raw value measured in the stack using a United Sciences Inc. Ultraflow 100 monitor. Reheat air is injected into the ductwork of the stack after the induced draft fan. WTI also measures the actual reheat flow with a USI Ultraflow 100 monitor (FI-7710). By subtracting the reheat flow measurement from the stack flow measurement, the total process flow is calculated and indicated on Tag FI-7510A/B. A redundant process flow monitor is located in the duct exiting the scrubber. This instrument is also a United Sciences Inc. Ultraflow 100 monitor and is identified as FI-7510B.

2.4.7 Scrubber Water Conditioning System

The scrubber water conditioning system is designed to remove acidic compounds from the waste water stream by converting these compounds to salts. To achieve this, basic compounds such as lime ($Ca(OH)_2$), caustic ($NaOH$) or soda ash (Na_2CO_3) are used. The acidic reaction with lime converts primarily to $CaCl_2$. The acidic reaction with caustic or soda ash converts primarily to Na_2SO_4. The quantity of caustic and slaked lime consumed is dependent on the type and quantity of acid gas constituents in the flue gas. In order to keep the pumps associated with the neutralization system operating properly, the system is periodically blown down to remove solids. The volume blown down is then replaced by blowdown from the quench stage of the scrubber.

The effluent from the scrubber water conditioning system is used in the spray dryer to control the inlet temperature to the ESP.

2.4.8 Activated Carbon Injection System [CONFIDENTIAL SYSTEM]

An enhanced carbon injection system (ECIS) was installed in 1993 to improve control efficiency for organics (primarily PCDDs/PCDFs) and to further control mercury emissions.

[redacted]

The overall system consists of [redacted] The carbon used in the ECIS will meet or exceed the following specifications as currently defined by permit:

[redacted]

[redacted]

2.4.9 Exhaust Stack

The stack for this system is 150 ft in height, 6 ft in diameter, and is constructed of carbon steel. Three access platforms are provided for stack sampling and for the permanently installed continuous emission monitors.

2.4.10 Air Pollution Control Equipment Maintenance Practices

2.4.10.1 Electrostatic Precipitator

Monthly PM is performed on the ESP. The operator checks the ESP voltages and currents four times a day. During outage there are planned PM that includes inspecting and cleaning the electrodes, transformers, perforations plates, rappers and controls, ash high transmitters and probes, inlet and outlet pressure transmitters, and the control cabinets in the 05 E/I are cleaned, inspected and all connections are tightened. The rappers in the ESP operate on a continuous basis.

2.4.10.2 Scrubber Tower

The operators inspect the scrubber twice per shift. Pumps are inspected for leaks, inlet pressure, discharge pressure, vibration, and oil level. The emergency nozzles are inspected once per shift as are the carbon injection lines. The scrubber has weekly PM performed by operators and E/I technicians. The operators inspect all manual hand valves for operation, leaks and leak through. E/I technicians inspect and recalibrate the pH probes as necessary. During planned outages, the scrubber has PM for both electrical and mechanical components. The mechanics inspect, change oil, and adjust impeller clearances, and check coupling alignment on the 1st, 2nd, 3rd, and 4th stage pumps. The automatic makeup water valve from the fire water system is inspected and tested; all level control valves are inspected and repaired/replaced as needed. The

quench stage nozzles are removed, cleaned and replaced if they are worn. The E/I technicians remove all level transmitters from all four stages of the scrubber and they are cleaned, tested, recalibrated, and reinstalled. Likewise, the pressure transmitters are cleaned, tested, recalibrated, and reinstalled. Low-level switches are cleaned and tested. The motors on the 1st, 2nd, 3rd, and 4th stage pumps are inspected and greased. During outage, the scrubber is drained and inspected by Operation and Engineering Department personnel. The rubber lining on the walls and interior structures is inspected for deterioration, mist eliminators are inspected for placement, damage and plugging. The packed bed modules are inspected for deterioration, plugging, and damage. The quench elbow insulating brick is inspected for missing brick, deterioration or damage. The 4th stage ring jets are inspected for plugging, bad hoses or damaged nozzles, and repairs or replacements are made as necessary.

2.5 Process Monitoring

The plant distributed control system (DCS) is a [redacted] system. Process and motor control are performed in the DCS. The operator control console is located in the control room and consists of three operator stations, each with two screens.

The natural gas burners are supervised by microprocessor-based flame safety systems. Burner status and control are provided for in the DCS. The auxiliary fuel supply set point, which indicates a failure, is the natural gas supply side pressure.

2.5.1 Automatic Waste Feed Cut-off (AWFCO) System

The computerized process control and instrumentation system is programmed to automatically cut off all waste fed to the incineration system in the event of one or a combination of circumstances. A summary of the primary operating parameter limits (OPLs) tied into the AWFCO system as regulated by MACT is provided in **Table 2-1.** Additional parameters or situations that would result in a waste feed cutoff are summarized below.

[redacted]

[redacted]

2.5.2 AWFCO System Testing

The automatic waste feed cutoff system is tested on a weekly basis in accordance with current permit requirements. Every MACT parameter is tested weekly through a software simulation of each MACT exceedance to verify that the AWFCO system is operating correctly.

2.5.3 Parameters to be Monitored to Ensure Compliance with MACT Standards

A variety of process parameters are monitored to ensure ongoing compliance with applicable MACT standards. An overall matrix depicting current operating parameter limits (OPLs) is provided in Table 2-1 (referenced earlier).

2.5.4 Stack Flue Gas Monitoring Equipment

An extensive array of instrumentation is used to monitor the stack gas stream on a continuous basis. A brief description of the CEMS instruments including the operating range and measurement principal is provided in **Table 2-2.** A detailed summary of the maintenance practices performed on these instruments is presented in Section 6.0 of WTI's "Quality Assurance Plan for the Continuous Emission Monitoring Systems", Revision 6, dated March 4, 2005.

2.6 Alternative Monitoring Procedures

All existing alternative monitoring procedures in place will remain in effect for this confirmatory test.

Figure 2-1 General Process Flow Schematic

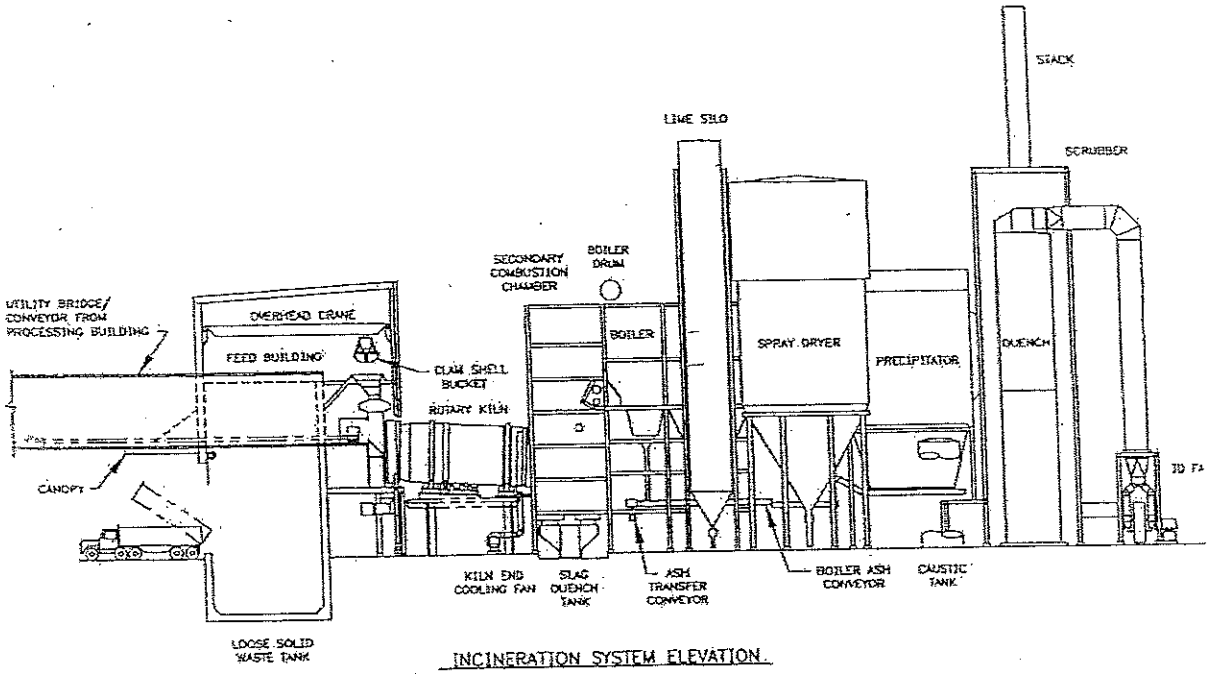


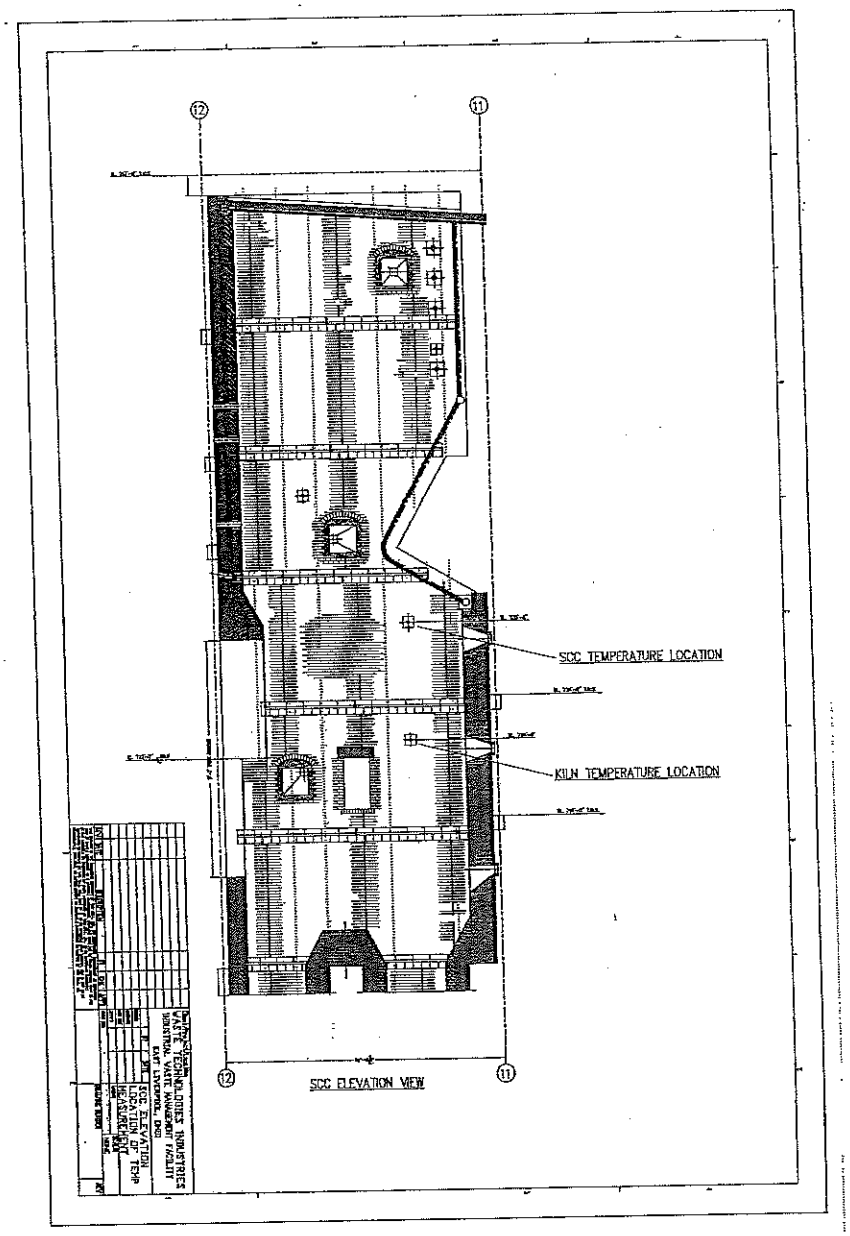
Table 2-1 MACT Operating Parameter Limits following to 2010 CPT

Process Parameters	Tag ID	Units	MACT OPL
Maximum Total Waste Feed Rate	WQI-9000F	lb/hr	35,069
Maximum Pumpable Waste Feed Rate	WQI-9000T	lb/hr	29,926
Minimum Feed Lance Atomization Pressure	Multiple	psig	30
Maximum SCC Pressure	PIC-4300	in. w.c.	See US EPA Letter 9/4/2003
Maximum Ash Feed Rate	WQI-9000AH	lb/hr	10,333
Maximum Total Chlorine Feed Rate	WQI-9000CL	lb/hr	2,032
Maximum Total LVM Feed Rate	WQI-9000LV	lb/hr	400
Maximum Total Pumpable LVM Feed Rate	WQI-9000PLV	lb/hr	400
Maximum Total SVM Feed Rate	WQI-9000SV	lb/hr	83.2
Maximum Total Mercury Feed Rate	WQI-9000M	lb/hr	0.14
Maximum ESP Inlet Temperature	TI-6002	°F	424
Minimum ESP Power Input to each Field	EI-6700,6710,6720	mA	100
Minimum Kiln Temperature	TI-4300	°F	1,718
Minimum SCC Temperature	TI-4310	°F	1,747
Maximum Process Gas Flowrate	FI-7510	wet scfm	67,505
Minimum Carbon Feed Rate – Location 1	WI-7003	lb/hr	[redacted]
Minimum Carbon Feed Pressure – Location 1	PI-5732	psig	3.0
Minimum Carbon Feed Rate – Location 2	WI-7002	lb/hr	[redacted]
Minimum Carbon Feed Pressure – Location 2	PI-7132	psig	3.0
Minimum Ring Jet Pressure Drop	DPI-7401	in. w.c.	28.0
Minimum Scrubber (1st & 2nd Packed Bed) Liquid Flowrate	FQI-7201	gpm	1,287
Minimum Scrubber (1st & 2nd Packed Bed) Combined Pressure Drop	DPT-7207, 7307	in. w.c.	1.3
Minimum Scrubber (Ring Jet) Liquid Flowrate	FI-7404	gpm	446
Minimum Scrubber (Ring Jet) Blowdown	FI-7403	gpm	19.5
Minimum Scrubber (Ring Jet) Sump Level	LIC-7401	ft	1.7
Minimum Scrubber (3rd Stage) Liquid pH	AI-7307	pH units	7.6
THC Concentration @ 7% O_2	AI-7851	ppm	10

Table 2-2 Continuous Emission Monitoring System

Location	Instrument Type	Meas. Basis	Range	Mfg.	Model No.	Serial No.
Process Flow	Flow	Wet-scfm	0-80,000	USI	Ultraflow 100	9401820
	Calculated Flow	Wet-scfm	N/A	N/A	N/A	N/A
Reheat Flow	Flow	Wet-scfm	0-50,000	USI	Ultraflow 100	Q-08572U-0793
Stack Outlet	THC #1 (certified at 2 ranges)	Wet	0-100 ppm 0-500 ppm	CAI	600HFID	U12054
	THC #2 (certified at 2 ranges)	Wet	0-100 ppm 0-500 ppm	CAI	600HFID	U12055
	O_2	Dry	0-25 %	Ametec	2000	C127340-1
	O_2	Dry	0-25 %	Ametec	2000	10206379
	O_2	Wet	0-25 %	Ametec	2000	C101180-102
	O_2	Wet	0-25 %	Ametec	2000	10206503
	CO	Dry	0-750 ppm	Thermo Scientific	48i	CM10360078
	Stack Flow	Wet-scfm	0-100,000	Teledyne	Ultraflow 150	1501036
	Stack Flow (Calculated)	Wet-scfm	N/A	N/A	N/A	N/A

Figure 2-2 SCC Elevation Showing Location of Temperature Measurement


SCC TEMPERATURE LOCATION
KILN TEMPERATURE LOCATION
SCC ELEVATION VIEW

3.0 Incinerator Feed Stream Descriptions

3.1 General Overview

This section provides a description of the primary hazardous waste streams that are managed within the WTI plant hazardous waste management program. Other non-hazardous incinerator feed materials are also described. Waste feed rates are monitored through the [redacted] and logged to a data logging system. The data logging system logs the current flow value every minute for the waste feed lances and logs the scale weight from the crane. The system receives the weight for the Drum conveyor and also from the skip hoist using the facility's waste tracking computer system (ARTS). Currently, Coriolis mass flow meters, positive displacement pumps, and load cells (scales) are used to measure waste feed rates to the incinerator.

The waste feed materials handled by the facility cover a wide range of waste codes and hazardous constituents. Because of the potential wide range in materials handled, WTI does not normally analyze the feed materials for hazardous air pollutants (HAPs) as defined by Section 112 of the Clean Air Act. However, review of the HAPs list indicates that all HAPs could be processed in the incinerator except for the following constituents that are specifically excluded from the facility's permit:

- Asbestos;
- Chlorine (gaseous);
- PCBs > 50ppm;
- 2,3,7,8-TCDD; and
- Radionuclides

3.2 Liquid Waste Feeds

Liquid wastes are injected into the incinerator through six different waste lances in the front wall of the kiln. These lances are referred to as the Organic lance, the High Btu lance, the Aqueous lance, the Slurry lance, the Sludge lance and the Secondary Sludge lance. The sources of the waste for these lances can vary depending on the operation plan for any specific day. Typically, one or two of those lances are being used for material being directly fed from a tanker and one of those lances is being used for material being fed directly from a drum. The lances that are assigned to these streams will vary. The remaining lances are used for materials from the liquid waste tank farm or the pump-out tanks.

3.2.1 Tank Farm Waste Feed Materials

Wastes that are fed to lances from the liquid waste tank farm are blended according to operational needs. Blending is done to meet specifications for heating value, water content, halogen content and other feed parameters. The characteristics of these streams vary depending on waste requirements.

3.2.1.1 High Btu Waste

High Btu waste is typically fed through either the High Btu lance or the Organic Lance and is used to maintain the minimum temperature in the kiln during waste operations. This waste stream typically consists of spent

solvents or used oil that cannot be recycled. These wastes are blended at a TSDF to meet our specifications for High Btu material. This waste typically has a heating value greater than 10,000 Btu/lb, a water content less than 10%, and a chloride content less than 10%. It is rare to see halogens other than chloride in this waste. Because this waste is used to control temperature in the kiln, there are very rarely any restricted feed metals in this waste.

3.2.1.2 Organic Waste

Organic waste is typically fed through Organic Lance, the Sludge Lance, or the Aqueous Lance. This stream is typically solvent material with either too much water, too high halogen content, or too little heating value to be used as a High Btu waste. This material typically has a Btu value less than 10,000 Btu/lb. These streams can have halogen contents as high as 80% but typically are less than 30%. While restricted metals can be present in these wastes, it is rare that any significant concentrations of these metals are found in the waste.

3.2.1.3 Sludge Waste

Sludge waste is typically fed through the Sludge Lance or the Slurry Lance. This material is generated from a variety of sources and is received in both tankers and drums. Typically, paint waste, refinery waste, still bottoms, and sump clean-outs make up the majority of this stream. The solids content of this stream is higher than other wastes, but it must be pumpable. These wastes usually have at least 30% water. It typically has a heating value of between 4,000 and 8,000 Btu/lb. While restricted metals are present in these wastes, it is rare that any significant concentrations of these metals are present.

3.2.1.4 Slurry Waste

Slurry waste is typically fed through the Sludge Lance or the Slurry Lance. This is waste that will have at least two distinct layers. One layer is typically aqueous and one is typically solvent. Most of this material is generated from drums that are pumped into tanks. Due to the variety of materials that can be pumped out, the specifications for this waste will vary greatly.

3.2.1.5 Aqueous Waste

Aqueous waste can be fed through any of the lances in the front wall, but most typically is fed through the Aqueous Lance and the High Btu Lance. This material represents a waste having a water content of at least 50% and a heat value of no greater than 3,000 Btu/lb. The halogen content is usually less than 15%, but may be higher on occasion. Because of the volume of material that is received of this type, it is rare that any restricted metals are seen in these streams.

3.2.2 Direct Tanker Waste Streams

There are two bays present at the facility where a tanker can be processed directly to the kiln without going through the tank farm. This is done because the material is potentially incompatible with material in the tanks or needs to be heated in order to be offloaded. At times, both bays may have material being processed to the kiln at the same time.

The South bay is typically utilized for monomers, chlorosilanes, and materials that need to be heated. Chlorosilane waste is the most common material that is processed through this bay. This stream will have a chloride content of between 20 and 80%. This stream also produces fly ash when incinerated due to the Silicon content.

The East bay is utilized for strong acids, oxidizers, amines, and other materials with may react with the material in the Tank Farm. Typically, no monomers or streams with high solids are processed through this bay due to the length of the piping to the lance.

Restricted metals may be present in either of these direct tanker streams, although It is rare for metals to be present.

3.2.3 Direct Drum Feed Materials

Pumpable materials that are not compatible with material that is in tanks or the materials of construction of the tank systems are pumped directly to a lance without being processed through a tank. There are currently two pumps, which can go to two different lances. Materials are separated into different types of waste based on halogen content, reactivity hazard, and compatibility groups. The following is a list of some typical waste streams that are processed through the Direct Drum feed system:

Cyanide Solutions

Monomers	Chlorosilanes	Grignard Reagents
Metal Chlorides in solution	Strong Acids	Amines
Various water reactive materials		

Many of these materials have a metal content that will restrict the flow rate to the lance. For example cyanide solution may contain silver or chromium cyanide from metal plating operations. The concentration of these waste streams is typically limited so as not to exceed the hourly feed restriction.

3.3 Solid Waste Feeds

Solid wastes are fed into the incinerator through a common feed chute from three different sources: containerized material, the skip hoist, and the bulk solid pits.

The containerized material consists of drums, over packs, boxes, buckets, and cans. This material is either prepared in the container processing area for incineration or is incinerated as it is received. This material is placed onto a conveyor carriage where it is transported to the front wall of the kiln. Each container is pushed onto a short roller conveyor and then enters the drum pre-chamber. Once the container is inside the pre-chamber, an inner door to the kiln opens, and the container is pushed down the feed chute.

The skip hoist is used for material that is placed inside of a one cubic yard, metal container. This container is lifted to the fourth floor of the incinerator feed building where it is automatically placed onto a tipper assembly. The tipper then inverts the container over the bulk solid feed chute and deposits the material onto a set of inner doors. Once the outer doors have closed, the inner doors open allowing the skip hoist material to feed down the chute into the incinerator.

Bulk solid material is accumulated in two bulk solid pits. This material is placed into these pits from a variety of containers including drums, boxes, waste sacks, roll-off boxes, and dump trailers. These solids are then fed to the feed chute using a clamshell crane. The solids are dropped from the crane onto a set of inner doors. Once the outer doors have closed, these inner doors open allowing the solids to feed down the chute to the incinerator.

3.4 Process Vent Streams

The process vent system is supplied by the waste storage and waste processing areas throughout the facility. The waste storage areas include the organic tank farm, the pump-out tanks, the drum warehouse, and the bulk solids pits. The process areas include the external truck wash, the drum sampling area, the drum splitting area, the drum pump-out area, the drum extruder, the two direct tanker feed bays, and the direct drum feed system. Drawing No. 1-06-2-31202, which shows the vent systems air flow being fed to the kiln, is included in **Appendix B**.

3.5 Supplemental Fuels

There are two supplemental fuels that are used in the incineration process – fuel oil and natural gas. There is a gas burner present at the front wall of the rotary kiln that is used during heat up and cool down periods and when incineration conditions require additional fuel. The supplemental fuel oil is fed to the organic lance from a dedicated fuel tank in the tank farm and is used during heat up and cool down periods and to maintain temperature while waste is not being fed to the kiln. Typical fuel properties are noted in **Tables 3-1 and 3-2**.

Gas burners are also present in the SCC. However, these burners are no longer in use and will not be used during this CPT or any subsequent operation of the incinerator without prior notification to the regulatory agencies.

Table 3-1 Typical Properties for Supplemental Fuel Oil

Parameter	Units	Value	Parameter	Units	Value
Heat Value	Btu/lb	> 17,000	Chromium	ppm	2.0
Ash Content	% wt	< 5.0	Lead	ppm	< 20
Chloride Content	% wt	< 2.0	Mercury	ppm	N/A
Antimony	ppm	< 1.0	Nickel	ppm	< 10
Arsenic	ppm	< 1.0	Selenium	ppm	< 0.1
Barium	ppm	< 2.0	Silver	ppm	< 0.1
Beryllium	ppm	< 2.0	Thallium	ppm	< 0.05
Cadmium	ppm	< 5.0			

Table 3-2 Typical Properties for Natural Gas

Component	Units	Value	Component	Units	Value
Methane	mole %	94.428	Heptanes	mole %	0.019
Ethane	mole %	3.081	Octanes	mole %	0.005
Propane	mole %	0.582	Nitrogen	mole %	0.703
Isobutane	mole %	0.087	Carbon Dioxide	mole %	0.824
N-butane	mole %	0.129	Helium	mole %	0.014
Isopentane	mole %	0.040	Hydrogen	mole %	0.023
N-pentane	mole %	0.032	Argon	mole %	0.0
Hexanes	mole %	0.029	Oxygen	mole %	0.004
Parameter	**Units**	**Value**	**Parameter**	**Units**	**Value**
Heat Content, gross, dry	Btu/CF	1040.5	Relative Density	-	0.592
Heat Content, gross, sat.	Btu/CF	1023.6	Wobbe Index	-	1330

4.0 Performance Test Protocol

4.1 General Description

This CFPT Plan has been designed to confirm compliance with the dioxin/furan emission standard while the incinerator operates under normal operating conditions. These operating conditions will be within the range of the average level from the minimum level to the maximum that is allowed.

4.2 Applicable Performance Standards

The CPT for the WTI incinerator has been designed to demonstrate compliance with current performance standards of the Hazardous Waste MACT rule as follows:

- Conformance with the PCDD/PCDF emission limit of 0.20 ng/dscm corrected to 7% oxygen, expressed as toxic equivalents (TEQ);

4.3 Operating Conditions for the CFPT

This CFPT will be conducted under normal operating test conditions for the following parameters presented in **Table 4-1**. The table presents the parameter average, minimum and maximum values which will be used as the range of operation for these parameters during the test. Table 4-1 displays the average, minimum, maximum, and std. dev. of WTI's operating parameters over the past 12 months. The average values were determined by the sum of the hourly rolling average values recorded (each minute) over the previous 12 months, divided by the number of rolling averages recorded during that time. This data was constructed from system operating records logged when the unit was conducting waste operations.

4.4 Description, Preparation and Delivery of Feeds for the CPT

To the extent possible only normal waste materials processed at the facility will be fed to the incinerator during the test program. Pumpable waste materials will be stockpiled in appropriate feed tanks to meet the objectives for the target parameters. In order to ensure that appropriate solid materials are fed, drummed waste will be characterized in advance of the test and kept until needed. All waste materials will be delivered to the kiln in accordance with routine operation and currently permitted procedures as described elsewhere in this document.

4.5 Anticipated Test Schedule

This CPT is expected to take place over a 3-day period using a three-person field crew according to the schedule shown in **Table 4-2**. For this program, it is anticipated that all runs will be approximately three hours in duration, as dictated by the sample run time required for PCDD/PCDF measurements. The CFPT program for this incinerator is tentatively scheduled for the week of **July 16, 2012.**

4.6 CPT Reporting

The final report will be prepared for submittal no later than 90 days from completion of the field test program. This document will provide a concise presentation of performance test results and will include all necessary supporting documentation. An example outline of the final CFPT report / Notification of Compliance is presented below:

Section 1.0 Certification – Includes project title, statement of compliance and project approval signatures

Section 2.0 Summary of Test Results – Summary of emission results compared to applicable standards; interim status operating limits; overview of process operating conditions; and PET audit results and conclusions

Section 3.0 Project Overview – Facility and unit description; project background and scope; test requirements; test chronology and report organization

Section 4.0 MACT Notification of Compliance – Regulatory requirements; performance test results and compliance determination; area or major source determination; description of air pollution control system; and description of process monitoring systems

Section 5.0 Process Operating Conditions – Overview of test conditions and summary of facility process monitoring data

Section 6.0 Sampling and Analytical Program Overview – Summary of proposed plans and discussion of actual activities and any required deviations from plan

Section 7.0 Test Results – Detailed presentation of waste analysis and stack sampling results including tabulated presentation of all data

Section 8.0 Quality Assurance / Quality Control – Detailed discussion of waste and stack sampling and analytical QA/QC procedures and results

APPENDICES
A – Facility Process Monitoring Data
B – CMS Performance Evaluation Test Results
C – Field Sampling Documentation
D – Analytical Data Reports

Table 4-1 Operating Parameters for the CFPT Normal Operating Condition

Process Parameter	Tag ID	Units	MACT OPL	Average[1]	Minimum	Maximum	St. Dev.
Maximum Total Waste Feed Rate	WQI-9000F	lb/hr	35,069	17,427	548	33,313	3,727
Maximum Pumpable Waste Feed Rate	WQI-9000T	lb/hr	29,926	10,359	499	20,945	2,818
Maximum Ash Feed Rate	WQI-9000AH	lb/hr	10,333	3,107	439	6,183	938
Maximum Total Chlorine Feed Rate	WQI-9000CL	lb/hr	2,032	630	49	1,663	265
Maximum Total LVM Feed Rate	WQI-9000LV	lb/hr	400	11.8	0.2	155.9	17.3
Maximum Total Pumpable LVM Feed Rate	WQI-9000PLV	lb/hr	400	11.8	0.2	155.9	17.3
Maximum Total SVM Feed Rate	WQI-9000SV	lb/hr	83.2	8.4	0.2	49.2	7.0
Maximum Total Mercury Feed Rate	WQI-9000M	lb/hr	0.14	0.036	0.003	0.133	0.026
Maximum ESP Inlet Temperature	TI-6002	°F	424	400	352	426	3
Maximum ESP Power Input to each Field	EI-6700, 6710, 6720	mA	100	453	105	495	55
Maximum Kiln Temperature	TI-4300	°F	1,718	1,889	1,760	2,140	57
Minimum SCC Temperature	TI-4310	°F	1,747	1,945	1,758	2,165	60
Maximum Process Gas Flowrate	FI-7510	wet scfm	67,505	57,318	45,764	64,997	2,215
Minimum Carbon Feed Rate – Location 1	WI-7003	lb/hr	[redacted]	[redacted]	[redacted]	[redacted]	1
Minimum Carbon Feed Pressure – Location 1	PI-5732	psig	3	5.4	3.2	7.3	0.9
Minimum Carbon Feed Rate – Location 2	WI-7002	lb/hr	[redacted]	[redacted]	[redacted]	[redacted]	1
Minimum Carbon Feed Pressure – Location 2	PI-7132	psig	3	7.4	3.3	10.6	1.5
Minimum Ring Jet Pressure Drop	DPI-7401	in. w.c.	28	33	28	40	2
Minimum Scrubber (1st & 2nd Packed Bed) Liquid Flowrate	FQI-7201	gpm	1,287	1,908	1,338	2,636	242

Process Parameter	Tag ID	Units	MACT OPL	Average[1]	Minimum	Maximum	St. Dev.
Minimum Scrubber (1st & 2nd Packed Bed) Combined Pressure Drop	DPT-7207, 7307	in. w.c.	1.3	3.6	1.5	11.7	1.6
Minimum Scrubber (Ring Jet) Liquid Flowrate	FI-7404	gpm	446	649	491	1,025	65
Minimum Scrubber (Ring Jet) Blowdown	FI-7403	gpm	19.5	45	19	100	11
Minimum Scrubber (Ring Jet) Sump Level	LIC-7401	ft	1.7	2.2	1.7	3.0	0.1
Minimum Scrubber (3rd Stage) Liquid pH	AI-7307	pH units	7.6	8.4	7.6	10.2	0.3
THC[2] Concentration @ 7% O2	AI-7851	ppm	10	0.7	0.0	18.4	1.4

[1] The average values were determined by the sum of the hourly rolling average values recorded (each minute) over the previous 12 months, divided by the number of rolling averages recorded during that time. This data was constructed from system operating records logged when the unit was conducting waste operations.

[2] Though the average THC value for the 12-month period is 0.7 ppm, it would be difficult for WTI to maintain a THC concentration between this average value and the allowable limit for the CfPT. THC is the result of poor combustion. WTI attempts to achieve proper combustion at all times with a goal of zero THC emissions. WTI will operate in such a manner during the CfPT which will likely result in THC concentrations less than 0.7 ppm. To account for this, an alternative operating range request in accordance 40 C.F.R. 63.1207(g)(2)(v) has been submitted to EPA.

Table 4-2 Anticipated CPT Schedule

General Overview of Planned Schedule

Activity	Schedule
Mobilization, site safety training and equipment set-up	Day 1 (Monday, July 16th, 2012)
Finalize Setup, Preliminary Traverse, Conduct Run1 PCDD/PCDF	Day 2 (Tuesday, July 17th, 2012)
Conduct Run 2 and Run 3 PCDD/PCDF	Day 3 (Wednesday, July 18th, 2012)
Prepare samples for shipment and ship to all labs. Equipment demobilization and site departure	Day 4 (Thursday, July 19th, 2012)

Example of Detailed Daily Schedule (Day 3 Above)

Test Activity	Time
Incinerator lined out on wastes	06:30
Test Crew On-site	07:00
Initiate all stack sampling and waste sampling	08:00
Approximate end time for all sampling runs	16:30
Recovery of sampling trains..	16:30 - 18:30
Depart Site	19:00

Table 4-3 Target Waste Feed Rates

Anticipated Waste Feeds for CfPT

Process Parameter	Units	Target	Feed
Waste Feedrates		Feed Rate	Source
High Btu Liquids Lance	lbs / hr	1,500	ST-4 or ST-5
Organic Liquids Lance	lbs / hr	1,000	ST-2
Aqueous Liquids Lance	lbs / hr	4,000	ST-12 or ST-13
Sludge Lance	lbs / hr	4,000	ST-6 or ST-7
Secondary Sludge Lance	lbs / hr	-	Direct Drum Pump
Slurry Lance	lbs / hr	2,000	Direct Tanker
Total Pumpable Waste	**lbs / hr**	**12,500**	**Combined Sources**
Bulk Solids	lbs / hr	6,000	Bulk Pit #2
Drummed Waste	lbs / hr	2,000	Containers
Total Solids Waste Feed	**lbs / hr**	**8,000**	**Combined Sources**
Total Waste Feed	**lbs / hr**	**20,500**	**Combined Sources**
Constituent Feed			
Total Ash	lbs / hr	2,400.00	Combined Sources
Total Chlorine	lbs / hr	1,200.0	Combined Sources

5.0 Sampling and Analytical Program Quality Assurance/Quality Control

This section presents the Quality Assurance and Quality Control goals, objectives, and procedures for the MACT CFPT program. The quality assurance/quality control procedures and criteria for this program will comply with the requirements of this document and its updates. The analytical work conducted will incorporate the QA/QC requirements of the approved methods. This document has been prepared using available guidance provided in the following EPA documents:

- "EPA Requirements for Quality Assurance Project Plans", EPA QA/R-5, November 1999.
- "Component 2 - How to Review a Quality Assurance Project Plan (including Attachment A - Generic Trial Burn QAPP", Hazardous Waste Combustion Unit Permitting Manual, U.S. EPA Region 6, January 1998.
- "Handbook – Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration" (EPA/625/6-89/023 January 1990).

Quality Assurance Project Plan for WTI's MACT CFPT Plan on the Rotary Kiln Incineration System

Facility ID Numbers: Title V Permit No. 02-15-02-0233; RCRA ID No. OHD 980 613 541

Prepared for: Heritage-WTI, Inc., 1250 St. George St., E. Liverpool, OH 43920

Prepared by: AECOM, Inc.,Chelmsford, MA 01824

Revision No.: 0

Date: May 2012

5.1 Title Page

5.1.1 Project Title

Quality Assurance Project Plan for WTI's MACT CFPT on the Rotary Kiln Incineration System

5.1.2 Expected CFPT Date

July 2012

5.1.3 Project Approvals

WTI Project Manager — May, 2012 Date

AECOM Project Manager — May, 2012 Date

AECOM QA Officer — May, 2012 Date

Vista Analytical Lab Services Coordinator — May, 2012 Date

5.2 Table of Contents

A complete table of contents, including listings of tables and figures and acronyms is presented at the beginning of this CFPT Plan and includes all pertinent information applicable to this QAPP section.

5.3 Project Description

This project will consist of a straightforward sampling and analysis program designed to demonstrate compliance with the HWC MACT rule standard for PCDDs/PCDFs. Testing will be performed under one (1) normal process operating condition, entailing triplicate sampling runs. The reader is referred to Sections 1.3, 1.4, 2.5.3 and 4.0 for further details on program scope, test objectives and target parameters for emission measurements and process monitoring. The remainder of this section outlines the detailed measures that will be followed to ensure collection of valid data. A brief overview of the measurements to be made during each test condition is provided in **Table 5-1**. A more detailed summary of the sampling and analytical program is provided later in Section 5.6.

5.4 Project Organization

The AECOM Project Manager, Mr. David Moll will be responsible for the overall direction of this program and will report to the WTI Project Manager, Mr. Vince Waggle. Mr. Moll will be responsible for project design and implementation, communicating with the client, scheduling all activities, reviewing all project data and preparing all reports. He will be assisted in the oversight of Quality Assurance activities by the program Quality Assurance Officer (QAO) and each Analytical Laboratory Services Coordinator (LSC). Each contract laboratory will have one individual designated as the person responsible for project activities.

5.4.1 QA Officer's Responsibilities

Mr. Douglas Roeck will serve as the project Quality Assurance Officer (QAO) and will be responsible for review and approval of the Quality Assurance Project Plan presented in this section, as well as any subsequent revisions. He will monitor implementation of field and laboratory activities, scheduling performance and/or system audits as warranted. The QAO will report to the Project Manager on any conditions noted which may adversely affect data quality.

Mr. Roeck will provide independent oversight for data verification and data quality assessment activities. He will prepare a section for the Final Report summarizing QA/QC activities and provide an overall evaluation of data quality.

5.4.2 Laboratory Coordinator Responsibilities

Each analytical laboratory will designate a Laboratory Services Coordinator (LSC), who will be the principal point of contact for the AECOM Project Manager. The LSC will review QA requirements with all laboratory staff to ensure that all required measures are taken to meet data quality objectives. They will monitor the shipment and receipt of samples, track analytical progress and review data as reported from the laboratories for completeness. Ms. Martha Maier will serve as the LSC for Vista Analytical Laboratories in El Dorado Hills, CA.

Each LSC will be responsible for validation of all data generated by the laboratory for this program and will provide all necessary documentation for inclusion in the final report.

5.5 QA/QC Program Objectives

5.5.1 Precision, Accuracy and Completeness

The collection of data to fully characterize the incinerator waste feed materials and stack gas emissions requires that sampling and analysis procedures be conducted with properly operated and calibrated equipment by trained personnel. QA objectives for measurements made in the field are summarized in **Table 5-2**. QA objectives specific to each analytical methodology performed by the subcontractor laboratories are presented later in Section 5.9. The overall program has been designed with consideration of sampling parameters and analytical limits to ensure that the achieved MDLs for emissions will be more than adequate for regulatory limit decisions. Critical MDL determinations are addressed subsequently in Section 5.5.3.

Precision is defined as a measurement of mutual agreement among individual measurements made under prescribed similar conditions. Precision is expressed in terms of relative percent difference (RPD) between duplicate determinations and in terms of relative standard deviation (RSD) when 3 or more determinations are made. Overall precision for analysis of the waste feed streams will be assessed through the analysis of one set of duplicate samples for each designated parameter.

Accuracy is the degree of agreement of a measurement with an accepted reference or true value. Analytical accuracy will be measured through the recoveries of surrogate spikes, matrix spikes, analysis of standard reference materials or audit sample analysis. Surrogates are compounds added to samples submitted for organic analyses prior to extraction and analysis; their recoveries are measured to assess sample-specific analytical efficiency and accuracy. Matrix spike samples for the waste feed will be prepared by spiking known amounts of target analytes into a portion of the sample. Matrix spike samples for the stack organic analyses will be prepared by spiking known amounts of target analytes into the sampling media and then carrying the spiked sample through the entire preparation and analysis sequence. Recoveries are monitored to assess laboratory and method accuracy. Laboratory control samples (LCS) will also be used to distinguish between method performance and matrix effects on accuracy. LCS and MS spiking solutions will be independent from calibration standards.

Completeness is a measure of the amount of valid data obtained compared to the amount that was expected under normal conditions. The overall program objective is to obtain valid data for three (3) runs for each test condition. For all data considered critical to the investigation, a completeness objective of 100% has been established. As a result, critical priority data from each of three (3) runs should achieve the precision and accuracy goals established herein. This completeness criterion applies to all permit parameters in emissions samples as well as feed/process stream samples. Individual samples for which the critical data points do not achieve accuracy and/or precision data quality objectives may require reanalysis. Results for samples where matrix interferences preclude meeting objectives for the recoveries of surrogates or spikes will be evaluated for potential bias to calculated emission results. In summary, the completeness goals are stated at 100%, since three valid runs are necessary to assess operation at any one condition.

5.5.2 Representativeness and Comparability

It is recognized that the usefulness of the data is also contingent upon meeting the criteria for representativeness and comparability. Wherever possible, reference methods and standard sampling procedures will be used. The QA objective is that all measurements be representative of the matrix and operation being evaluated. The detailed requirements for sampling given in the various EPA Reference Methods will be followed to ensure representative sampling of flue gases. The frequent grab sampling of incinerator feed and process streams during each test run will provide representative samples of these matrices.

The corresponding QA objective is that all data resulting from sampling and analysis be comparable with other representative measurements made by the CPT field team, on this or a similar process operating under similar conditions. The use of published sampling and analytical methods and standard reporting units will aid in ensuring the comparability of the data.

5.5.3 Method Detection Limit (MDL) Determinations

Method Detection Limits (MDLs) for the various analytes to be measured in this program will be determined following well-established laboratory procedures in accordance with standard EPA protocols. These are described below for those parameters deemed most crucial to the program.

5.5.3.1 PCDDs/PCDFs - Methods 0023A/8290

In accordance with EPA Methods 23 (40 CFR Part 60 Appendix A Method 23), SW-846 Methods 0023A and 8290, sample specific method detection limits (MDLs) are calculated using the following formula:

$$MDL = [2.5^* H_n^* Q_{IS}] / [H_{IS}^*W^*RRF]$$

where: 2.5 = the minimum signal to noise ratio

H_n = Height of the native (noise height, peak to peak)

Q_{IS} = the quantity, in pg, of internal standard added to the sample

H_{IS} = the peak height of the internal standard

W = the weight or volume of the sample

RRF = relative response factor from initial calibration

5.6 Sampling and Monitoring Procedures

This section describes the procedures that will be followed during the field sampling program. Throughout the overall program, all sampling will be performed using sampling protocols described herein and approved by EPA. Regulatory agency approval will be obtained for any deviations from or changes to the approved CFPT Plan which may be warranted prior to program implementation as a result of changes in personnel or facility circumstances. If situations occur during the demonstration testing which necessitate deviations from the plan, the agency will be notified and onsite approval requested. Any deviations from the specified protocols will be fully documented in the final CPT Report / Notification of Compliance.

5.6.1 Field Program Description

A detailed description of the compliance strategy and test conditions was provided previously in Section 4.0. In general, however, the program is presently configured to collect samples during three runs for the normal process operating condition. **Table 5-3** provides a detailed listing of the sampling and analytical parameters and methods planned for this program. All sampling will be conducted concurrently at the outlet stack location.

5.6.2 Pre-sampling Activities

Pre-sampling activities include equipment calibration, sample media preparation, cleaning of sample train glassware, preparation of computer-generated sample labels, and other miscellaneous tasks. Each of these activities are described or referenced in the following subsections. Other pre-sampling activities include such details as team meetings, equipment packing and shipment, equipment setup, and finalization of all details leading up to the coordinated initiation of the sampling program.

5.6.2.1 Equipment Calibration

A most important aspect of pre-sampling preparations is the inspection and calibration of all equipment planned to be used for the field effort. Equipment is inspected for proper operation and durability prior to calibration. Calibration of equipment is conducted in accordance with the procedures outlined in the EPA document entitled "Quality Assurance Handbook for Air Pollution Measurement Systems; Volume III—Stationary Source Specific Methods" (EPA-600/4-77-027b). Equipment calibration is performed in accordance with EPA guidelines and/or manufacturer's recommendations. Documentation of all calibration records will be kept in the project file during the field program and will be available for inspection by test observers. Examples of field equipment used and typical calibration requirements follow:

- **Probe nozzles** (QA Handbook Section 3.4.2, pg. 19) - make three measurements of the nozzle ID (to the nearest 0.001 in.) using different diameters with a micrometer. Difference between the high and low values should not exceed 0.004 in. Post-test check - inspect for damage.

- **Pitot tubes** (QA Handbook Section 3.1.2, pp. 1-13) - measured for appropriate spacing and dimensions or calibrate in a wind tunnel. Rejection criteria given on the calibration sheet. Post-test check - inspect for damage.

- **Thermocouples** (QA Handbook Section 3.4.2, pp. 15-18) - verify against a mercury-in-glass thermometer at two or more points including the anticipated measurement range. Acceptance limits - impinger ±2°F; DGM ±5.4°F; stack ±1.5 percent of stack temperature.

- **Dry gas meters** (QA Handbook Section 3.4.2, pp. 1-12) - calibrate against a wet test meter. Acceptance criteria - pretest Yi = Y ± 0.02; post test Y = ± 0.05 Yi.

- **Field barometer** (QA Handbook Section 3.4.2, pp. 18-19) - compare against a mercury-in-glass barometer or use Airport Station BP and correct for elevation. Acceptance criteria - ± 0.02 in. Hg; post-test check - same.

5.6.2.2 Glassware Preparation

Sample train glassware and sample containers require specialized pre-cleaning to avoid contamination of the sample from the collection container or devices. Cleaning/storage procedures for sample train glassware are summarized below. Note that all bottle caps are fitted with teflon liners which are cleaned in the same manner as the bottles themselves. Sample containers used for waste feed streams are purchased pre-cleaned and sealed to specified EPA protocols.

- **EPA Method 0023A glassware and containers (PCDDs/PCDFs)** - wash with soap and water, rinse three times with deionized (DI) water, bake at 400°C for 2-hours, rinse three times with pesticide grade methylene chloride, rinse three times with pesticide grade toluene and air dry. Open ends will be sealed prior to shipment to the field with brand new aluminum foil that is free of any potential contamination.

5.6.2.3 Sample Media Preparation

All reagents will be checked in accordance with AECOM's existing QC Program to minimize the probability of using contaminated solvents. This includes the use of the proper grade reagents/solvents as specified in the test method, selection of reagents from the same lot and the collection and analysis of the appropriate blanks. Sampling media will be procured and prepared in accordance with the appropriate test methods as described below:

- **XAD resin** is purchased new and packed in specially designed sorbent traps. All glass cleaning and sorbent packing procedures will follow the protocols specified in EPA Methods 0023A.

- **Glass filters** used in the Method 0023A sampling train are purchased from Pallflex Products Co. with designated technical specifications and efficiency ratings.

5.6.2.4 Other Pre-Sampling Activities

Sample team meetings will be held to designate responsibilities to each team member. Assignments will be based on individual experience and relative importance of the assigned task. Other pre-sampling activities in the office will include generation of sample checklists, printing of computer-generated sample labels, and proper packing of all equipment. Equipment will then be transported by freight or truck to the sampling location.

Site setup is the final pre-sampling activity. This task will involve moving the equipment to the vicinity of the sample collection area. A separate office trailer or other suitable onsite facility will be used to serve as a sample train setup and recovery area and sample custody area.

Normally, preliminary tests are conducted at the stack location to verify the presence or absence of cyclonic flow conditions and to determine flue gas moisture, temperature and velocity. These measurements facilitate determination of nozzle size selection and sample train operation rates for the isokinetic sampling trains. However, extensive past testing at the facility eliminates the need for such preliminary measurements on the WTI stack.

5.6.3 Sampling Locations

5.6.3.1 Waste Feed Streams

Waste feed materials will be sampled in accordance with the facility's feed stream analysis plan (FSAP). Waste feed sampling will occur upstream of any POHC or metal spiking location. Taps in the feed lines will be used to access feed streams. Samples will be collected using methodologies described in the FSAP.

5.6.3.2 Stack Sampling Location

Gaseous emissions samples will be collected from test ports that meet the minimum criteria specified in EPA Method 1. Test ports located on stack level 2 will be used to accommodate simultaneous testing of all emissions test parameters. **Figure 5-1** provides a schematic of the stack showing the location of the sampling ports and the upstream/downstream distances from flow disturbances. This schematic drawing also provides a schematic of the traverse point locations applicable to the isokinetic sampling trains as well as key stack parameters needed to select the appropriate size sampling nozzle. It should be noted that a new stack is being installed in June 2009 and two new drawings (D08-51-S1-0 and D08-51-S3A-0) are included in **Appendix B**.

5.6.4 Waste Feed Stream Sampling Procedures

Each waste feed material fed during the test will be sampled from taps in the feed lines or other appropriate locations. The waste feed streams will be sampled in accordance with the procedures and methodologies currently described in the facility's FSAP. The waste feed materials will be characterized in advance of the CFPT and the analytical results will be incorporated into the final report.

The feed streams will be characterized for total chlorine. WTI will be responsible for all waste feed analyses.

For solid waste feed streams, a sample from each container fed to the kiln will be collected and analyzed separately. For bulk solids feeds, each container that is placed into the bulk solids pits will be collected from the front, middle, and back of each container. Due to the variability of solid waste, each sample will be analyzed separately. The results of these individual samples will be averaged to represent the material that is being fed to the incinerator during the CFPT from the bulk solid pits. This is the same procedure currently used during normal operation.

5.6.5 Stack Sampling Methodologies

Gases discharged from the exhaust stack will be sampled by AECOM for the following parameters:

- Flue gas velocity, flow rate, temperature, moisture content and fixed gas (O_2 and CO_2) composition; and
- PCDDs/PCDFs.

The following sections provide summaries of the sampling methodologies to be followed. In addition, sample field data sheets to be used during the program are provided in **Appendix C.** Summaries of relevant information pertaining to setup and recovery of each isokinetic sampling train are provided in **Appendix D.**

5.6.5.1 Gas Stream Velocity, Moisture and Fixed Gases

Gas stream flowrate, moisture and fixed gas concentration will be determined concurrent with the isokinetic sampling train (Methods 0023A). Gas stream velocity will be determined using a pitot tube and water manometer in accordance with EPA Method 2. Gas stream temperature will also be determined at each of the Method 2 traverse points using a Type "K" thermocouple and pyrometer. Gas stream moisture will be will be determined as specified in EPA Method 4 concurrent with the isokinetic sampling methods. In this procedure the impinger contents are measured or weighed before and after each test run and used in conjunction with the metered gas volume to determine the gas stream moisture content. Fixed gases (O_2 and CO_2) for gas stream molecular weight determination and constituent oxygen correction will be determined in accordance with EPA Method 3 during each test run.

5.6.5.2 PCDDs / PCDFs

Method 0023A will be used to sample for all target PCDD / PCDF parameters. Specific sampling details for the sampling train are as follows:

- Target sampling rate - 0.75 cfm
- Sample run time - 3-hr
- Minimum sample volume required - 2.5 dscm
- Number of sampling points per stack traverse - 6
- Total number of sampling points - 12
- Number of field reagent blank sets collected - 1

5.6.5.3 Oxygen Determination and Facility CEMS

AECOM will provide measurement of oxygen (O_2) and carbon dioxide (CO_2) throughout all test run periods. These parameters will be measured using the procedures specified in 40 CFR 60, Appendix A, Method 3 (Orsat analysis). These test results will be used to calculate stack gas molecular weight and to correct measured emission results to to 7% oxygen.

WTI will provide continuous emission monitoring for a variety of other CEM parameters including total hydrocarbons (THC) corrected to 7% oxygen in accordance with existing MACT compliance requirements. These data will be collected in accordance with Revision 6 (March 4, 2005) of WTI's Quality Assurance Plan for the CEMS. A CEMs audit will be conducted within one month of the CPT test. WTI will correct their THC results using their O_2 monitoring data.

5.7 Sample Handling, Traceability and Holding Times

Sample integrity will be maintained throughout all phases of the sampling and analysis program. Samples will be held within sight of the samplers or sample custodian, or will be kept in sealed or secured containers at all times. Sealed coolers and DOT shipping boxes will be used to ship samples to the designated laboratory via Priority 1 overnight FedEx service.

Preprinted sample identification labels are used by AECOM to ensure that all required information is fully documented. When sample batches are shipped to the specified laboratory, a sample packing list (see **Figure 5-2**) accompanies the shipment. This form is based on established laboratory format and will be used to document sample transfer in the field and from sampling personnel to the laboratory.

The AECOM Field Team Leader will coordinate the packing and shipment of all samples. Worksheets specifically designed for this program will be generated prior to the field effort. These sheets will assist the Field Team Leader in assuring that all samples have been collected, accounted for and shipped under sample traceability documentation to the appropriate laboratory. Requirements pertaining to sample preservation and recommended holding times are noted in **Table 5-4**. All materials such as field and laboratory notebooks and logbooks, field and laboratory data records, correspondence, reports, sample tags, traceability records and instrument printouts will be clearly labeled with the project number and become a permanent part of the project file. Project samples will be disposed of in an appropriate manner 60 days after acceptance and approval of a final report. All project-related documentation at both AECOM and the subcontractor laboratories will be kept on file for 2 years following submittal of the final report.

5.8 Analytical Methods and Calibration Procedures

This section delineates the analytical protocols that will be used to analyze samples during this CFPT. Samples of waste feed materials and stack gas will be collected and analyzed for the parameters previously discussed using the appropriate laboratory protocols detailed in this section and as outlined previously in **Table 5-3.**

5.8.1 Total Chlorine Analysis of Waste Feed Streams

5.8.1.1 Chemical and Physical Properties of Waste Feed Streams

Analyses to determine the chemical and physical properties of the waste feed materials will be performed using appropriate ASTM or EPA SW-846 analytical methods as outlined in the Heritage-WTI FSAP. Quality assurance requirements for the determinations of chemical and physical properties of the waste feed materials are summarized in **Table 5-5.**

5.8.1.2 Reporting of Values Below Detection Limits

Analyses returning a result less than that of the specified instrument or method detection limit will be recorded as one-half of the detection limit. For example, if the detection limit is 10 and the analysis returns a result of less than 10, then a value of 5 will be recorded and used for any subsequent feed rate calculations related to this project.

5.8.2 Analysis of Stack Gas Samples

5.8.2.1 Stack Gas - Analysis for PCDDs/PCDFs

Stack flue gas samples collected using the Method 0023A sampling train will be analyzed for polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDDs/PCDFs). Each M0023A train will be prepared and split appropriately for analyses for PCDDs/PCDFs: separate front-half and back-half analyses will be done in accordance with Method 0023A.

Briefly, the XAD and filter will be spiked with internal standards and then sequentially extracted with methylene chloride and toluene. Method 0023A analyses (which include high resolution GC/MS as per EPA Method 8290) incorporate five isotopically labeled PCDD and PCDF field surrogates and nine labeled PCDD/PCDF internal standards. The field surrogates are spiked into the XAD resin prior to field sampling; their recoveries are monitored to assess overall method accuracy and precision. The internal standards are added at a level of 2,000 pg/sample prior to Soxhlet extraction. These internal standards are used for direct quantification of all surrogate and native PCDD/PCDF species. The addition of these standards prior to the extraction and cleanup procedures permits internal correction for any losses of target analytes that might occur during the preparation steps.

Method 8290 details instrument tune, GC column performance and instrument calibration requirements for the analysis of stack gas samples by high resolution gas chromatography/high resolution mass spectrometry. Instrument calibration will be performed for all 15 2,3,7,8- substituted PCDD and PCDF isomers; data will be reported for each of these target analytes and for the total dioxins and total furans at each level of chlorination from Cl_4 through Cl_8.

QA/QC requirements for these analyses are summarized in **Table 5-7**.

5.9 Internal QA Program

Quality control checks will be performed to ensure the collection of representative samples and the generation of valid analytical results for these samples. These checks will be performed by project participants throughout the program under the direction of the Project Manager and the QA Officer.

5.9.1 Data Collection and Sampling QC Procedures

QC checks for the process data collection and sampling aspects of this program will include, but not be limited to, the following:

1. Use of standardized data sheets, checklists and field notebooks to ensure completeness, traceability, and comparability of the process information and samples collected.
2. Field checking of standardized forms by the Field Team Leader and a second person to ensure accuracy and completeness.
3. Strict adherence to the sample traceability procedures.
4. Submission of field biased blanks.
5. Leak checks of sample trains before and after sample collection and during the test, when appropriate.

5.9.1.1 Sampling Equipment QC Checks and Frequency

Calibration of the field sampling equipment will be performed prior to and at the conclusion of the field sampling effort. Copies of the calibration sheets will be available onsite during the field sampling program for inspection, will be kept in the project file and will be submitted in the final report. Calibrations will be performed as described in the EPA publication "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods;" Section 4.2.1 presents acceptance limits.

Leak checks of the sample trains will be conducted in accordance with the protocol called out for each method. Leak checks will be conducted prior to and at the end of sample collection and during the test run, when appropriate.

5.9.1.2 Sample Collection QC Checks

Field-biased blanks of reagents and collection media (deionized water, filters, impinger solutions, etc.) will be placed in appropriately cleaned and sized sample containers in the field and handled in the same way as actual field samples, to provide a QC check on sample handling.

For this program, sample collection QC checks and frequency for samples to be analyzed in the laboratory are listed below:

- One field reagent blank Method 0023A sampling train.

5.9.2 Analytical QC Procedures for Samples to be Analyzed in the Laboratory

The Quality Control program for laboratory analysis makes use of a number of different types of QC samples to document the validity of the generated data. The following types of QC samples will be used during the program.

5.9.2.1 Quality Control Samples and Blanks

Method Blanks

Method blanks contain all the reagents used in the preparation and analysis of samples and are processed through the entire analytical scheme to assess spurious contamination arising from reagents, glassware, and other materials used in the analysis.

Calibration Check Samples

One of the working calibration standards which is periodically used to check that the original calibration is still valid.

Laboratory Control Samples (LCS) or Blank Spikes

These samples are generated from spikes prepared independently from the calibration concentrates. The LCS are used to establish that an instrument or procedure is in control. An LCS is normally carried through the entire sample preparation and analysis procedure also.

Surrogate Spikes

Samples requiring analysis by GC/MS are routinely surrogate-spiked with a series of deuterated analogues of the components of interest. It is anticipated that these compounds would assess the behavior of actual components in individual program samples during the entire preparative and analysis scheme. The percent recovery for each surrogate will be calculated in accordance with method-specific procedures. Any values which fall outside the target QC limits described in the applicable analytical method will be flagged. Some of these recovery values may be outside the QC limit owing to matrix interferences. The following guidelines will be used:

1. All recovery data are evaluated to determine if the QC limits are appropriate and if a problem may exist even though the limits are being achieved (e.g., one compound that is consistently barely within the lower limit).

2. Any recovery data which are outside the established limits are investigated. This evaluation will include an independent check of the calculation.

3. Corrective action will be performed if any of the following are observed:

   - All recovery values in any one analysis are outside the established limits, where one analysis is considered to be one sample analyzed by one method,

   - Over 10 percent of the values for a given sample delivery group are outside limits, or

   - One compound is outside the limits in over 10 percent of the samples.

An analysis batch is defined as a group of ten or fewer samples carried through the entire preparation and analysis procedure in one batch.

Reagents used in the laboratory are normally of analytical reagent grade or higher purity; each lot of acid or solvent used is checked for acceptability prior to laboratory use. All reagents are labeled with the date received and date opened. The quality of the laboratory deionized water is routinely checked. All glassware used in the sampling and analysis procedures will be pre-cleaned according to the method requirements. Standard laboratory practices for laboratory cleanliness, personnel training and other general procedures are used. The results of these quality control procedures will be included in the final report.

5.9.2.2 Quality Control of Sorbents

Sorbents used for the organic sampling trains are provided by the laboratory after QC verification has been performed following recommended procedures in each applicable method. Additional details on sample media preparation were provided previously in Section 5.6.2.3.

5.10 Data Reduction, Verification and Data Reporting

Specific QC measures will be used to ensure the generation of reliable data from sampling and analysis activities. Proper collection and organization of accurate information followed by clear and concise reporting of the data is a primary goal in all such projects.

5.10.1 Field Data Reduction

Appendix C of this CPT Plan presents the standardized forms that will be used to record field sampling data. The Field Team Leader and at least one other field crewmember will review the data collected from each train in its entirety in the field. Errors or discrepancies will be noted and dealt with accordingly. The Field Team Leader has the authority to institute correction actions in the field. The QA officer will also be notified for resolution if the situation warrants. At a minimum, the QA officer is apprised of all deviations from standard protocol. Field data reduction (checking of valid isokinetic sampling rate and other sampling parameters) is done with a laptop computer using standardized Excel spreadsheets. **Appendix D** provides sample train setup and recovery schematics and a description of solutions and reagents to be used in each isokinetic train required for the overall program. All sample recovery sheets will be checked for completeness.

5.10.2 Laboratory Analysis Data Reduction

Analytical results will be reduced to appropriate units by the laboratory using the equations given in the applicable analytical method. Unless otherwise specified, results from the analysis of waste feed and process samples for specific target constituents will be reported in units of mg/kg or % wt. Other parameters will be reported in standard units such as g/cc, Btu/lb, etc.

The laboratory typically reports results from the analysis of stack flue gas samples as total mass detected for the sample submitted. For those sample fractions where liquid impinger condensate is analyzed, the laboratory will measure the total liquid volume submitted and multiply by the measured concentrations of target analytes in these samples. The laboratories will generally report data as follows:

- PCDDs/PCDFs - total **pg** collected in each fraction (front-half and back-half)

The LSC will be responsible for reviewing all results and calculations and verifying the completeness of the data set. The laboratory reports submitted by each laboratory will include the following deliverables:

- Transmittal letter listing all samples and analyses and a case narrative identifying any difficulties associated with the analyses and any anomalous QA/QC results
- Copies of Chain of Custody Forms
- Sample Report forms with sample field and laboratory identifier, dates of sample preparation and analysis, analytical results and detection limits
- Method Blank results
- Matrix spike and matrix spike duplicate results (as applicable)
- Replicate sample analyses (as applicable)
- Laboratory Control Sample results

Reports for organics in will include the following additional information:

- Surrogate recoveries

- Summary of initial calibrations
- Continuing calibration summaries
- Instrument tunes

5.10.3 Data Verification

Data verification is the process of reviewing data and accepting, qualifying or rejecting it on the basis of method-specific criteria. The independent project QAO will use validation methods and criteria appropriate to the type of data and the purpose of the measurement. Records of all data will be maintained, even that judged to be an "outlying" or spurious value.

Field sampling data will be validated by the Field Team Leader based on a judgment of the representativeness of the sample, maintenance and cleanliness of sampling equipment and the adherence to an approved, written sample collection procedure.

Analytical data will be validated by the subcontractor laboratory QC or supervisory personnel using criteria outlined in their laboratory-specific QA Plan and/or written SOPs. Results from field and laboratory method blanks, replicate samples and internal QC samples will be used to further validate analytical results. Analytical results on field blanks and replicate field samples are valuable for validation of sample collection also. QC personnel will review all subcontractor laboratory raw analytical data to verify calculated results presented.

The following criteria will be used to evaluate the field sampling data:

- Use of approved test procedures
- Proper operation of the process being tested
- Use of properly operating and calibrated equipment
- Leak checks conducted before and after tests
- Use of reagents that have conformed to QC specified criteria
- Use of NBS traceable CEM calibration gases (as applicable)
- Proper chain-of-custody maintained
- All sample trains –check to ensure proper sample gas volume collected

The criteria listed below will be used to evaluate the analytical data:

- Use of approved analytical procedures
- Use of properly operating and calibrated instrumentation

- Precision and accuracy achieved should be comparable to that achieved in previous analytical programs and consistent with objectives stated in this document.

5.10.4 Final Data Reporting

Stack gas concentrations for each applicable parameter will be calculated from laboratory results and field sampling data. The total weight of the analyte detected will be divided by the volume of gas sampled to provide emission concentrations. For MACT compliance, all emission concentrations are further corrected to 7% oxygen for comparison to the published standards.

A complete Final Report outlining the goals, methods and results for the program will be prepared and any deviations from this test plan will be documented. The Final Report will include a section on evaluation and discussion of QA/QC results. Results will be compared to expected limits for accuracy, precision and/or completeness as targeted in this protocol. The final test report will also include the results of any internal audits conducted on the program as well as:

- All field data sheets showing sampling method, dates, run times, personnel, equipment; sample preservation, identification and compositing records.
- Field equipment calibration data.
- Analytical lab reports and relevant supporting documentation.

5.11 Routine Maintenance Procedures and Schedules

This section provides pertinent information for field sampling equipment as well as a listing of all critical facility equipment necessary to maintain permitted operating conditions and to demonstrate continuing permit compliance. Information is provided for preventive maintenance and schedules and spare parts for key equipment and instrumentation.

5.11.1 Field Sampling Equipment

The field team follows an orderly program of positive actions to prevent the failure of equipment or instruments during use. This preventive maintenance and careful calibration helps to ensure accurate measurements and minimal field delays.

All equipment that is scheduled for field use is calibrated as outlined previously in Section 5.6.2.1. Prior to each field use for a specific project, the equipment is cleaned and checked to ensure it is in good working order. An adequate supply of spare parts and sample train glassware is brought to each site to minimize downtime and field sampling delays. Any equipment that does experience problems is appropriately tagged in the field to ensure that it is repaired upon return to the office.

5.11.2 Facility Equipment and Instrumentation

During scheduled shutdowns, all waste feed lances are pulled and inspected. If necessary, the lance is repaired, otherwise it is replaced. All seals and expansion joints from the feed end to the stack are inspected and repaired as needed. All thermocouples and draft pressure transmitters in the SCC are pulled, inspected, calibrated and repaired as needed. The boiler is inspected cleaned and repaired as needed. All

thermocouples and draft pressure transmitters in the Spray Dryer are pulled, inspected, calibrated and repaired as needed. The spray dryer vessel is inspected and cleaned. The Atomizers in the spray dryer are pulled, cleaned and maintained according to manufacture specifications. The ESP is inspected cleaned and repaired according to manufacture specifications. All electrical connections are inspected and repaired as needed. All thermocouples and draft pressure transmitters are pulled, inspected, calibrated and repaired as needed. The four stage wet scrubber is inspected cleaned and repaired as needed. All flow, temperature, and pressure instrumentation is inspected, repaired and calibrated as needed.

5.12 QA/QC Assessment Procedures

The QA activities implemented in this program will provide a basis for assessing the accuracy and precision of the analytical measurements. Section 5.8 of this QAPP discusses the QA activity that will generate the accuracy and precision data for each sample type. A generalized form of the equations that will be used to calculate accuracy, precision and completeness follows.

5.12.1 Accuracy

Percent accuracy will be determined using the following equation:

$$\%\ \text{Recovery} = \frac{(X - S)}{T} x100$$

where:

X = experimentally determined concentration of the spiked sample

T = true concentration of the spike

S = sample concentration before spiking

5.12.2 Precision

Precision (calculated as percent relative difference) will be determined using the following equation:

$$\text{Re}\,lative\ Percent\ Difference\ (RPD) = \left[\frac{(D_1 - D_2)}{\left\{ \frac{D_1 + D_2}{2} \right\}} \right] x100$$

where:

D_1 and D_2 = results of duplicate measurements or standard deviation relative to the average value expressed as relative standard deviation:

Relative standard deviation will be expressed as follows:

$$\text{Relative Standard Deviation (\% RSD)} = = \left\{ \frac{\sigma_{(n-1)}}{\bar{x}\,(x_1 \cdots x_n)} \right\} x \quad 100$$

where:

$\sigma_{(n-1)}$ = standard deviation of the sample data

n = number of replicates

$X_{(x1..xn)}$ = arithmetic mean of the sample data

5.12.3 Completeness

Data completeness is a measure of the extent to which the database resulting from a measurement effort fulfills objectives for the amount of data required. For this program, completeness will be defined as the percentage of valid data for the total valid tests. Completeness is assessed using the following equation:

$$Completeness\ (\%) = \left[\frac{D_r}{D_c} \right] \quad x \quad 100$$

where:

D_r = number of samples for which valid results are reported

D_c = number of valid samples that are collected and reach the laboratory for analysis

The completeness objective will help to evaluate the accuracy and precision of the analytical measurements.

5.13 External QA Program

The External Quality Assurance Program includes both performance and system audits as independent checks on the quality of data obtained from sampling, analysis, and data gathering activities. Every effort is made to have the audit assess the measurement process in normal operation. Either type of audit may show the need for corrective action.

5.13.1 Performance Audits

The sampling, analysis, and data handling segments of a project are checked in performance audits. A different operator/analyst prepares and conducts these audit operations to ensure the independence of the quantitative results.

EPA Quality Control concentrates or other standards will be used to assess the analytical work. Results will be reviewed by the subcontractor laboratory and QC personnel. Any additional audit samples presented by the regulatory agencies will be analyzed along with program samples, by the appropriate lab and at the same time as all other samples. It will, however, be the responsibility of the regulatory agency to obtain these samples, and present them to the facility project manager in a form that is amenable and appropriate to the analytical methods being utilized.

If the regulatory agency advises facility program manager that audit results fall outside of acceptable ranges, the analytical data will be further reviewed for error in conjunction with the agency. If a simple, correctable error is found (e.g., an arithmetic error), correction will be made and results resubmitted. If no error is found, an investigation into other causes of the failure (e.g., lack of sample integrity) will be conducted and results evaluated in terms of the impact on sample data integrity.

5.13.2 Corrective Action

The acceptance limits for the sampling and analyses to be conducted in this program will be those stated in the method or defined by the project manager. The corrective actions are likely to be immediate in nature and most often will be implemented by the analyst or Project Manager; the corrective action will usually involve recalculation, reanalysis, or repeating a sample run. Ongoing corrective action policy is described here.

5.13.2.1 Immediate Corrective Action

Specific QC procedures and checklists are designed to help analysts detect the need for corrective action. Often the person's experience will be more valuable in alerting the operator to suspicious data or malfunctioning equipment.

If a corrective action can be taken at this point, as part of normal operating procedures, the collection of poor quality data can be avoided. Instrument and equipment malfunctions are amenable to this type of action and QC procedures include troubleshooting guides and corrective action suggestions. The actions taken should be noted in field or laboratory notebooks but no other formal documentation is required, unless further corrective action is necessary. These on-the-spot corrective actions are an everyday part of the QA/QC system.

Corrective action during the field sampling portion of a program is most often a result of equipment failure or an operator oversight and may require repeating a run. When equipment is discovered to be defective (i.e., pre- and post-sampling leak check) it is repaired or replaced and a correction factor is established as per the EPA method. If a correction factor is unacceptable the run is repeated. Operator oversight is best avoided by having field crew members audit each other's work before and after a test. Every effort is made by the field team leader to ensure that all QC procedures are followed. Economically, it is preferred to repeat a run during a particular field trip rather than return at a later date.

Corrective action for analytical work would include re-calibration of instruments, reanalysis of known QC samples and, if necessary, of actual field samples.

If the problem is not solved in this way, more formalized long-term corrective action may be necessary.

5.13.2.2 Long-Term Corrective Action

The need for this action may be identified by standard QC procedures, control charts, performance or system audits. Any quality problem which cannot be solved by immediate corrective action falls into the long-term category. The condition is reported to a person responsible for correcting it who is part of the closed-loop action and follow-up plan.

The essential steps in the closed-loop corrective action system are:

- Identify and define the problem.
- Assign responsibility for investigating the problem.
- Investigate and determine the cause of the problem.
- Determine a corrective action to eliminate the problem.
- Assign and accept responsibility for implementing the corrective action.
- Establish effectiveness of the corrective action and implement it.
- Verify that the corrective action has eliminated the problem.

Documentation of the problem is important to the system. A Corrective Action Request Form is filled out by the person finding the quality problem. This form identifies the problem, possible causes and the person responsible for action on the problem. The responsible person may be an analyst, field team leader, department QC coordinator or the QA Director. If no person is identified as responsible for action, the QA Director investigates the situation and determines who is responsible in each case.

The Corrective Action Request Form includes a description of the corrective action planned and the date it was taken, and space for follow-up. The QA Director checks to be sure that initial action has been taken and appears effective and, at an appropriate later date, checks again to see if the problem has been fully solved. The QA Director receives a copy of all Corrective Action Forms and then enters them in the Corrective Action Log. This permanent record aids the QA Director in follow-up and makes any quality problems visible to management; the log may also prove valuable in listing a similar problem and its solution.

5.13.3 Quality Assurance Reports to Management

5.13.3.1 Internal Reports

The Laboratory Services Coordinator will prepare a written report on QC activities associated with this project for the Quality Assurance Director. This report will detail the results of quality control procedures, problems encountered and any corrective action, which may have been required.

All Corrective Action Forms are submitted to the QA Officer for initial approval of the corrective action planned and a copy is provided to the Program Manager. All system audit reports are provided to the Program Manager and the Quality Assurance Officer.

5.13.3.2 Reports to Client

The final report will include a section summarizing QA/QC activities during the program. The Project Manager, Laboratory Services Coordinators and the QA Officer will participate in preparing this section. This section will provide summary QA/QC results for method blanks, surrogate spikes and laboratory control spike recoveries. This section will evaluate overall data quality in terms of accuracy, precision and completeness. Any discrepancies or difficulties noted in program work, protocol deviations or documentation gaps will be identified and discussed.

Table 5-1 General Sampling and Analytical Program Overview (Stack Exhaust)

Parameter	MACT Emission Limits (a)	Sampling Method	Analytical Method	Test Condition(s)
Flow, Fixed Gases and Moisture	N/A	EPA Methods 2, 3 and 4	N/A	Normal
PCDDs/PCDFs	0.20 ng TEQ/dscm	EPA Method 0023A	EPA Method 8290 HRGC / HRMS	Normal
(a) All MACT Emission Limits corrected to 7% oxygen				

Table 5-2 QA Objectives for Field Measurements

Field Measurement	Accuracy	Precision	Completeness
Moisture (EPA Method 4)	(a)	± 20%	100%
Carbon Dioxide (EPA Method 3 – Orsat Analysis)	(b)	N/A	100%
Oxygen (EPA Method 3 – Orsat Analysis)	(c)	N/A	100%
(a) Not determinable.			
(b) An accuracy of ± 0.2% would be expected if a certified gas audit is performed. Otherwise individual readings must be within 0.3 g/g-mole of the mean value for three (replicate) readings.			
(c) An accuracy of 20.8% ± 0.5% would be expected if an ambient air audit is performed.			

Table 5-3 Overall Summary of CPT Stack Gas Sampling and Analysis Program

Sample Matrix and Sampling Method	Analytical Parameters	Analytical Method	Lab (a)	Total Samples Analyzed			
				Total Runs	Field Blanks	Audit	Lab QC
EPA M 0023A	PCDDs/PCDFs	EPA M 0023A / M 8290	VISTA	3	1	0	1
EPA M 3	O2 and CO_2	EPA M 3	AECOM	3	0	0	0
Facility CEM	O2 and THC	Facility CEM QA Plan	WTI	3	0	0	0

(a) AECOM = AECOM. Inc.

VISTA = Vista Analytical Laboratories, Inc. (El Dorado Hills, CA)
WTI = Heritage-WTI

Table 5-4 Sample Preservation and Holding Time Requirements

Stack Gas Samples [a]

Parameter	Matrix	Preservation	Holding Time
PCDDs/PCDFs (Method 0023A)	XAD Resin	Cool, 4°C	30 days (to extraction)
			45 days (extraction to analysis)

(a) Holding times will be calculated from the day of sample collection.

Waste Feed Samples

Parameter	Matrix	Preservation	Holding Time
Total Chlorides	Organic Liquid	Cool	30 days

Table 5-5 Summary of QA/QC Procedures for Chemical/Physical Properties of Waste Feed

Quality Parameter	Method Determination	Frequency	Target Criteria
Calibration	Initial analysis standards	Prior to sample analysis	Instrument dependant
	Continuing calibration standards	Before and after sample analysis; once every 20 samples	90%-110% of expected value
Interference check	Interference check sample	Before and after sample analysis	90%-110% of true value
Accuracy - calibration	Analysis of calibration check standard	After every calibration	90%-110% of expected value
Accuracy - spikes (chlorine)	Spike sample at twice sample level	Once every 20 samples	90% to 110% of spiked value
Precision	Duplicate preparation and analysis of at least one run's samples	Once every 20 samples	Range < 30% if sample result above lowest standard
Blank	Method blank carried through all sample preparation and analysis steps	Once every 20 samples	Below detection limit

Table 5-6 WTI Laboratory Test Methods for Waste Feed (Relative to the CFPT)

Parameter	Method Description	Analytical Methods
Ash Content	Ash from Petroleum Products	EPA M 9040
Inorganic Anions	Anions in Water by Ion Chromatography (Fluorine, Chlorine, Bromine, Sulfur, Iodine)	EPA M 300 and ASTM D 4327
Heat Content	Bomb Combustion Method for Solid Waste	EPA M 5050 and ASTM D 12964
Inorganic Preparation Methods	Acid Digestion of Sediments, Sludges & Soils (Metals)	EPA M 3050
	Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by FLAA or ICP Spectroscopy	EPA M 3005
	Microwave Assisted Acid Digestion of Aqueous Samples and Extracts (Metals)	EPA M 3015
	Microwave Assisted Acid Digestion of Sediments Sludges, Soils & Oils (Metals)	EPA M 3051
	Toxicity Characteristic Leaching Procedure (TCLP - Metals)	EPA M 1311
Paint Filter	Paint Filter Liquids Test	EPA M 9095A
Inorganic Analysis Procedures	Inductively Couples Plasma-Atomic Emission (Metals) Spectroscopy	EPA M 6010
	Mercury in Liquid Waste (Manual Cold-Vapor Technique)	EPA M 7470
	Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)	EPA M 7471
pH	pH Electrometric Measurement	EPA M 9040
	Soil & Waste pH	EPA M 9045
Physical Description	Physical Description Screening Analysis in Waste	ASTM D 4979
Radioactivity Screen	Radioactivity	WTI Method W-1002
Specific Gravity	Specific Gravity Apparent of Liquid Industrial Chemicals	ASTM D 891
Viscosity	Low Temperature Viscosity Measured by Brookfield Viscometer	ASTM D 2983-87
Water Content	Water in Crude Oils (Karl Fischer) Titration	ASTM D 4377
	Water in Paints & Paint Materials by Karl Fischer Method	ASTM D 4017

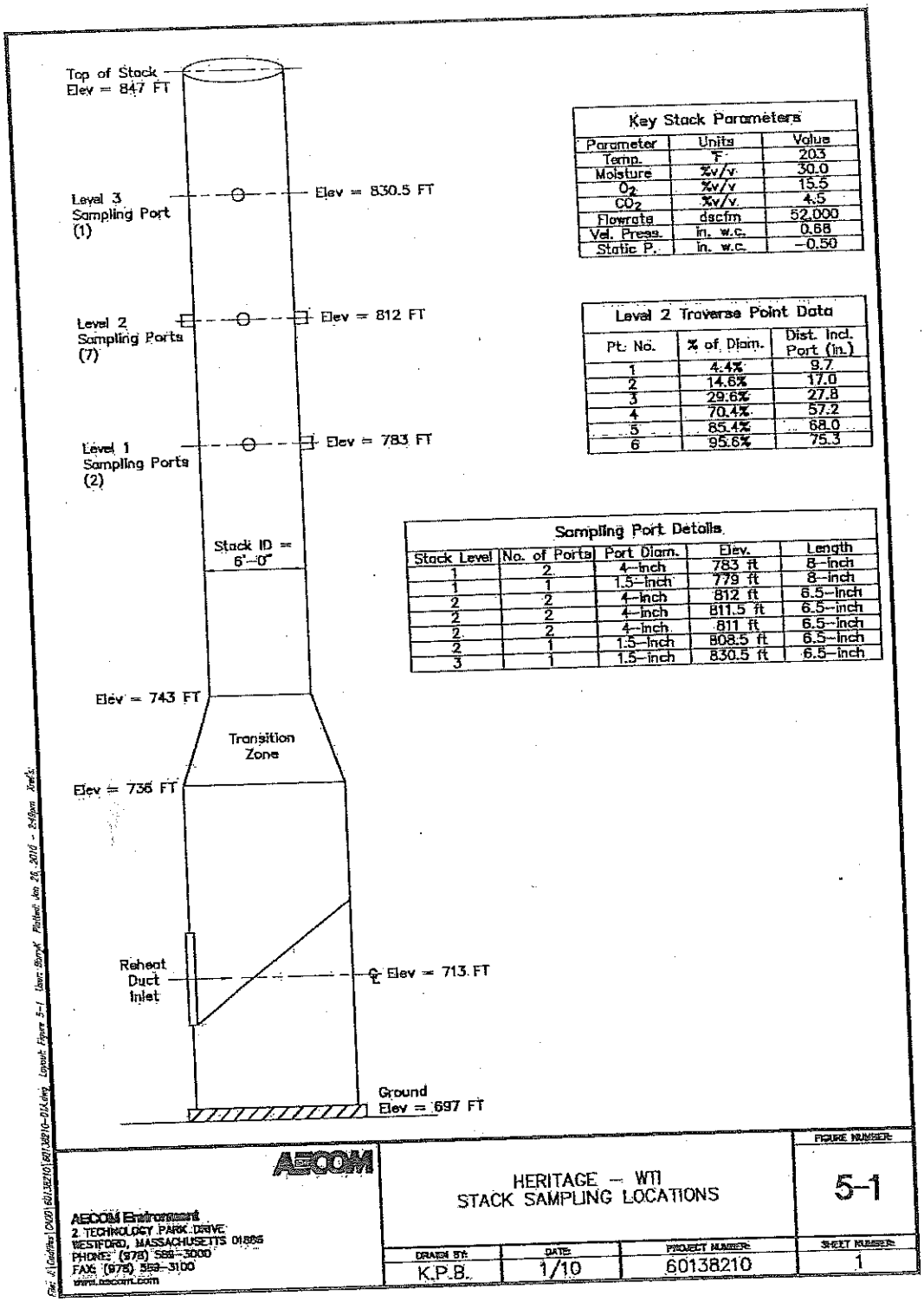
Note: Waste streams combusted during the MACT CPT will be analyzed via the test method listed in this table.

Table 5-7 QA Objectives for PCDD/PCDF Analyses of Stack Gas Samples by Method 0023A

Quality Parameter	Method Determination	Frequency	Target Criteria
Calibration	Five-level calibration curve; continuing calibration standard	At least once; continuing calibration check at beginning of each 12-hr shift	Initial: ≤ 20% RSD for unlabeled standards ≤ 30% RSD for internal standards S/N ratio ≥2.5; Isotope ratios within control limits Continuing: ≤ 20% of ICAL for 17 unlabelled stds ≤ 30% of ICAL for internal standards S/N ratio ≥ 2.5; Isotope ratios within control limits
Accuracy-calibration	Analysis of calibration check	After every initial calibration	80% - 120% of theoretical value
Accuracy-surrogates	Spiked into samples prior to sampling	Every sample	70% - 130% recovery
Accuracy-internal standards	Spiked into samples prior to extraction and analysis	Every sample	40%-135% recovery for all homologs
Accuracy – audit samples	Prepared and analyzed along with program samples, if provided	Presented by the regulatory agency	Determined by regulatory agency
Blanks	Method blank for each component Field reagent blanks	One per batch of samples Once per test	ND or <5% of field concentration Evaluated on a case-by-case basis
Mass Spectrometer Performance	Section 8.2.2 of Method 8290	At beginning of each 12-hr period	Static resolving power of 10,000 (10% valley definition)
Qualitative Identification	Retention Time and GC Column Performance	Every sample	Compliance with Section 8.2.1 of Method 8290

S/N = Signal to Noise Ratio
RSD = Relative Standard Deviation

Figure 5-1 Stack Sampling Locations



Key Stack Parameters

Parameter	Units	Value
Temp.	°F	203
Moisture	%v/v	30.0
O_2	%v/v	15.5
CO_2	%v/v	4.5
Flowrate	dscfm	52,000
Vel. Press.	in. w.c.	0.68
Static P.	in. w.c.	−0.50

Level 2 Traverse Point Data

Pt. No.	% of Diam.	Dist. Incl. Port (in.)
1	4.4%	9.7
2	14.6%	17.0
3	29.6%	27.8
4	70.4%	57.2
5	85.4%	68.0
6	95.6%	75.3

Sampling Port Details

Stack Level	No. of Ports	Port Diam.	Elev.	Length
1	2	4-inch	783 ft	8-inch
1	1	1.5-inch	779 ft	8-inch
2	2	4-inch	812 ft	6.5-inch
2	2	4-inch	811.5 ft	6.5-inch
2	2	4-inch	811 ft	6.5-inch
2	1	1.5-inch	808.5 ft	6.5-inch
3	1	1.5-inch	830.5 ft	6.5-inch

EPA-R5AECAB-AE2010-514

Figure 5-2 Example Sample Packing List

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Sample Packing List

Site of Program:	Sample Date:	Project Location:
Type of Program:	Date Shipped:	Analytical Lab:
Project #:	Shipper:	Lab P.O. #:
Program Office:	Contact:	FedEx Air Bill #:

Sample ID	Sample Matrix	Sample Description	Analyses	Instructions

Field Notes/ Comments

Relinquished By: Date:	Received By: Date:	**Analytical Laboratory Destination:**
Signature: Time:	Signature: Time:	

EXAMPLE SAMPLE LABEL

AECOM

Site of Program: _____
Project No.: _____

Sample Date: _____ Sample Matrix: _____
Analytical Parameters: _____
Sampler: _____
Sample Description: _____
Sample ID Code: _____
Special Instructions: _____

6.0 Continuous Monitoring System Performance Evaluation Test Plan [40 CFR 63.8(e)(4) and 1207(b)(1)]

6.1 Introduction

As part of complying with the requirements of the HWC MACT regulations, facilities must submit a plan along with the CPT Plan and perform an evaluation of their "Continuous Monitoring System" (CMS) as part of the CPT. EPA defines the CMS in 40 CFR 63.2:

"Continuous Monitoring System (CMS) is a comprehensive term that may include, but is not limited to, continuous emission monitoring systems, continuous opacity monitoring systems, continuous parameter monitoring systems, or other manual or automatic monitoring that is used for demonstrating compliance with an applicable regulation on a continuous basis as defined by the regulation."

Based on the above definition, the main components of the CMS for the WTI incinerator includes the following:

- Process instruments that monitor or control key process parameters, including the Unit's Continuous Emissions Monitoring system;
- The DCS and Data Acquisition System (or DAS);
- The AWFCO system; and
- The programmable logic that utilizes regulatory set-points to assure compliance.

The CMS Performance Evaluation Test Plan utilizes a combination of activities to accomplish its objective, which is to verify that the incinerator is properly controlled and that the equipment and systems that are used are operating properly and are accurate. These activities include instrument audits or calibrations, auditing the function of the AWFCO system and the programmable logic used in the DCS. This plan describes the CMS itself, the procedures and documentation practices that will be used to verify the functionality of the CMS and the Quality Assurance requirements of the evaluation.

6.2 Continuous Monitoring System Description

This section provides an overview of the key components of the CMS. This CMS evaluation includes field instrumentation, the DCS/DAS, the programmable logic and field control (e.g., control and block valves).

6.2.1 Field Instrumentation

Tables 2-4 and 2-5 in Section 2.0 of this Plan provide information pertaining to field instruments that are part of the overall CMS. These instruments monitor and control certain process operations to assure the unit is operating safely and in compliance with applicable environmental requirements. The instruments used for these aspects of process control meet the definition of "Continuous Monitor" in 40 CFR 63.1201.

As part of initial instrument specification prior to installation and use in the process, instrument audit and calibration procedures are identified or developed. These procedures specify the frequency of auditing the instrument's function and accuracy and the actual procedure for verification. These procedures specify both

the specific steps and the acceptable accuracy requirements that the instrument must meet to "pass". Troubleshooting procedures are typically included to help plant personnel correct any problems and get the instruments operational.

6.2.2 Continuous Emissions Monitoring System

In addition to other field instrumentation, the operation of the incinerator also relies on its Continuous Emission Monitoring System (CEMS) to monitor stack emissions concentrations. This system is described in Section 2.6. When emission levels deviate from allowable limits, the DCS takes appropriate action up to and including initiating an AWFCO.

6.2.3 Process Control

The process control systems for this incinerator are described in Section 2.5 of this Plan. It detects signals from process instruments, performs calculations according to the programmable logic, adjusts control equipment and notifies operators when key process parameters deviate outside acceptable limits. In addition to notifying operating personnel the AWFCO system described in Section 2.5.1 will automatically shut down the waste feeds and the overall process itself in the event of deviations outside acceptable operating limits.

6.2.4 CMS Operation

All the components of the CMS must be operational for the incinerator to burn waste. The DCS and overall process control system are designed in such a manner as to continually verify that operation while the unit is running. Field instrumentation (both sensing and control) are connected to the DCS in "control loops" with common wiring, electrical signal transmitters, input/output devices and related programmable logic. All components of each control loop related to the feeding of a certain type of waste (i.e., liquid organic, liquid aqueous or process vents) must be operating for the incinerator to be enabled to burn that waste. The programmable logic is designed in such a way that it can sense and verify that various components of the process and the process itself are operating as required. For example, if power is lost to a flow meter on a waste feed line, the programmable logic will sense this signal loss and initiate either an alarm or shutdown. Similarly, if the actual field position of a specific control valve disagrees beyond a certain amount with what the programmable logic calculates it should be, again, appropriate alarms and/or shutdowns are initiated. (A complete listing of current and future AWFCO limits was provided previously in Table 2-4.)

6.2.5 Management of Change

A Management of Change (MOC) procedure is implemented at Heritage-WTI, Inc., to ensure that adequate levels of communication exist between all departments when changes are made which affect the process. A change made in one part of the process or other processes may have unintended effects on other parts of the process because the stationary sources are an integrated system. These proposed changes are therefore appropriately scrutinized before they are made to ensure the changes do not compromise the safety and integrity of the process and avoid adverse effects or worker and public safety and the environment.

The MOC evaluation form includes changes which impact:

- Process chemicals;
- Technology;
- Equipment;

- Procedures; and
- Employees.

Any change to these criteria triggers the use of an MOC form. This procedure does not apply to "replacement in kind" which is defined as replacements that satisfy the design specifications. A form is used to document the Management of Change procedure when the above changes are planned by facility personnel.

Each type of change requires the appropriate signatures and authorization to proceed with the change. As part of the MOC form, an action item checklist is used to identify tasks as a result of the change and to track their completion. Personnel (e.g., engineering, operations, safety) assess the potential impact of the change on safety and health through a safety checklist for minor changes or a process hazard analysis (PHA) for major changes. The following steps are taken to ensure proper implementation of the change:

- Process safety information (PSI) is updated as necessary but always prior to startup;
- Operating procedures are updated as necessary in accordance with the written operating procedure program.; and
- Employees (e.g., operations, maintenance, contract) whose job tasks are affected by the change, are trained in accordance with the written training program prior to the startup of the process.

The MOC forms and documentation of completed action items are forwarded to the appropriate personnel for authorization. The MOC records and recommendations are tracked according to the assigned checklist.

6.3 CMS Performance Evaluation Plan

As described above, the CMS Performance Evaluation Test Plan relies on a combination of activities to determine whether the CMS is operating properly. This will include the following:

- Auditing the instrument maintenance and calibration program;
- Calibrating field instruments;
- Auditing the AWFCO Testing Program; and
- Auditing portions of the programmable logic to verify that the AWFCO set-points used assure regulatory limits will be met.

Personnel who are knowledgeable of WTI incinerator operations, their process control systems and relevant regulatory requirements, will perform these activities.

6.3.1 Instrument Audit and Calibration

As part of conducting the CMS Performance Evaluation, a two step process will be used to assess the status of the various field instruments identified in Section 2.0. First, audit/calibration records will be reviewed for these instruments to determine when their most recent audit/calibration occurred. From this review, any instruments that are approaching the end of their audit/calibration cycle will be scheduled for audit and/or calibration prior to performing the actual Trial Burn/CPT. For example, if a mass flow meter (annual audit

cycle) has been audited/calibrated within several months of the test, it will not be re-calibrated. If however, that same flow meter hasn't been audited/calibrated within the last nine to ten months, it will be audited and/or calibrated prior to the test.

Because certain instruments cannot be audited or calibrated without taking the incinerator offline, these will be scheduled over a period of time prior to the test program to minimize process interruptions and shutdowns. All instruments requiring pre-test audits/calibrations will be evaluated prior to field program implementation.

6.3.2 AWFCO System Performance Evaluation

Another component of the CMS Performance Evaluation is auditing the AWFCO system and related DCS logic. This will be accomplished by reviewing the last year of AWFCO testing logs to assess whether there are any recurring problems with the AWFCO system. Any incidence of problems with the AWFCO system will be identified for follow-up and correction prior to testing.

This evaluation will also include examining the appropriate programmable logic statements to compare the AWFCO set-points with the applicable operating parameter limits to assure that these are appropriate.

6.3.3 Auditing the CEM System

The CEM systems used at WTI's incinerator are installed, operated and maintained to comply with the provisions of the applicable performance specifications and/or EPA Reference Methods. In general, this means the CEMs are calibrated daily (zero/span), quarterly (gas audits) and annually (Relative Accuracy Test Audits). Thus, the evaluation of the performance of this system will be done as part of meeting those requirements and a separate evaluation will not be conducted under this plan.

6.3.4 Schedule

The Performance Evaluation itself will be conducted from one to three months prior to a CPT or Confirmatory Test as required by the HWC MACT regulations. All CMS Performance Evaluation activities will be completed with all components meeting their respective accuracy requirements prior to performing the CPT.

6.3.5 Reporting and Documentation

The results of the CMS Performance Evaluation will be included as part of the Notification of Compliance as required by 40 CFR 63.9(h)(2). This will include the following information:

- Description of the CMS components;
- Description of the CMS Performance Evaluation Plan;
- Listing of all field instruments that are part of the CMS and their audit/calibration status;
- Listing of field instruments that have been specifically audited/calibrated as part of the CMS Performance Evaluation;
- Copies of the most recent audit/calibration results for CMS instruments;
- AWFCO system evaluation results;
- CEM system evaluation results; and

- Copies of relevant programmable logic statements showing where calculations and regulatory alarms and set-points are used in the coding to assure compliance.

6.4 Quality Assurance

The quality assurance (QA) requirements for this Performance Evaluation are specified in Table 6-1. The QA requirements for CMS equipment components are established by other criteria outside this Performance Evaluation.

Table 6-1 QA Requirements for the CMS Performance Evaluation

CMS Component	Basis for QA Requirement	QA Specification
Field Instruments	Manufacturer recommendations	Audit/calibration meets recommended specifications for all affected instruments
AWFCO System Evaluation	MACT requirement	No failures of the AWFCO system
CEM System	40 CFR 60, Appendix A	Meets those specifications
Programmable Logic	MACT requirement	All set points programmed correctly

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Appendix A

Regulatory Agency Correspondence and Other Correspondence Regarding Scrubber and ESP Operation

(AGENCY ONLY)

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Appendix B

Facility Process and Instrumentation Diagrams

(AGENCY ONLY)

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Appendix C

Field Data Sample Collection Forms

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Appendix D

Isokinetic Sampling Train Setup and Recovery Schematics

RITAGE-WTI

WTI, INC.
eorge Street
pool, Ohio 43920-3400
30-385-7337
-385-7813
te: www.heritage-wti.com

OHSAS 18001: 2007
ISO 14001: 2004
ISO 9001: 2008

RECEIVED
MAY 14 2012
AIR ENFORCEMENT BRANCH
U.S. EPA REGION 5

Mr. Erik Bewley
Ohio EPA - NEDO
Division of Air Pollution Control
2110 East Aurora Rd
Twinsburg, OH 44087

May 10, 2012
VIA CERTIFIED MAIL

RE: Heritage-WTI, Inc.
Facility ID: 02-15-02-0233
MACT Confirmatory Test Plan

Dear Mr. Bewley:

Please find the enclosed Revision 0 of the MACT Confirmatory Test (CFT) Plan prepared by AECOM, Inc. for Heritage-WTI, Inc. This plan is being submitted as required by 40 C.F.R. 63.1207(e) within the 60-day notification period. A completed Ohio Intent to Test form accompanies this document. Please also note that a redacted copy of this document has also been provided to be displayed in your public records.

If you have questions concerning the content of the MACT CFT Plan Revision 0, please contact Vince Waggle of my staff at 330-386-2182.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are certain penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.

Sincerely,

Frank Murray
Vice President and General Manager

EPA-R5AECAB-AE2010-602

Cc: Charles Hall – USEPA Region V (Cover Letter and Plan)
William MacDowell – USEPA Region V (Cover Letter only)
Dennis Bush – OEPA-DAPC-NEDO (Cover Letter only)
George Czerniak – USEPA Region V (Cover Letter only)
Michelle Tarka, OEPA-DHWM-NEDO (Cover Letter only)
Frank Popotnik, OEPA-DHWM-NEDO (Cover Letter only)
Ed Fasco, OEPA-DAPC-NEDO (Cover Letter only)

EPA-R5AECAB-AE2010-603

Agency Use Only

Date Received _____

No. Assigned _____

Premise No. _____

INTENT TO TEST NOTIFICATION

Proposed Test Date July 16-20, 2012

Pre-Test Meeting Desired? Yes /__/ No /_X_/

A. Facility Information

Name: Heritage-WTI, Inc.

Address: 1250 St. George St., East Liverpool, OH 43920

Contact Person: Mr. Vince Waggle

Telephone No.: (330) 386-2182

B. Testing Firm Information

Name: AECOM

Address: 250 Apollo Drive, Chelmsford, MA 01824

Contact Persons: David Moll

Telephone No.: (978) 905-2331

C. Source Sampling Information: Identify all sources and pollutants to be sampled.

Source/ Control Equipment	Monitoring Equipment / Location	Pollutant to be Tested	EPA Test Method	Filter Box Temperature	Number of Sampling Points	Total Time for Test Run (min)	Number of Sampling Runs
Rotary Kiln / ESP & Wet Scrubber	[See the accompanying Confirmatory Test Plan for a complete summary of all test methods, and procedures as well of descriptions of the incineration system components.]						

D. What is the rated capacity? 97.8 MM BTU/hr (LHV)

Source will operate at 90% or better of its rated capacity? Yes /_/ No /X/ See CFT Plan for details.

How is this to be demonstrated? * Waste feed records will be shown in final report.

Any modifications to US EPA Reference Method(s)? Yes/__/ No /_X_/; If yes, explain

Sampling Location(s): Inlet /__/ Outlet /_X_/ Simultaneous /__/ Will cyclonic flow check(s) be conducted? Yes/__/ No /X_/

Fuel Sampling: Coal - Proximate /__/ Ultimate /__/ Other (specify): Incinerator Waste Feed Streams

Emission Rate to be calculated using: F-Factor /__/ Ultimate Coal Analysis /__/ Other (specify): N/A

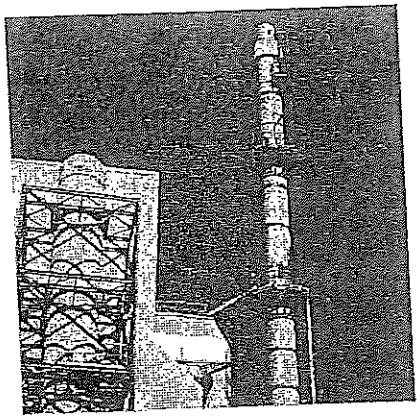
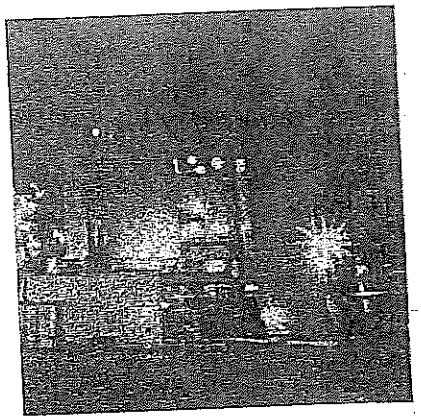
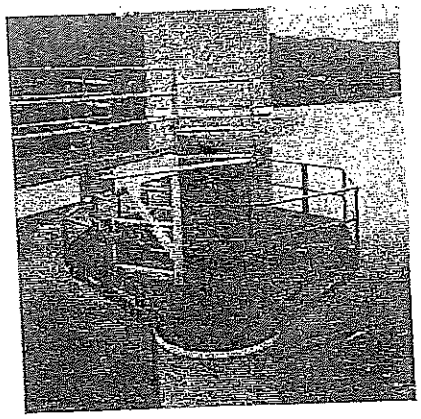
Are concurrent Method 9 readings to be performed? Yes /__/ No /_X_/

E. Sample Train Calibration: All affected measuring and metering equipment should be calibrated within 60 days of the scheduled testing.

\\Hgvrafs1\environ\mact\HWC MACT\2012 MACT Confirmatory\[WTI ITT July 2012 DF Confirm Test.xlsx]ITTFORM

EPA-R5AECAB-AE2010-604

Prepared for:
Heritage-WTI, Inc.
1250 St. George Street
E. Liverpool, Ohio 43920

MACT Confirmatory Performance Test Plan for the Rotary Kiln Hazardous Waste Incineration System

Revision 0

[REDACTED]

HERITAGE REDACTED 67 LINES IN DOCUMENTS EPAR5AECAB-AE2010-605 through EPAR5AECAB-AE2010-683 FOR EXEMPTION 4-CONFIDENTIAL BUSINESS INFORMATION

AECOM, Inc.
May 2012
Document No.: 60264806-1

EPA-R5AECAB-AE2010-605

Prepared for:
Heritage-WTI, Inc.
1250 St. George Street
E. Liverpool, Ohio 43920

MACT Confirmatory Performance Test Plan for the Rotary Kiln Hazardous Waste Incineration System

Revision 0

Prepared By David Moll

Reviewed By Douglas Roeck

EPA-R5AECAB-AE2010-606

AECOM, Inc.
May 2012
Document No.: 60264806-1

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1.0 Introduction

1.1 Program Summary

This document represents a MACT Confirmatory Performance Test (CFPT) Plan for the rotary kiln incineration system operated by Heritage-WTI, Inc. (WTI) at its East Liverpool, Ohio facility. Since the WTI incinerator treats certain waste that are classified as hazardous under state and/or federal regulations, this unit is subject to the requirements of the HWC MACT Rule.

This Plan has been prepared in accordance with requirements promulgated in **NESHAPS: Final Standards for Hazardous Waste Air Pollutants for Hazardous Waste Combustors**, (generally referred to as the Hazardous Waste Combustor [or "HWC"] MACT Rule). These regulations were initially published by US EPA on September 30, 1999 in 40 CFR 63 Subpart EEE. However, these initial regulations were vacated based on a DC Circuit Court ruling, were subsequently replaced by "Interim Standards" in February of 2002 and then re-promulgated again in the Permanent Replacements Standards published in the Federal Register on October 12, 2005.

This document addresses the requirements to develop and submit a CTP Plan set forth in 40 CFR § 63.1207 and § 63.7 and the requirements to develop and submit a Continuous Monitoring System (CMS) Performance Evaluation Plan under 40 CFR § 63.1207(b)(1) and § 63.8(e)(4). This CPT Plan is written to address all applicable Subpart EEE (and General Provisions) requirements incorporated into the regulations through promulgation of the Final Replacement Standards published in the Federal Register on October 12, 2005.

1.2 Facility / Unit Identification

1.2.1 General

As mentioned above, this CFPT Plan has been developed to evaluate the incinerator at the WTI facility in East Liverpool, OH. This is a commercial hazardous waste incineration facility that treats liquid and solid wastes that are classified as hazardous and also treats process vent streams from operations at the facility as part of the overall air emissions control program.

1.2.2 Facility ID, Mailing Address and Primary Contact

The facility ID and mailing address is:

Heritage-WTI, Inc.
1250 St. George St.
East Liverpool, Ohio 43920
U.S. EPA RCRA ID # : OHD 980 613 541
Ohio Title V Permit No. 02-15-02-0233
Ohio Permit to Install No. 02-18743

The primary contact is:

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1.2.3 Incinerator Overview

The WTI incinerator is a rotary kiln incineration system with primary and secondary combustion chambers that treats solid wastes as well as aqueous and organic liquids. The process is monitored and controlled by a distributed control system (DCS) capable of continuously monitoring the process to assure all operational parameters are within regulatory and permit limits while waste is being fed to the unit. In addition, this incinerator is equipped with a Continuous Emissions Monitoring System (CEMS) that continuously samples the exhaust gases for oxygen and total hydrocarbons in the stack gas exhaust stream.

1.3 Purpose and Objectives of the CFPT

The purpose of the CFPT is to validate the performance level of the incinerator against the requirements in 40 CFR Part 63, Subpart EEE. To this end, the specific objectives of this CFPT are to:

- Demonstrate compliance with the dioxin/furan emission standard of ≤0.20 ng/dscm TEQ basis (40 CFR § 63.1219(a)(1)(ii)) while the incinerator operates under normal conditions.
- Conduct a performance evaluation of the Continuous Monitoring Systems (CMS) required for compliance with the dioxin/furan standard (40 CFR § 63.1209(k)).

The CFPT will include feeding a variety of liquid and solid waste materials to the incinerator, sampling and analyzing the feed streams, monitoring certain process parameters and conducting emissions testing. The emissions standards that will be evaluated under the HWC MACT regulations are summarized in **Table 1-1**.

1.4 CPT Plan Organization

This test plan has been organized in a format typically used for compliance demonstration test programs. **Table 1-2** is included so that the CFPT requirements in the HWC MACT rule can be cross-referenced with the sections in this Plan. The remainder of the document has been organized as follows:

- **Section 2.0** provides a general physical description of the rotary kiln incineration system and associated unit operations (including the air pollution control system) as well as an overview of the automatic waste feed cutoff (AWFCO) system and maintenance procedures.
- **Section 3.0** presents a brief discussion of the wastes to be treated in terms of physical and chemical parameters which impact thermal oxidation and summarizes the hazardous air pollutants presently identified in the waste streams.
- **Section 4.0** presents the Test Protocol including planned feed and test conditions, rationale for the test design, anticipated test schedule and final report format.
- **Section 5.0** fully describes all sampling and analysis procedures and associated QA/QC protocols following the latest EPA guidance. This section essentially serves as the Quality Assurance Project Plan (QAPP) for this project.
- **Section 6.0** includes the Continuous Monitoring System (CMS) Performance Evaluation Test (PET) Plan that is required to be performed as part of addressing the overall MACT testing requirements.

The Appendices contain pertinent correspondence with the regulatory agencies and/or relevant information regarding control equipment operation (**Appendix A**); detailed facility process and instrumentation diagrams (P&IDs) (**Appendix B**); examples of performance test field data sheets, (**Appendix C**); and isokinetic sample train setup and recovery schematics (**Appendix D**).

Table 1-1 Summary of Applicable MACT Emission Standards for the CFPT

Emissions Parameter	Limit	Citation
PCDDs/PCDFs (TEQ basis)	≤ 0.20 ng/dscm	40 CFR 63.1219(a)(1)(i)(A)

Note: All emission concentrations are corrected to 7% oxygen

Table 1-2 Cross Reference of CFPT Requirements

Topic	Regulatory Citation	Section No. in this Document
Program Summary	40 CFR § 63.1207(f) and § 63.7(c)(2)(i)	1.1
Test schedule	40 CFR § 63.1207(f), (f)(1)(v) and § 63.7(c)(2)(i)	4.7 and Table 4-6
Data Quality Objectives (DQOs)	40 CFR § 63.1207(f) and § 63.7(c)(2)(i)	5.5
Internal and External Quality Assurance Plan	40 CFR § 63.1207(f) and § 63.7(c)(2)(i)	5.9 & 5.13
Analysis of feedstreams (as fired) Heating value, ash content, semi-volatile metals, low volatile metals, mercury and total chlorine Viscosity Identification and quantification of reasonably expected HAPs	40 CFR § 63.1207(f)(1)(i) 40 CFR § 63.1207(f)(1)(i)(A) 40 CFR § 63.1207(f)(1)(i)(B) 40 CFR § 63.1207(f)(1)(ii)(A) & (B)	3.0
Detailed engineering description of combustor Manufacturer/make/model of HWC Type of HWC Maximum design capacity Feed systems Location of combustion zone temperature device Hazardous waste AWFCO system Design, operation and maintenance of APC Justification of alternative gas flow rate measurement technique Design, operation and maintenance of stack gas monitoring systems	40 CFR § 63.1207(f)(1)(iii)(A) 40 CFR § 63.1207(f)(1)(iii)(B) 40 CFR § 63.1207(f)(1)(iii)(C) 40 CFR § 63.1207(f)(1)(iii)(D) & (E) 40 CFR § 63.1207(f)(1)(xix) 40 CFR § 63.1207(f)(1)(iii)(F) 40 CFR § 63.1207(f)(1)(iii)(G) 40 CFR § 63.1207(f)(1)(xvii) 40 CFR § 63.1207(f)(1)(iii)(H)	2.0 2.2 2.2 2.2 2.3 2.2.6 2.5.1 2.4.11 N/A 2.6
Description of Waste handling and blending Operations	40 CFR § 63.1207(f)(1)(ii)(C)	2.3.5
Detailed test protocol including: Description of sampling, monitoring and analytical procedures Description of Planned Feed and Operating conditions during the CPT	40 CFR § 63.1207(f)(1)(iv) 40 CFR § 63.1207(f)(1)(vi) & (vii)	5.6 & 5.8 4.3, 4.4 & 4.5
Procedures for rapidly stopping hazardous waste feed and controlling emissions during malfunction	40 CFR § 63.1207(f)(1)(viii)	2.3.6
Determination of hazardous waste residence time	40 CFR § 63.1207(f)(1)(ix)	2.2.7
Metal feed rate limit extrapolation (if used)	40 CFR § 63.1207(f)(1)(x)	4.4.2 and Table 4-5
CMS and CEMS performance evaluation plans	40 CFR § 63.8(e)(4) and 1207(b)(1)	6.0
Documentation of expected levels of regulated constituents in other feed streams that are not analyzed	40 CFR § 63.1207(f)(1)(xi)	3.0
Documentation of conditioning time needed to reach steady state prior to testing	40 CFR § 63.1207(f)(1)(xii)	4.6
Alternative monitoring frequency for wet scrubbers (if used)	40 CFR § 63.1207(f)(1)(xxiii)	N/A
Other information deemed necessary by the agency	40 CFR § 63.1207(f)(1)(xxvii)	-

Table 1-3 Specific Confirmatory Test Plan Requirements

Topic	Regulatory Citation	Section No. in this Document
Confirmatory Dioxin/Furan Testing to demonstrate compliance	40 CFR § 63.1207(b)(2)(i)	CFPT Plan
Conduct performance evaluation of CMS	40 CFR § 63.1207(b)(2)(ii)	Section 6
Normal Hydrocarbon operating levels	40 CFR § 63.1207(f)(2)(i)	4.1
Normal operating parameter levels	40 CFR § 63.1207(f) (2)(ii)	4.1
Normal chlorine operating levels	40 CFR § 63.1207(f)(2)(iii)	4.1
Normal cleaning cycle for carbon injection and particulate control device operations	40 CFR § 63.1207(f)(2)(iv) and 1207(g)(2)(iv)	2.4.9 & 2.4.11
Description of sampling and monitoring procedures	40 CFR § 63.1207(f)(2)(v)	Section 5
Average, Minimum, maximum hydrocarbon values	40 CFR § 63.1207(g)(2)(i)	Table 4-1
Average, Minimum, maximum operating parameter values	40 CFR § 63.1207(g)(2)(ii)	Table 4-1
Average, Minimum, maximum chlorine values	40 CFR § 63.1207(g)(2)(iii)	Table 4-1

2.0 Engineering Description

2.1 Process Overview

This section presents a summary description of the WTI incinerator train. A general process flow schematic is provided in **Figure 2-1**. Detailed process and instrumentation diagrams (P&IDs) for individual system components as well as the overall treatment train are provided in **Appendix B** of this Plan.

2.2 Combustor Design Specifications

Descriptions for each major section of the combustion system are provided below.

2.2.1 Rotary Kiln Primary Combustion Chamber (PCC) [CONFIDENTIAL SYSTEM]

The PCC is capable of incinerating containerized, bulk, and pumpable waste in solid, liquid, gaseous and sludge form. The rotary kiln is 16 ft (5.0 m) in diameter, and is 43 ft (13.1 m) in length. The kiln is constructed of carbon steel with a refractory inner lining. Seals located at each end of the kiln are designed to minimize leakage of air into the kiln. Fugitive emissions from the kiln are prevented through two mechanisms. First, negative pressure is maintained in the kiln by the I.D. fan and the pressure is measured at the discharge end of the kiln. [redacted]

Under normal operating conditions the induced draft fan maintains the pressure in the combustion chamber below ambient conditions. During pressure spikes, the shrouds act as an alternative means of controlling combustion system leaks. This is equivalent to maintaining the pressure in the combustion zone below ambient pressure. (Please refer to Appendix A for a copy of the U.S. EPA letter dated Sept, 4 2003 for details on the AWFCO as it pertains to the combustion chamber pressure.)

Normally, kiln temperature is controlled by varying the flow of high Btu liquids to the kiln. Ash or slag from the kiln flow into an ash quench tank below the secondary combustion chamber (SCC). Gases from the kiln pass to the SCC for continued retention time.

2.2.2 Secondary Combustion Chamber (SCC)

The SCC provides for continued burning and retention time. Solid particles passing to the SCC and residue from the kiln drop into a water filled quench tank below the SCC. The SCC achieves complete burnout of incinerator off-gases by maintaining an elevated temperature for sufficient time and by ensuring turbulent mixing through introduction of steam, secondary combustion air and/or oxygen. The SCC is refractory lined,

and has an insulated outer shell to minimize heat losses. Flue gas from the SCC flows into the heat recovery boiler. The dimensions of the SCC are 18'2"' wide x 18'7" long x 56'6" high.

2.2.3 Oxygen Injection [CONFIDENTIAL SYSTEM]

[redacted]

2.2.4 Waste Heat Recovery Boiler

The waste heat recovery boiler (HRB) utilizes heat generated from waste incineration to produce steam for plant use. Flue gas temperatures entering the boiler are approximately 1380°F; flue gas leaving the boiler is approximately 700°F. Particulate accumulation on tube surfaces is removed by mechanical rapping, which occurs every 30 minutes during normal operation. Gases from the boiler section pass on to the evaporative quench section (spray dryer).

2.2.5 Evaporative Quench (Spray Dryer)

The Spray Dryer performs two functions; (1) the cooling of the flue gas; and (2) the evaporation of effluent or blowdown from the four stage wet scrubber. The spray dryer is constructed of carbon steel and is heated and insulated to prevent corrosion. The cylindrical-shaped unit is approximately 36 feet in diameter and 104.5 feet tall. At the base of the unit is a cone-shaped hopper that collects salts and fly ash. The inlet temperature of the flue gas is approximately 700 to 750°F; the temperature at the outlet is approximately 400°F.

Flue gas leaving the HRB is introduced through a gas disperser at the top of the spray dryer. Neutralized scrubber effluent or blowdown is injected into the spinning flue gas and atomized by means of high-speed rotary atomizers. The atomized scrubber blowdown cools the flue gas by evaporation in the drying chamber. The volume and temperature of the flue gas as it enters and leaves the spray dryer will determine the amount of scrubber blowdown that can be evaporated. The scrubber blowdown is gravity fed to the atomizers from a small head tank located on the top of the spray dryer. The head tank is fed from the neutralization system feed tank.

The Spray Dryer is designed to evaporate the water in the atomized scrubber blowdown before any droplets can impinge upon the vessel walls and cause buildup and corrosion. To prevent corrosion, the temperature of the flue gas leaving the spray dryer will be maintained at approximately 400°F by modulating the amount of scrubber blowdown that is atomized.

Solids in the scrubber blowdown will be dried and entrained in the flue gas. Large particles will be removed in the spray dryer by the centrifugal force resulting from a change in direction of the flue gas flow as it leaves the vessel. Smaller particles will be entrained in the flue gas and transferred to the ESP for removal. Particulate matter separated from the flue gas in the spray dryer will be collected in the hopper at the base of the unit.

Vibrating mechanisms prevent the build-up of particulate on the hopper. The fly ash in the hopper is transferred to the ash conveyor that eventually discharges it to a pneumatic tanker for off-site disposal.

The complete operating atomizer assembly is made up of an abrasion and corrosion resistant centrifugal atomizer (wheel) with nozzle inserts. The atomizer is driven by a highly advanced liquid and air-cooled induction motor with frequency inverter speed control. This design allows infinite control of the wheel speed up to 16,200 rpm. Normal operating speed is 13,000-15,000 rpm. All connections to the atomizer (oil, air, cooling water, feed, electrical controls) are through one central terminal stand which is located in the spray dryer penthouse. A continuous air/oil cooling and lubrication system is used for the upper and lower bearings. Cooling water is circulated through the atomizer jacket. Wet scrubber effluent in fed through an integral disperser in the atomizer prior to injection to the rotating wheel.

The spray dryer has undergone some minor changes since the original construction. These changes include the installation of several vibrators to the exterior of the spray dryer cone to minimize ash build up on the walls of the cone.

2.2.6 Location of Combustion Zone Temperature Devices

Temperature refers to the temperature of the flue gas from a point midway down the rotary kiln to a point within the SCC. It is in this region that volatilized organic compounds are thermally destroyed. The normal operating temperature range for the flue gas in the SCC is 1,795°F to 2,250°F. Flue gas temperature measurements in the SCC are made by temperature monitoring devices (TMDs) located as follows:

Elevation	Identification No.	Location
El.724'0"	TI-4300 A	North side of SCC
El.724'0"	TI-4300 B	South side of SCC
El.743'0"	TI-4310 A	North side of SCC
El.743'0"	TI-4310B	South side of SCC
El.765'0"	TI-4503 A	North Side of SCC Roof
El.765'0"	TI-4503 B	North Side of SCC Roof

These TMDs are used to maintain constantly updated temperature readings to allow for optimum destruction of the volatilized organic compounds and for optimum kiln operating conditions.

The temperature after the SCC remains constant for a given set of operating conditions. The temperature is controlled by modulating the rate at which high Btu liquids are injected into the kiln to maintain proper permitted temperature conditions. The concentration of oxygen in the flue gas leaving the ESP and/or the temperature of the flue gas in the SCC is used to control the waste flow to the high Btu liquid lance on the front wall of the rotary kiln. The primary air fan damper controls the oxygen concentration for proper combustion and is modulated as necessary to maintain proper oxygen concentrations to achieve optimum combustion conditions in the kiln. Maintaining the proper fuel to air ratio in the combustion zone using the high Btu lance and primary air fan damper, optimal operation will be achieved.

WTI refers to the "kiln temperature" from TI-4300A or TI-4300B because both TMDs are located at the same elevation in the SCC (El 724'0" north and south sides). The logic used with these two devices is the one obtaining the lowest temperature reading is used to determine compliance with the current temperature limits. The use of redundant TMDs allows for failure of one device and provides time for repair without stopping waste feed. The current measuring points for the kiln and SCC temperatures are located within a few feet of each other (see **Figure 2-2**).

2.2.7 Hazardous Waste Residence Time

The HWC MACT rule defines hazardous waste residence time as *"the time elapsed from cutoff of the flow of waste into the combustor until solid, liquid and gaseous materials from the hazardous waste exit the combustion chamber."* This is a regulatory term used to define when a unit is operating under a hazardous waste combustion mode. For the purposes of establishing the residence time for WTI's rotary kiln system, this calculation is based on the time required for solid materials to pass through the kiln. This computation is a function of the diameter and length of the kiln, the angle of inclination and the kiln rotational speed. The equation for residence time is as follows:

RT = KL / [(Tan IA) x (KS) x (Pi) x (KID)]

where,

RT = residence time, minutes

KL = Kiln length = 43 ft.

IA = Inclination angle = 3 degrees = 0.05236 radians

KS = Kiln rotation speed, which varies from 0.05 to 0.5 rpm

Pi = constant = 3.14159

KID = Kiln inside diameter = 14.5 ft.

At a kiln speed of 0.05 rpm, the solid phase residence time would be 360 minutes or 6 hours. At a rotational speed of 0.5 rpm, the residence time would be 36 minutes. Based on the RPM curve above, a computation is preformed to provide the operator with a "counter" representing the amount of time left until the kiln is burned out and no longer is under the MACT Subpart EEE regulations. The counter is reset to 360 after every bulk or drum feed. When the counter counts down from 360 to 0 and there are no lances established, the waste retention flag is no longer set.

2.3 Feed Systems Description

2.3.1 Liquid Waste Feeds

The front wall of the kiln is equipped with six (6) steam or air-atomized pumpable waste lances referred to as the organic lance, the high Btu lance the aqueous lance, the slurry lance, the sludge lance, and the secondary sludge lance:

Designed by – Von Roll Inc.; Manufactured by – North American Manufacturing Inc.

- High Btu Lance Tag No. X3110 (Maximum flow rate – 10,000 lb/hr)
- Organic Lance Tag No. X3120 (Maximum flow rate – 10,000 lb/hr)
- Aqueous Lance Tag No. X3140 (Maximum flow rate – 10,000 lb/hr)

Designed and Manufactured by – Wolfensberger/Southwire Inc.

- Sludge Lance - Tag No. X3130 (Maximum flow rate – 10,000 lb/hr)
- Sludge (secondary) Lance Tag No. X3160 (Maximum flow rate – 10,000 lb/hr)
- Slurry Lance - Tag No. X3150 (Maximum flow rate – 10,000 lb/hr)

Designed and Manufactured by – North American Manufacturing, Inc.

- Natural Gas Front Wall Burner - Tag No. X3510 (Maximum Btu rate – 60 x 10^6 Btu/hr)

The sources of the waste for these lances can vary depending on the operation plan for any specific day. Typically, one or two of those lances are being used for material being directly fed from a tanker, and one of those lances is being used for material being fed directly from a drum. The lances that are assigned to these streams will vary. The remaining lances are being fed from the liquid waste tank farm or the pump-out tanks.

The front wall natural gas burner is provided for startup and firing to maintain kiln temperature when necessary.

Drawing M-06-2-04302 (**Appendix B**) shows the sludge, secondary sludge, and slurry lance details. Drawing C7-2872 (**Appendix B**) shows the high Btu, organic, and aqueous lance details. All lances, with the exception of the secondary sludge lance are therminol-cooled. The secondary sludge lance is water- cooled.

2.3.2 Solid Waste Feeds

Solid wastes are fed into the incinerator through a common feed chute from three different sources: containerized material, the skip hoist, and the bulk solid pits. The containerized feed system can feed any container that will physically fit through the feed chamber. Currently, 55 gallon drums (paper and metal), 85 gallon over packs, boxes of various sizes, 5 gallon buckets, and various cans are fed via this system. There are no individual weight restrictions, however there is a total solid feed limit which encompasses all solid feed mechanisms and does not restrict feeds from either mechanism. The solids feed to the kiln may be a combination of the three mechanisms or entirely from one of the feed mechanisms as long as the feed limit is maintained. Currently, the frequency of pushes is set at approximately 50 seconds per push. A drawing detailing this system (Drawing No. I-02-1-00004) is enclosed in **Appendix B**.

2.3.2.1 Feed Chute

The kiln feed chute extends into the kiln so that containers and loose solids are injected well into the first zone of the kiln. The chute is liquid-cooled.

2.3.2.2 Containerized Feed System

The containerized material consists of drums, over-packs, boxes, buckets, and cans. This material is either prepared in the container processing area for incineration or is incinerated as it is received. This material is placed onto a conveyor carriage where it is transported to the front wall of the kiln. Each container is pushed onto a short roller conveyor and then enters the drum pre-chamber. Drums and containers fed to the kiln are weighed by a scale built into the conveyor prior to entry into the kiln. Once the container is inside the pre-chamber, an inner door to the kiln opens, and the container is pushed down the feed chute.

2.3.2.3 Bulk Solid Waste Feed Systems

Two systems are provided for feeding bulk solids to the kiln: an overhead crane and a skip hoist.

Bulk solid material is accumulated in two bulk solid pits. This material is placed into these pits from a variety of containers including drums, boxes, waste sacks, roll-off boxes, and dump trailers. These solids are then fed to the feed chute using a clamshell crane. The solids are dropped from the crane onto a set of inner doors. Once the outer doors have closed, these inner doors open allowing the solids to feed down the chute to the incinerator. An overhead crane and bucket mixes loose solids prior to feeding the material into the rotary kiln feed chute. Up to 2 $^1/_2$-ton lifts can be delivered to the kiln using the overhead crane. Solids fed to the kiln via the bucket are weighed by a load cell.

The skip hoist loading platform and conveyance system is located outside and on the south side of the incinerator feed building next to the direct drum pump-out stations. The skip hoist is used to convey waste material in metal containers from ground level directly into the feed chute hopper for the incineration system. This container is lifted to the fourth floor of the incinerator feed building where it is automatically placed onto a tipper assembly. The tipper then inverts the container over the bulk solid feed chute and deposits the material onto a set of inner doors. Once the outer doors have closed, the inner doors open allowing the skip hoist material to feed down the chute into the incinerator. The skip hoist is capable of ten, one ton feed cycles per hour.

2.3.3 Process Vent Streams [CONFIDENTIAL SYSTEM]

The process vent system is supplied by the waste storage and waste processing areas throughout the facility. The waste storage areas include the organic tank farm, the pump-out tanks, the drum warehouse, and the bulk solids pits. The process areas include the external truck wash, the drum sampling area, the drum splitting area, the drum pump-out area, the drum extruder, the two direct tanker feed bays, and the direct drum feed system.

[redacted]

2.3.4 Supplemental Fuels

Fuel oil and natural gas are two supplemental fuels that are used in the incineration process. There are gas burners present in the front wall of the rotary kiln which are used during heat up and cool down periods and when incineration conditions require additional fuel. The fuel oil is fed to the organic lance from a dedicated fuel tank in the Tank Farm. This material is used during heat-up and cool-down periods and to maintain

temperature while waste is not being fed to the kiln. There are also gas burners present in the secondary combustion chamber but the gas lines have blind flanges installed and therefore the burners are not functional.

2.3.5 Waste Handling and Blending Operations

When containerized materials are received at the facility, they are off-loaded from trucks to the processing area. A unique bar code is assigned to each container and the materials are sampled, inspected, and palletized. By permit, at least 10% of containers are sampled for "fingerprint" analysis. This is to assure that the waste that is received is the same as the waste that was approved initially. All containers (unless there is a safety reason not to) are inspected. In addition to the fingerprint analysis, WTI performs compatibility testing for all bulk loads and drummed waste that is pumped into tanks. Wastes having similar compatibility ratings are mixed and blended into the appropriate tanks.

Once the material has been approved by the lab (based on the 10% sample), one of the operations planners schedules the waste for processing. A treatment process is assigned to each container. The containers are pulled from the warehouse and, based on the assigned treatment process, the material will go in one of several directions:

- It can go to be dumped into the bulk solids pits;
- It can go to be pumped out into a tank;
- It can go to the extruder, (devise that punches a hole in the bottom of the drum and crushes the drum to remove the material);
- It can go directly to one of the 5 queuing lanes;
- It can be sent to be pumped directly to one of the lances;
- It can be sent to a materials preparation area called the "splitting station"; or
- It can be loaded into the skip hoist.

Wastes that are fed to lances from the liquid waste tank farm are blended according to operational needs. Blending is done to meet specifications for heating value, water content, halogen content and other feed parameters. This waste is pumped into the tank farm from bulk liquid tankers and the pump-out tanks. The material in the pump-out tanks is received in drums and totes. This material is accumulated in one of the pump-out tanks, which can either be fed directly to the incinerator or pumped to the liquid waste tank farm for blending.

2.3.6 Procedures for Rapidly Stopping Hazardous Waste Feed During Equipment Malfunction [CONFIDENTIAL]

If the facility experiences an equipment malfunction or catastrophic equipment failure that is not directly related to the existing automatic waste feed cut off system, the control room operator would take action to manually shut down waste feeds. The control room operator has total control over all waste feed controls. This includes all waste feed lances as well as bulk solids. [redacted] In the event of a catastrophic equipment malfunction, the control

room operator will initiate the function that will systematically shutdown all waste feeds, virgin fuel feeds, as well as all combustion air fed to the incinerator.

2.4 Air Pollution Control Equipment

The flue gas cleaning system (FGCS) consists of a NO_x control system and an electrostatic precipitator (ESP) followed by a quench and multistage wet scrubber. The system is also equipped with a proprietary activated carbon injection system for controlling PCDD/PCDF and mercury emissions. The overall FGCS also includes an induced draft fan, a plume suppression system and exhaust stack, each of which is described below.

2.4.1 Electrostatic Precipitator

A three field ESP (manufactured by Environmental Elements Corporation) is used as the primary stage of particulate emission control. The precipitator is of rigid electrode design and each field in the unit is electrically independent. Total collection plate area for the ESP is 42,075 ft^2. The ESP has three separately controlled, electrically isolated fields. The design parameters for these fields are as follows:

Field Number	Primary Voltage	Maximum Primary Current	Secondary Voltage	Maximum Secondary Current
1	480 V	85 AAC	55 kV	500 mADC
2	480 V	85 AAC	55 kV	500 mADC
3	480 V	128 AAC	55 kV	750 mADC

The control console for each field regulates the power supplied by the transformer/rectifier set to the collection electrodes for highest collection efficiency. The controls can be set based on spark rate or secondary voltage limit. The operating parameters vary as dust loading or precipitator conditions change. The minimum ESP secondary current OPL listed in Table 2-1 applies to each field of the ESP. The automatic voltage controller (AVC) is manufactured by Environmental Elements and it is a Digicon Optipulse Controller #PN0803.

The precipitator is conservatively designed for 99.7% removal efficiency at the design dust loading, which includes dust from the spray dryer system. The ESP operates with all three fields online. The ESP is sized for an approximate inlet dust load of 11.2 gr/dscf of flue gas. The anticipated actual average loading is approximately 5.2 gr/dscf.

The precipitator is equipped with an electric impulse rapping system to remove fly ash from collecting surfaces. This rapping system is automatically controlled by a PLC. The PLC controls the frequency with which the rappers are utilized. This rapping system will be operated during the CPT in the same manner in which it is operated during normal operation. Hoppers are provided under the collecting surfaces of the precipitators. These hoppers automatically accumulate and feed the spray dryer salts and fly ash to a conveying system. The hoppers are insulated to prevent condensation of the flue gas on the interior of the hoppers. Fly ash from the precipitator is combined with fly ash from the boiler and accumulated in a closed elevated silo prior to disposal. Flue gas from the ESP passes to the quench section for cooling and further cleaning.

2.4.2 Flue Gas Quench

The flue gas discharged from the ESP is cooled further by a quench to protect the downstream scrubbing equipment. In the quench section, the flue gas is cooled from approximately 380°F to the saturation temperature of approximately 170°F using recycled process water. During the quench step some of the hydrogen halides in the flue gas are removed. The flue gas pressure drop across the quench is approximately one inch water column. Bleed off from the quench section is sent to the neutralization system and ultimately to the spray dryer. The quench sump level is maintained with scrubber bleed off from the first packed bed stage.

2.4.3 Low Energy Packed Bed Scrubber

The removal of SO_2 and hydrogen halides is accomplished with a multistage, packed bed flue gas scrubber. The packed bed tower consists of two packed bed absorbing sections followed by a venturi (Ring Jet ™) stage and associated mist eliminators (refer to drawing I-06-2-31215). Hydrogen halides are removed in the first packed bed stage of the scrubber. Spray nozzles are used to distribute scrubber liquor evenly over the first packed bed. The first packed bed consists of vonRoll packing (or equivalent) packing with a bed depth of 1.6 meters (refer to the attached data sheet for the scrubber packing). The extensive surface are of the packing material maximizes absorption of the hydrogen halides. The scrubber liquor is collected in a sump beneath the packed bed and is recirculated to the spray nozzles. The recirculation flow rate remains constant during normal operation and the liquid to gas ratio (gpm scrubber liquor per 1000 acfm flue gas) varies depending on the exact scrubber inlet gas flow rate.

Bleed off from the first packed bed section is sent to the quench stage as makeup. Makeup to the first packed bed stage is supplied as required to maintain sump level from the second packed bed recirculation bleed off.

Sulfur dioxide is removed in the second packed bed of the scrubber. The process is very similar to the one described for the first packed bed with the exception that sodium hydroxide is injected into the recirculated scrubber liquor to maintain the pH of the second packed bed stage at the proper level. The second packed bed consists of vonRoll Hiflow Ring 50-6 Plastic packing (or equivalent) at a depth of 2.9 meters. The scrubber liquor is collected in a sump beneath the packed bed and is recirculated to the spray nozzles. Makeup to the second packed bed is supplied as required to maintain sump level from the venturi stage recirculation bleed off.

2.4.4 High Energy Venturi Scrubber Stage

Flue gas leaving the second packed stage passes through a mist eliminator before entering the final stage of the scrubber system. The venturi stage is comprised of a multitude of venturi-type, Ring Jets™ for the removal of sub-micron-sized particles and aerosols from the flue gases. A dedicated sump and recirculation pump provides scrubbing liquor flow to the manifold feeding the Ring Jets.

The flue gas stream is divided into a number of smaller streams, which are forced through the individual Ring Jets. Due to the shape of the Ring Jets, the flue gas is accelerated to high velocities. At this point the scrubbing liquid is injected into the gas stream. The significant difference in velocity of the gas and the liquid droplets causes the particles entrained in the flue gas stream to impact on the water droplets. This causes the small particles to be absorbed and thus removed by the scrubbing liquid droplets. Separation of the droplets occurs in the mist eliminator section following the Ring Jets.

The liquid flow rate to the Ring Jets stage is controlled in response to the gas side pressure drop. This feature allows for a constant operating pressure differential across the stage and, therefore, constant removal efficiencies at different flue gas flow rates. A final mist eliminator system follows the venturi stage in the scrubber. Cleaned flue gas exits the scrubber and is drawn into the ID fan.

A continuous blowdown of scrubber liquor from the scrubber neutralization system is pumped as makeup to the spray dryer feed tank. The blowdown liquor is evaporated and salts are purged in the bottom ash system. The cascaded bleed off and makeup process described above for the packed bed and venturi scrubber stages provides liquor for makeup for the separate scrubber sumps, and purges salt accumulations from the scrubbing liquor.

Mist eliminators are installed at the outlet of all four stages of the scrubber in order to remove entrained moisture droplets. Chevron type mist eliminators are utilized that are constructed from polypropylene injection elements on a building block system. The mist eliminators are rinsed intermittently with scrubber liquor. The rinse water is collected with the scrubber liquor in the sump for each stage.

The design of the quench tower also includes provisions for emergency cooling water in the event of an increase in the temperature of the flue gas entering the scrubber tower.

2.4.5 Induced Draft Fan

The ID fan removes gases from the scrubber and discharges the gas stream through a plume suppression system (reheater) to the stack. The ID fan is sized to convey up to 96,500 acfm at a static pressure rise of 58 inches w.c.

2.4.6 Plume Suppression System

Saturated flue gas from the ID fan is discharged through a mixing chamber in which hot air is added to the flue gas to reheat the stack gas to approximately 190°F. The objective is to suppress the visible plume so that opacity can be measured. The plume suppression system is operational during normal operation. Reheat air from the plume suppression system has no effect on emission results since the concentrations are corrected to a standard oxygen or carbon dioxide concentration for evaluation, thereby eliminating the effects of stack gas dilution.

In order to comply with the permitted process air limit, WTI must account for the amount of reheat air added to the system. This is accomplished by subtracting the reheat flow from the measured stack flow as follows. FI-7510A/B is the calculated process flow in scfm through the Incinerator. The stack flow monitor (FI-7805) is the raw value measured in the stack using a United Sciences Inc. Ultraflow 100 monitor. Reheat air is injected into the ductwork of the stack after the induced draft fan. WTI also measures the actual reheat flow with a USI Ultraflow 100 monitor (FI-7710). By subtracting the reheat flow measurement from the stack flow measurement, the total process flow is calculated and indicated on Tag FI-7510A/B. A redundant process flow monitor is located in the duct exiting the scrubber. This instrument is also a United Sciences Inc. Ultraflow 100 monitor and is identified as FI-7510B.

2.4.7 Scrubber Water Conditioning System

The scrubber water conditioning system is designed to remove acidic compounds from the waste water stream by converting these compounds to salts. To achieve this, basic compounds such as lime ($Ca(OH)_2$), caustic ($NaOH$) or soda ash (Na_2CO_3) are used. The acidic reaction with lime converts primarily to $CaCl_2$. The acidic reaction with caustic or soda ash converts primarily to Na_2SO_4. The quantity of caustic and slaked lime consumed is dependent on the type and quantity of acid gas constituents in the flue gas. In order to keep the pumps associated with the neutralization system operating properly, the system is periodically blown down to remove solids. The volume blown down is then replaced by blowdown from the quench stage of the scrubber.

The effluent from the scrubber water conditioning system is used in the spray dryer to control the inlet temperature to the ESP.

2.4.8 Activated Carbon Injection System [CONFIDENTIAL SYSTEM]

An enhanced carbon injection system (ECIS) was installed in 1993 to improve control efficiency for organics (primarily PCDDs/PCDFs) and to further control mercury emissions.

[redacted]

The overall system consists of [redacted] The carbon used in the ECIS will meet or exceed the following specifications as currently defined by permit:

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

2.4.9 Exhaust Stack

The stack for this system is 150 ft in height, 6 ft in diameter, and is constructed of carbon steel. Three access platforms are provided for stack sampling and for the permanently installed continuous emission monitors.

2.4.10 Air Pollution Control Equipment Maintenance Practices

2.4.10.1 Electrostatic Precipitator

Monthly PM is performed on the ESP. The operator checks the ESP voltages and currents four times a day. During outage there are planned PM that includes inspecting and cleaning the electrodes, transformers, perforations plates, rappers and controls, ash high transmitters and probes, inlet and outlet pressure transmitters, and the control cabinets in the 05 E/I are cleaned, inspected and all connections are tightened. The rappers in the ESP operate on a continuous basis.

2.4.10.2 Scrubber Tower

The operators inspect the scrubber twice per shift. Pumps are inspected for leaks, inlet pressure, discharge pressure, vibration, and oil level. The emergency nozzles are inspected once per shift as are the carbon injection lines. The scrubber has weekly PM performed by operators and E/I technicians. The operators inspect all manual hand valves for operation, leaks and leak through. E/I technicians inspect and recalibrate the pH probes as necessary. During planned outages, the scrubber has PM for both electrical and mechanical components. The mechanics inspect, change oil, and adjust impeller clearances, and check coupling alignment on the 1st, 2nd, 3rd, and 4th stage pumps. The automatic makeup water valve from the fire water system is inspected and tested; all level control valves are inspected and repaired/replaced as needed. The

quench stage nozzles are removed, cleaned and replaced if they are worn. The E/I technicians remove all level transmitters from all four stages of the scrubber and they are cleaned, tested, recalibrated, and reinstalled. Likewise, the pressure transmitters are cleaned, tested, recalibrated, and reinstalled. Low-level switches are cleaned and tested. The motors on the 1st, 2nd, 3rd, and 4th stage pumps are inspected and greased. During outage, the scrubber is drained and inspected by Operation and Engineering Department personnel. The rubber lining on the walls and interior structures is inspected for deterioration, mist eliminators are inspected for placement, damage and plugging. The packed bed modules are inspected for deterioration, plugging, and damage. The quench elbow insulating brick is inspected for missing brick, deterioration or damage. The 4th stage ring jets are inspected for plugging, bad hoses or damaged nozzles, and repairs or replacements are made as necessary.

2.5 Process Monitoring [CONFIDENTIAL]

The plant distributed control system (DCS) is a [redacted] system. Process and motor control are performed in the DCS. The operator control console is located in the control room and consists of three operator stations, each with two screens.

The natural gas burners are supervised by microprocessor-based flame safety systems. Burner status and control are provided for in the DCS. The auxiliary fuel supply set point, which indicates a failure, is the natural gas supply side pressure.

2.5.1 Automatic Waste Feed Cut-off (AWFCO) System [CONFIDENTIAL SYSTEM]

The computerized process control and instrumentation system is programmed to automatically cut off all waste fed to the incineration system in the event of one or a combination of circumstances. A summary of the primary operating parameter limits (OPLs) tied into the AWFCO system as regulated by MACT is provided in **Table 2-1.** Additional parameters or situations that would result in a waste feed cutoff are summarized below.

[redacted]

[redacted]

2.5.2 AWFCO System Testing

The automatic waste feed cutoff system is tested on a weekly basis in accordance with current permit requirements. Every MACT parameter is tested weekly through a software simulation of each MACT exceedance to verify that the AWFCO system is operating correctly.

2.5.3 Parameters to be Monitored to Ensure Compliance with MACT Standards

A variety of process parameters are monitored to ensure ongoing compliance with applicable MACT standards. An overall matrix depicting current operating parameter limits (OPLs) is provided in Table 2-1 (referenced earlier).

2.5.4 Stack Flue Gas Monitoring Equipment

An extensive array of instrumentation is used to monitor the stack gas stream on a continuous basis. A brief description of the CEMS instruments including the operating range and measurement principal is provided in **Table 2-2**. A detailed summary of the maintenance practices performed on these instruments is presented in Section 6.0 of WTI's "Quality Assurance Plan for the Continuous Emission Monitoring Systems", Revision 6, dated March 4, 2005.

2.6 Alternative Monitoring Procedures

All existing alternative monitoring procedures in place will remain in effect for this confirmatory test.

Figure 2-1 General Process Flow Schematic

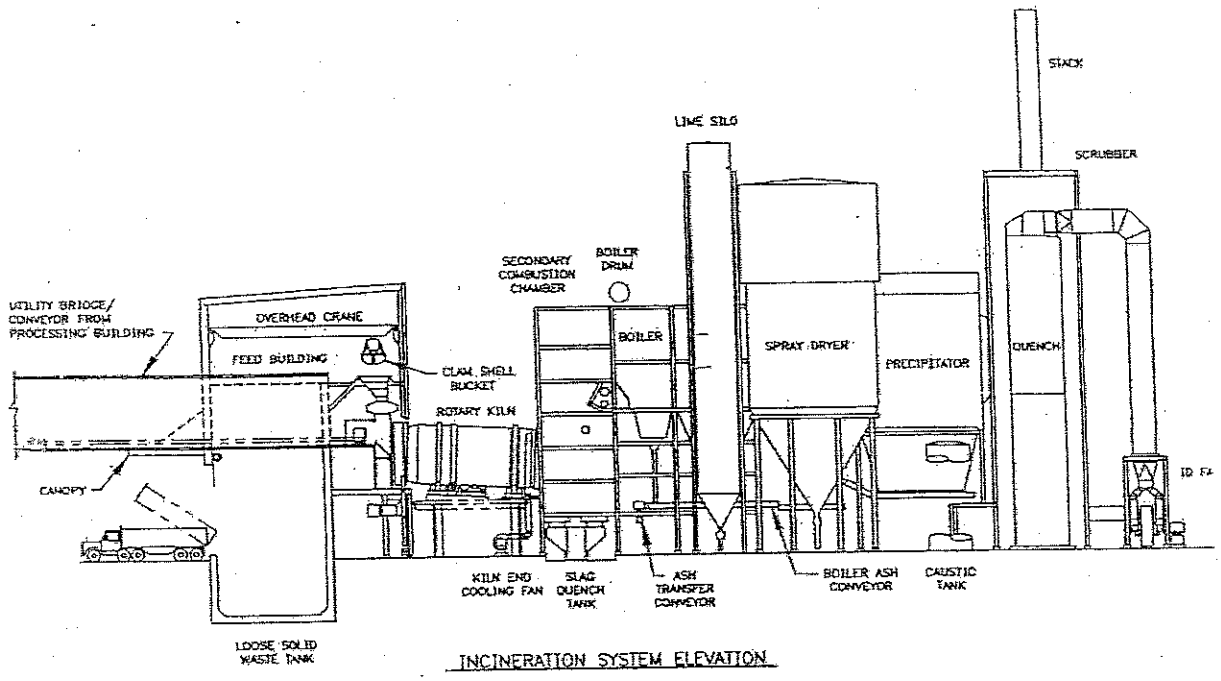


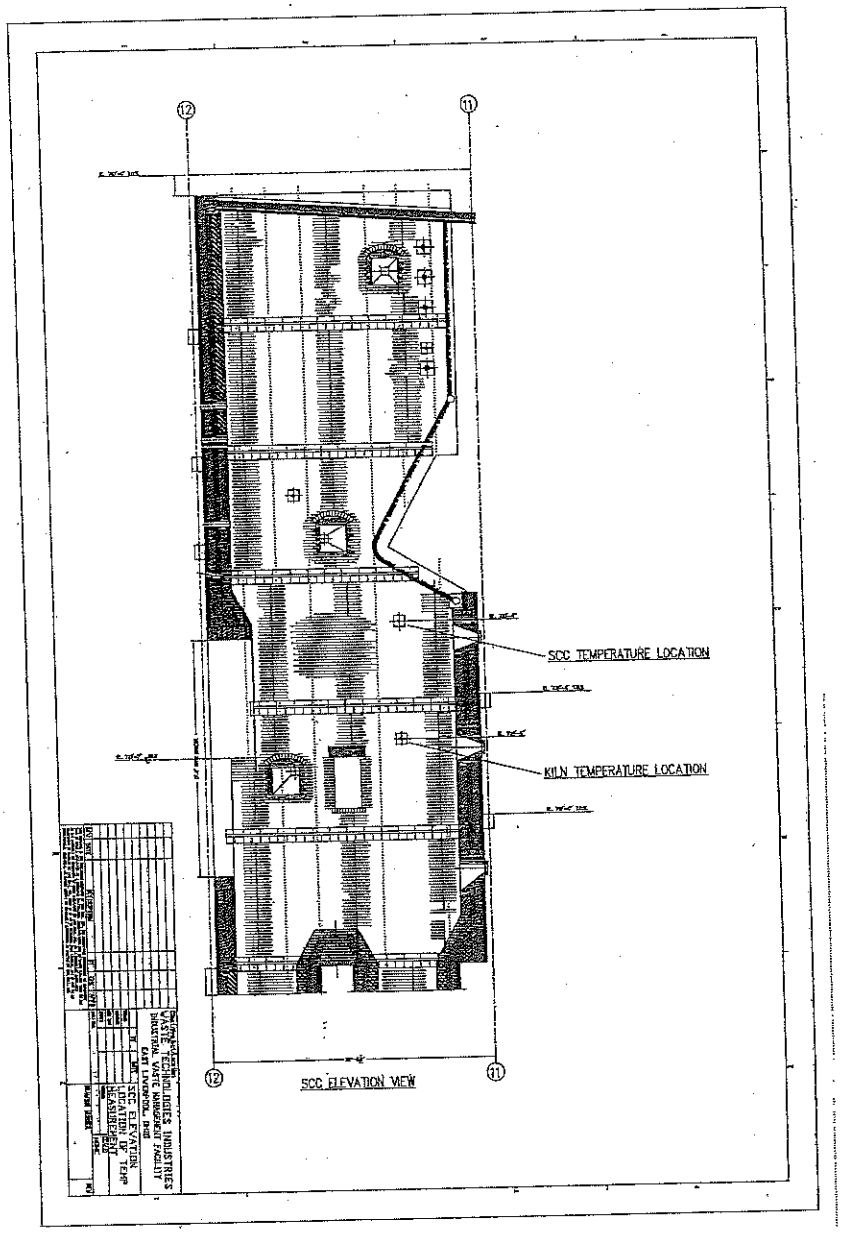
Table 2-1 MACT Operating Parameter Limits following 2010 CPT [CONFIDENTIAL]

Process Parameters	Tag ID	Units	MACT OPL
Maximum Total Waste Feed Rate	WQI-9000F	lb/hr	35,069
Maximum Pumpable Waste Feed Rate	WQI-9000T	lb/hr	29,926
Minimum Feed Lance Atomization Pressure	Multiple	psig	30
Maximum SCC Pressure	PIC-4300	in. w.c.	See US EPA Letter 9/4/2003
Maximum Ash Feed Rate	WQI-9000AH	lb/hr	10,333
Maximum Total Chlorine Feed Rate	WQI-9000CL	lb/hr	2,032
Maximum Total LVM Feed Rate	WQI-9000LV	lb/hr	400
Maximum Total Pumpable LVM Feed Rate	WQI-9000PLV	lb/hr	400
Maximum Total SVM Feed Rate	WQI-9000SV	lb/hr	83.2
Maximum Total Mercury Feed Rate	WQI-9000M	lb/hr	0.14
Maximum ESP Inlet Temperature	TI-6002	°F	424
Minimum ESP Power Input to each Field	EI-6700,6710,6720	mA	100
Minimum Kiln Temperature	TI-4300	°F	1,718
Minimum SCC Temperature	TI-4310	°F	1,747
Maximum Process Gas Flowrate	FI-7510	wet scfm	67,505
Minimum Carbon Feed Rate – Location 1	WI-7003	lb/hr	[redacted]
Minimum Carbon Feed Pressure – Location 1	PI-5732	psig	3.0
Minimum Carbon Feed Rate – Location 2	WI-7002	lb/hr	[redacted]
Minimum Carbon Feed Pressure – Location 2	PI-7132	psig	3.0
Minimum Ring Jet Pressure Drop	DPI-7401	in. w.c.	28.0
Minimum Scrubber (1st & 2nd Packed Bed) Liquid Flowrate	FQI-7201	gpm	1,287
Minimum Scrubber (1st & 2nd Packed Bed) Combined Pressure Drop	DPT-7207, 7307	in. w.c.	1.3
Minimum Scrubber (Ring Jet) Liquid Flowrate	FI-7404	gpm	446
Minimum Scrubber (Ring Jet) Blowdown	FI-7403	gpm	19.5
Minimum Scrubber (Ring Jet) Sump Level	LIC-7401	ft	1.7
Minimum Scrubber (3rd Stage) Liquid pH	AI-7307	pH units	7.6
THC Concentration @ 7% O_2	AI-7851	ppm	10

Table 2-2 Continuous Emission Monitoring System

Location	Instrument Type	Meas. Basis	Range	Mfg.	Model No.	Serial No.
Process Flow	Flow	Wet-scfm	0-80,000	USI	Ultraflow 100	9401820
	Calculated Flow	Wet-scfm	N/A	N/A	N/A	N/A
Reheat Flow	Flow	Wet-scfm	0-50,000	USI	Ultraflow 100	Q-08572U-0793
Stack Outlet	THC #1 (certified at 2 ranges)	Wet	0-100 ppm 0-500 ppm	CAI	600HFID	U12054
	THC #2 (certified at 2 ranges)	Wet	0-100 ppm 0-500 ppm	CAI	600HFID	U12055
	O_2	Dry	0-25 %	Ametec	2000	C127340-1
	O_2	Dry	0-25 %	Ametec	2000	10206379
	O_2	Wet	0-25 %	Ametec	2000	C101180-102
	O_2	Wet	0-25 %	Ametec	2000	10206503
	CO	Dry	0-750 ppm	Thermo Scientific	48i	CM10360078
	Stack Flow	Wet-scfm	0-100,000	Teledyne	Ultraflow 150	1501036
	Stack Flow (Calculated)	Wet-scfm	N/A	N/A	N/A	N/A

Figure 2-2 SCC Elevation Showing Location of Temperature Measurement


SCC TEMPERATURE LOCATION
KILN TEMPERATURE LOCATION
SCC ELEVATION VIEW

3.0 Incinerator Feed Stream Descriptions

3.1 General Overview [CONFIDENTIAL]

This section provides a description of the primary hazardous waste streams that are managed within the WTI plant hazardous waste management program. Other non-hazardous incinerator feed materials are also described. Waste feed rates are monitored through the [redacted] and logged to a data logging system. The data logging system logs the current flow value every minute for the waste feed lances and logs the scale weight from the crane. The system receives the weight for the Drum conveyor and also from the skip hoist using the facility's waste tracking computer system (ARTS). Currently, Coriolis mass flow meters, positive displacement pumps, and load cells (scales) are used to measure waste feed rates to the incinerator.

The waste feed materials handled by the facility cover a wide range of waste codes and hazardous constituents. Because of the potential wide range in materials handled, WTI does not normally analyze the feed materials for hazardous air pollutants (HAPs) as defined by Section 112 of the Clean Air Act. However, review of the HAPs list indicates that all HAPs could be processed in the incinerator except for the following constituents that are specifically excluded from the facility's permit:

- Asbestos;
- Chlorine (gaseous);
- PCBs > 50ppm;
- 2,3,7,8-TCDD; and
- Radionuclides

3.2 Liquid Waste Feeds

Liquid wastes are injected into the incinerator through six different waste lances in the front wall of the kiln. These lances are referred to as the Organic lance, the High Btu lance, the Aqueous lance, the Slurry lance, the Sludge lance and the Secondary Sludge lance. The sources of the waste for these lances can vary depending on the operation plan for any specific day. Typically, one or two of those lances are being used for material being directly fed from a tanker and one of those lances is being used for material being fed directly from a drum. The lances that are assigned to these streams will vary. The remaining lances are used for materials from the liquid waste tank farm or the pump-out tanks.

3.2.1 Tank Farm Waste Feed Materials

Wastes that are fed to lances from the liquid waste tank farm are blended according to operational needs. Blending is done to meet specifications for heating value, water content, halogen content and other feed parameters. The characteristics of these streams vary depending on waste requirements.

3.2.1.1 High Btu Waste

High Btu waste is typically fed through either the High Btu lance or the Organic Lance and is used to maintain the minimum temperature in the kiln during waste operations. This waste stream typically consists of spent

solvents or used oil that cannot be recycled. These wastes are blended at a TSDF to meet our specifications for High Btu material. This waste typically has a heating value greater than 10,000 Btu/lb, a water content less than 10%, and a chloride content less than 10%. It is rare to see halogens other than chloride in this waste. Because this waste is used to control temperature in the kiln, there are very rarely any restricted feed metals in this waste.

3.2.1.2 Organic Waste

Organic waste is typically fed through Organic Lance, the Sludge Lance, or the Aqueous Lance. This stream is typically solvent material with either too much water, too high halogen content, or too little heating value to be used as a High Btu waste. This material typically has a Btu value less than 10,000 Btu/lb. These streams can have halogen contents as high as 80% but typically are less than 30%. While restricted metals can be present in these wastes, it is rare that any significant concentrations of these metals are found in the waste.

3.2.1.3 Sludge Waste

Sludge waste is typically fed through the Sludge Lance or the Slurry Lance. This material is generated from a variety of sources and is received in both tankers and drums. Typically, paint waste, refinery waste, still bottoms, and sump clean-outs make up the majority of this stream. The solids content of this stream is higher than other wastes, but it must be pumpable. These wastes usually have at least 30% water. It typically has a heating value of between 4,000 and 8,000 Btu/lb. While restricted metals are present in these wastes, it is rare that any significant concentrations of these metals are present.

3.2.1.4 Slurry Waste

Slurry waste is typically fed through the Sludge Lance or the Slurry Lance. This is waste that will have at least two distinct layers. One layer is typically aqueous and one is typically solvent. Most of this material is generated from drums that are pumped into tanks. Due to the variety of materials that can be pumped out, the specifications for this waste will vary greatly.

3.2.1.5 Aqueous Waste

Aqueous waste can be fed through any of the lances in the front wall, but most typically is fed through the Aqueous Lance and the High Btu Lance. This material represents a waste having a water content of at least 50% and a heat value of no greater than 3,000 Btu/lb. The halogen content is usually less than 15%, but may be higher on occasion. Because of the volume of material that is received of this type, it is rare that any restricted metals are seen in these streams.

3.2.2 Direct Tanker Waste Streams

There are two bays present at the facility where a tanker can be processed directly to the kiln without going through the tank farm. This is done because the material is potentially incompatible with material in the tanks or needs to be heated in order to be offloaded. At times, both bays may have material being processed to the kiln at the same time.

The South bay is typically utilized for monomers, chlorosilanes, and materials that need to be heated. Chlorosilane waste is the most common material that is processed through this bay. This stream will have a chloride content of between 20 and 80%. This stream also produces fly ash when incinerated due to the Silicon content.

The East bay is utilized for strong acids, oxidizers, amines, and other materials with may react with the material in the Tank Farm. Typically, no monomers or streams with high solids are processed through this bay due to the length of the piping to the lance.

Restricted metals may be present in either of these direct tanker streams, although it is rare for metals to be present.

3.2.3 Direct Drum Feed Materials

Pumpable materials that are not compatible with material that is in tanks or the materials of construction of the tank systems are pumped directly to a lance without being processed through a tank. There are currently two pumps, which can go to two different lances. Materials are separated into different types of waste based on halogen content, reactivity hazard, and compatibility groups. The following is a list of some typical waste streams that are processed through the Direct Drum feed system:

Cyanide Solutions

Monomers	Chlorosilanes	Grignard Reagents
Metal Chlorides in solution	Strong Acids	Amines
Various water reactive materials		

Many of these materials have a metal content that will restrict the flow rate to the lance. For example cyanide solution may contain silver or chromium cyanide from metal plating operations. The concentration of these waste streams is typically limited so as not to exceed the hourly feed restriction.

3.3 Solid Waste Feeds

Solid wastes are fed into the incinerator through a common feed chute from three different sources: containerized material, the skip hoist, and the bulk solid pits.

The containerized material consists of drums, over packs, boxes, buckets, and cans. This material is either prepared in the container processing area for incineration or is incinerated as it is received. This material is placed onto a conveyor carriage where it is transported to the front wall of the kiln. Each container is pushed onto a short roller conveyor and then enters the drum pre-chamber. Once the container is inside the pre-chamber, an inner door to the kiln opens, and the container is pushed down the feed chute.

The skip hoist is used for material that is placed inside of a one cubic yard, metal container. This container is lifted to the fourth floor of the incinerator feed building where it is automatically placed onto a tipper assembly. The tipper then inverts the container over the bulk solid feed chute and deposits the material onto a set of inner doors. Once the outer doors have closed, the inner doors open allowing the skip hoist material to feed down the chute into the incinerator.

Bulk solid material is accumulated in two bulk solid pits. This material is placed into these pits from a variety of containers including drums, boxes, waste sacks, roll-off boxes, and dump trailers. These solids are then fed to the feed chute using a clamshell crane. The solids are dropped from the crane onto a set of inner doors. Once the outer doors have closed, these inner doors open allowing the solids to feed down the chute to the incinerator.

3.4 Process Vent Streams

The process vent system is supplied by the waste storage and waste processing areas throughout the facility. The waste storage areas include the organic tank farm, the pump-out tanks, the drum warehouse, and the bulk solids pits. The process areas include the external truck wash, the drum sampling area, the drum splitting area, the drum pump-out area, the drum extruder, the two direct tanker feed bays, and the direct drum feed system. Drawing No. 1-06-2-31202, which shows the vent systems air flow being fed to the kiln, is included in **Appendix B**.

3.5 Supplemental Fuels

There are two supplemental fuels that are used in the incineration process – fuel oil and natural gas. There is a gas burner present at the front wall of the rotary kiln that is used during heat up and cool down periods and when incineration conditions require additional fuel. The supplemental fuel oil is fed to the organic lance from a dedicated fuel tank in the tank farm and is used during heat up and cool down periods and to maintain temperature while waste is not being fed to the kiln. Typical fuel properties are noted in **Tables 3-1 and 3-2**.

Gas burners are also present in the SCC. However, these burners are no longer in use and will not be used during this CPT or any subsequent operation of the incinerator without prior notification to the regulatory agencies.

Table 3-1 Typical Properties for Supplemental Fuel Oil

Parameter	Units	Value	Parameter	Units	Value
Heat Value	Btu/lb	> 17,000	Chromium	ppm	2.0
Ash Content	% wt	< 5.0	Lead	ppm	< 20
Chloride Content	% wt	< 2.0	Mercury	ppm	N/A
Antimony	ppm	< 1.0	Nickel	ppm	< 10
Arsenic	ppm	< 1.0	Selenium	ppm	< 0.1
Barium	ppm	< 2.0	Silver	ppm	< 0.1
Beryllium	ppm	< 2.0	Thallium	ppm	< 0.05
Cadmium	ppm	< 5.0			

Table 3-2 Typical Properties for Natural Gas

Component	Units	Value	Component	Units	Value
Methane	mole %	94.428	Heptanes	mole %	0.019
Ethane	mole %	3.081	Octanes	mole %	0.005
Propane	mole %	0.582	Nitrogen	mole %	0.703
Isobutane	mole %	0.087	Carbon Dioxide	mole %	0.824
N-butane	mole %	0.129	Helium	mole %	0.014
Isopentane	mole %	0.040	Hydrogen	mole %	0.023
N-pentane	mole %	0.032	Argon	mole %	0.0
Hexanes	mole %	0.029	Oxygen	mole %	0.004
Parameter	**Units**	**Value**	**Parameter**	**Units**	**Value**
Heat Content, gross, dry	Btu/CF	1040.5	Relative Density	-	0.592
Heat Content, gross, sat.	Btu/CF	1023.6	Wobbe Index	-	1330

4.0 Performance Test Protocol

4.1 General Description

This CFPT Plan has been designed to confirm compliance with the dioxin/furan emission standard while the incinerator operates under normal operating conditions. These operating conditions will be within the range of the average level from the minimum level to the maximum that is allowed.

4.2 Applicable Performance Standards

The CPT for the WTI incinerator has been designed to demonstrate compliance with current performance standards of the Hazardous Waste MACT rule as follows:

- Conformance with the PCDD/PCDF emission limit of 0.20 ng/dscm corrected to 7% oxygen, expressed as toxic equivalents (TEQ);

4.3 Operating Conditions for the CFPT

This CFPT will be conducted under normal operating test conditions for the following parameters presented in **Table 4-1**. The table presents the parameter average, minimum and maximum values which will be used as the range of operation for these parameters during the test. Table 4-1 displays the average, minimum, maximum, and std. dev. of WTI's operating parameters over the past 12 months. The average values were determined by the sum of the hourly rolling average values recorded (each minute) over the previous 12 months, divided by the number of rolling averages recorded during that time. This data was constructed from system operating records logged when the unit was conducting waste operations.

4.4 Description, Preparation and Delivery of Feeds for the CPT

To the extent possible only normal waste materials processed at the facility will be fed to the incinerator during the test program. Pumpable waste materials will be stockpiled in appropriate feed tanks to meet the objectives for the target parameters. In order to ensure that appropriate solid materials are fed, drummed waste will be characterized in advance of the test and kept until needed. All waste materials will be delivered to the kiln in accordance with routine operation and currently permitted procedures as described elsewhere in this document.

4.5 Anticipated Test Schedule

This CPT is expected to take place over a 3-day period using a three-person field crew according to the schedule shown in **Table 4-2**. For this program, it is anticipated that all runs will be approximately three hours in duration, as dictated by the sample run time required for PCDD/PCDF measurements. The CFPT program for this incinerator is tentatively scheduled for the week of **July 16, 2012.**

4.6 CPT Reporting

The final report will be prepared for submittal no later than 90 days from completion of the field test program. This document will provide a concise presentation of performance test results and will include all necessary supporting documentation. An example outline of the final CFPT report / Notification of Compliance is presented below:

Section 1.0 Certification – Includes project title, statement of compliance and project approval signatures

Section 2.0 Summary of Test Results – Summary of emission results compared to applicable standards; interim status operating limits; overview of process operating conditions; and PET audit results and conclusions

Section 3.0 Project Overview – Facility and unit description; project background and scope; test requirements; test chronology and report organization

Section 4.0 MACT Notification of Compliance – Regulatory requirements; performance test results and compliance determination; area or major source determination; description of air pollution control system; and description of process monitoring systems

Section 5.0 Process Operating Conditions – Overview of test conditions and summary of facility process monitoring data

Section 6.0 Sampling and Analytical Program Overview – Summary of proposed plans and discussion of actual activities and any required deviations from plan

Section 7.0 Test Results – Detailed presentation of waste analysis and stack sampling results including tabulated presentation of all data

Section 8.0 Quality Assurance / Quality Control – Detailed discussion of waste and stack sampling and analytical QA/QC procedures and results

APPENDICES
A – Facility Process Monitoring Data
B – CMS Performance Evaluation Test Results
C – Field Sampling Documentation
D – Analytical Data Reports

Table 4-1 Operating Parameters for the CFPT Normal Operating Condition [CONFIDENTIAL]

Process Parameter	Tag ID	Units	MACT OPL	Average	Minimum	Maximum	St. Dev.
Maximum Total Waste Feed Rate	WQI-9000F	lb/hr	35,069	17,427	548	33,313	3,727
Maximum Pumpable Waste Feed Rate	WQI-9000T	lb/hr	29,926	10,359	499	20,945	2,818
Maximum Ash Feed Rate	WQI-9000AH	lb/hr	10,333	3,107	439	6,183	938
Maximum Total Chlorine Feed Rate	WQI-9000CL	lb/hr	2,032	630	49	1,663	265
Maximum Total LVM Feed Rate	WQI-9000LV	lb/hr	400	11.8	0.2	155.9	17.3
Maximum Total Pumpable LVM Feed Rate	WQI-9000PLV	lb/hr	400	11.8	0.2	155.9	17.3
Maximum Total SVM Feed Rate	WQI-9000SV	lb/hr	83.2	8.4	0.2	49.2	7.0
Maximum Total Mercury Feed Rate	WQI-9000M	lb/hr	0.14	0.036	0.003	0.133	0.026
Maximum ESP Inlet Temperature	TI-6002	°F	424	400	352	426	3
Maximum ESP Power Input to each Field	EI-6700, 6710, 6720	mA	100	453	105	495	55
Maximum Kiln Temperature	TI-4300	°F	1,718	1,889	1,760	2,140	57
Minimum SCC Temperature	TI-4310	°F	1,747	1,945	1,758	2,165	60
Maximum Process Gas Flowrate	FI-7510	wet scfm	67,505	57,318	45,764	64,997	2,215
Minimum Carbon Feed Rate – Location 1	WI-7003	lb/hr	[redacted]	[redacted]	[redacted]	[redacted]	1
Minimum Carbon Feed Pressure – Location 1	PI-5732	psig	3	5.4	3.2	7.3	0.9
Minimum Carbon Feed Rate – Location 2	WI-7002	lb/hr	[redacted]	[redacted]	[redacted]	[redacted]	1
Minimum Carbon Feed Pressure – Location 2	PI-7132	psig	3	7.4	3.3	10.6	1.5
Minimum Ring Jet Pressure Drop	DPI-7401	in. w.c.	28	33	28	40	2
Minimum Scrubber (1st & 2nd Packed Bed) Liquid Flowrate	FQI-7201	gpm	1,287	1,908	1,338	2,636	242

Process Parameter	Tag ID	Units	MACT OPL	Average	Minimum	Maximum	St. Dev.
Minimum Scrubber (1st & 2nd Packed Bed) Combined Pressure Drop	DPT-7207, 7307	in. w.c.	1.3	3.6	1.5	11.7	1.6
Minimum Scrubber (Ring Jet) Liquid Flowrate	FI-7404	gpm	446	649	491	1,025	65
Minimum Scrubber (Ring Jet) Blowdown	FI-7403	gpm	19.5	45	19	100	11
Minimum Scrubber (Ring Jet) Sump Level	LIC-7401	ft	1.7	2.2	1.7	3.0	0.1
Minimum Scrubber (3rd Stage) Liquid pH	AI-7307	pH units	7.6	8.4	7.6	10.2	0.3
THC Concentration @ 7% O2	AI-7851	ppm	10	0.7	0.0	18.4	1.4

The average values were determined by the sum of the hourly-rolling average values recorded (each minute) over the previous 12 months, divided by the number of rolling averages recorded during that time. This data was constructed from system operating records logged when the unit was conducting waste operations.

Table 4-2 Anticipated CPT Schedule

General Overview of Planned Schedule

Activity	Schedule
Mobilization, site safety training and equipment set-up	Day 1 (Monday, July 16th, 2012)
Finalize Setup, Preliminary Traverse, Conduct Run1 PCDD/PCDF	Day 2 (Tuesday, July 17th, 2012)
Conduct Run 2 and Run 3 PCDD/PCDF	Day 3 (Wednesday, July 18th, 2012)
Prepare samples for shipment and ship to all labs. Equipment demobilization and site departure	Day 4 (Thursday, July 19th, 2012)

Example of Detailed Daily Schedule (Day 3 Above)

Test Activity	Time
Incinerator lined out on wastes	06:30
Test Crew On-site	07:00
Initiate all stack sampling and waste sampling	08:00
Approximate end time for all sampling runs	16:30
Recovery of sampling trains..	16:30 - 18:30
Depart Site	19:00

5.0 Sampling and Analytical Program Quality Assurance/Quality Control

This section presents the Quality Assurance and Quality Control goals, objectives, and procedures for the MACT CFPT program. The quality assurance/quality control procedures and criteria for this program will comply with the requirements of this document and its updates. The analytical work conducted will incorporate the QA/QC requirements of the approved methods. This document has been prepared using available guidance provided in the following EPA documents:

- "EPA Requirements for Quality Assurance Project Plans", EPA QA/R-5, November 1999.
- "Component 2 - How to Review a Quality Assurance Project Plan (including Attachment A - Generic Trial Burn QAPP", Hazardous Waste Combustion Unit Permitting Manual, U.S. EPA Region 6, January 1998.
- "Handbook – Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration" (EPA/625/6-89/023 January 1990).

Quality Assurance Project Plan for WTI's MACT CFPT Plan on the Rotary Kiln Incineration System

Facility ID Numbers: Title V Permit No. 02-15-02-0233; RCRA ID No. OHD 980 613 541

Prepared for: Heritage-WTI, Inc., 1250 St. George St., E. Liverpool, OH 43920

Prepared by: AECOM, Inc.,Chelmsford, MA 01824

Revision No.: 0

Date: May 2012

5.1 Title Page

5.1.1 Project Title

Quality Assurance Project Plan for WTI's MACT CFPT on the Rotary Kiln Incineration System

5.1.2 Expected CFPT Date

July 2012

5.1.3 Project Approvals

WTI Project Manager — May, 2012 Date

AECOM Project Manager — May, 2012 Date

AECOM QA Officer — May, 2012 Date

Vista Analytical Lab Services Coordinator — May, 2012 Date

5.2 Table of Contents

A complete table of contents, including listings of tables and figures and acronyms is presented at the beginning of this CFPT Plan and includes all pertinent information applicable to this QAPP section.

5.3 Project Description

This project will consist of a straightforward sampling and analysis program designed to demonstrate compliance with the HWC MACT rule standard for PCDDs/PCDFs. Testing will be performed under one (1) normal process operating condition, entailing triplicate sampling runs. The reader is referred to Sections 1.3, 1.4, 2.5.3 and 4.0 for further details on program scope, test objectives and target parameters for emission measurements and process monitoring. The remainder of this section outlines the detailed measures that will be followed to ensure collection of valid data. A brief overview of the measurements to be made during each test condition is provided in **Table 5-1**. A more detailed summary of the sampling and analytical program is provided later in Section 5.6.

5.4 Project Organization

The AECOM Project Manager, Mr. David Moll will be responsible for the overall direction of this program and will report to the WTI Project Manager, Mr. Vince Waggle. Mr. Moll will be responsible for project design and implementation, communicating with the client, scheduling all activities, reviewing all project data and preparing all reports. He will be assisted in the oversight of Quality Assurance activities by the program Quality Assurance Officer (QAO) and each Analytical Laboratory Services Coordinator (LSC). Each contract laboratory will have one individual designated as the person responsible for project activities.

5.4.1 QA Officer's Responsibilities

Mr. Douglas Roeck will serve as the project Quality Assurance Officer (QAO) and will be responsible for review and approval of the Quality Assurance Project Plan presented in this section, as well as any subsequent revisions. He will monitor implementation of field and laboratory activities, scheduling performance and/or system audits as warranted. The QAO will report to the Project Manager on any conditions noted which may adversely affect data quality.

Mr. Roeck will provide independent oversight for data verification and data quality assessment activities. He will prepare a section for the Final Report summarizing QA/QC activities and provide an overall evaluation of data quality.

5.4.2 Laboratory Coordinator Responsibilities

Each analytical laboratory will designate a Laboratory Services Coordinator (LSC), who will be the principal point of contact for the AECOM Project Manager. The LSC will review QA requirements with all laboratory staff to ensure that all required measures are taken to meet data quality objectives. They will monitor the shipment and receipt of samples, track analytical progress and review data as reported from the laboratories for completeness. Ms. Martha Maier will serve as the LSC for Vista Analytical Laboratories in El Dorado Hills, CA.

Each LSC will be responsible for validation of all data generated by the laboratory for this program and will provide all necessary documentation for inclusion in the final report.

5.5 QA/QC Program Objectives

5.5.1 Precision, Accuracy and Completeness

The collection of data to fully characterize the incinerator waste feed materials and stack gas emissions requires that sampling and analysis procedures be conducted with properly operated and calibrated equipment by trained personnel. QA objectives for measurements made in the field are summarized in **Table 5-2**. QA objectives specific to each analytical methodology performed by the subcontractor laboratories are presented later in Section 5.9. The overall program has been designed with consideration of sampling parameters and analytical limits to ensure that the achieved MDLs for emissions will be more than adequate for regulatory limit decisions. Critical MDL determinations are addressed subsequently in Section 5.5.3.

Precision is defined as a measurement of mutual agreement among individual measurements made under prescribed similar conditions. Precision is expressed in terms of relative percent difference (RPD) between duplicate determinations and in terms of relative standard deviation (RSD) when 3 or more determinations are made. Overall precision for analysis of the waste feed streams will be assessed through the analysis of one set of duplicate samples for each designated parameter.

Accuracy is the degree of agreement of a measurement with an accepted reference or true value. Analytical accuracy will be measured through the recoveries of surrogate spikes, matrix spikes, analysis of standard reference materials or audit sample analysis. Surrogates are compounds added to samples submitted for organic analyses prior to extraction and analysis; their recoveries are measured to assess sample-specific analytical efficiency and accuracy. Matrix spike samples for the waste feed will be prepared by spiking known amounts of target analytes into a portion of the sample. Matrix spike samples for the stack organic analyses will be prepared by spiking known amounts of target analytes into the sampling media and then carrying the spiked sample through the entire preparation and analysis sequence. Recoveries are monitored to assess laboratory and method accuracy. Laboratory control samples (LCS) will also be used to distinguish between method performance and matrix effects on accuracy. LCS and MS spiking solutions will be independent from calibration standards.

Completeness is a measure of the amount of valid data obtained compared to the amount that was expected under normal conditions. The overall program objective is to obtain valid data for three (3) runs for each test condition. For all data considered critical to the investigation, a completeness objective of 100% has been established. As a result, critical priority data from each of three (3) runs should achieve the precision and accuracy goals established herein. This completeness criterion applies to all permit parameters in emissions samples as well as feed/process stream samples. Individual samples for which the critical data points do not achieve accuracy and/or precision data quality objectives may require reanalysis. Results for samples where matrix interferences preclude meeting objectives for the recoveries of surrogates or spikes will be evaluated for potential bias to calculated emission results. In summary, the completeness goals are stated at 100%, since three valid runs are necessary to assess operation at any one condition.

5.5.2 Representativeness and Comparability

It is recognized that the usefulness of the data is also contingent upon meeting the criteria for representativeness and comparability. Wherever possible, reference methods and standard sampling procedures will be used. The QA objective is that all measurements be representative of the matrix and operation being evaluated. The detailed requirements for sampling given in the various EPA Reference Methods will be followed to ensure representative sampling of flue gases. The frequent grab sampling of incinerator feed and process streams during each test run will provide representative samples of these matrices.

The corresponding QA objective is that all data resulting from sampling and analysis be comparable with other representative measurements made by the CPT field team, on this or a similar process operating under similar conditions. The use of published sampling and analytical methods and standard reporting units will aid in ensuring the comparability of the data.

5.5.3 Method Detection Limit (MDL) Determinations

Method Detection Limits (MDLs) for the various analytes to be measured in this program will be determined following well-established laboratory procedures in accordance with standard EPA protocols. These are described below for those parameters deemed most crucial to the program.

5.5.3.1 PCDDs/PCDFs - Methods 0023A/8290

In accordance with EPA Methods 23 (40 CFR Part 60 Appendix A Method 23), SW-846 Methods 0023A and 8290, sample specific method detection limits (MDLs) are calculated using the following formula:

$$MDL = [2.5^* H_n^* Q_{IS}] / [H_{IS}^*W^*RRF]$$

where: 2.5 = the minimum signal to noise ratio

H_n = Height of the native (noise height, peak to peak)

Q_{IS} = the quantity, in pg, of internal standard added to the sample

H_{IS} = the peak height of the internal standard

W = the weight or volume of the sample

RRF = relative response factor from initial calibration

5.6 Sampling and Monitoring Procedures

This section describes the procedures that will be followed during the field sampling program. Throughout the overall program, all sampling will be performed using sampling protocols described herein and approved by EPA. Regulatory agency approval will be obtained for any deviations from or changes to the approved CFPT Plan which may be warranted prior to program implementation as a result of changes in personnel or facility circumstances. If situations occur during the demonstration testing which necessitate deviations from the plan, the agency will be notified and onsite approval requested. Any deviations from the specified protocols will be fully documented in the final CPT Report / Notification of Compliance.

5.6.1 Field Program Description

A detailed description of the compliance strategy and test conditions was provided previously in Section 4.0. In general, however, the program is presently configured to collect samples during three runs for the normal process operating condition. **Table 5-3** provides a detailed listing of the sampling and analytical parameters and methods planned for this program. All sampling will be conducted concurrently at the outlet stack location.

5.6.2 Pre-sampling Activities

Pre-sampling activities include equipment calibration, sample media preparation, cleaning of sample train glassware, preparation of computer-generated sample labels, and other miscellaneous tasks. Each of these activities are described or referenced in the following subsections. Other pre-sampling activities include such details as team meetings, equipment packing and shipment, equipment setup, and finalization of all details leading up to the coordinated initiation of the sampling program.

5.6.2.1 Equipment Calibration

A most important aspect of pre-sampling preparations is the inspection and calibration of all equipment planned to be used for the field effort. Equipment is inspected for proper operation and durability prior to calibration. Calibration of equipment is conducted in accordance with the procedures outlined in the EPA document entitled "Quality Assurance Handbook for Air Pollution Measurement Systems; Volume III—Stationary Source Specific Methods" (EPA-600/4-77-027b). Equipment calibration is performed in accordance with EPA guidelines and/or manufacturer's recommendations. Documentation of all calibration records will be kept in the project file during the field program and will be available for inspection by test observers. Examples of field equipment used and typical calibration requirements follow:

- **Probe nozzles** (QA Handbook Section 3.4.2, pg. 19) - make three measurements of the nozzle ID (to the nearest 0.001 in.) using different diameters with a micrometer. Difference between the high and low values should not exceed 0.004 in. Post-test check - inspect for damage.

- **Pitot tubes** (QA Handbook Section 3.1.2, pp. 1-13) - measured for appropriate spacing and dimensions or calibrate in a wind tunnel. Rejection criteria given on the calibration sheet. Post-test check - inspect for damage.

- **Thermocouples** (QA Handbook Section 3.4.2, pp. 15-18) - verify against a mercury-in-glass thermometer at two or more points including the anticipated measurement range. Acceptance limits - impinger ±2°F; DGM ±5.4°F; stack ±1.5 percent of stack temperature.

- **Dry gas meters** (QA Handbook Section 3.4.2, pp. 1-12) - calibrate against a wet test meter. Acceptance criteria - pretest Yi = Y ± 0.02; post test Y = ± 0.05 Yi.

- **Field barometer** (QA Handbook Section 3.4.2, pp. 18-19) - compare against a mercury-in-glass barometer or use Airport Station BP and correct for elevation. Acceptance criteria - ± 0.02 in. Hg; post-test check - same.

5.6.2.2 Glassware Preparation

Sample train glassware and sample containers require specialized pre-cleaning to avoid contamination of the sample from the collection container or devices. Cleaning/storage procedures for sample train glassware are summarized below. Note that all bottle caps are fitted with teflon liners which are cleaned in the same manner as the bottles themselves. Sample containers used for waste feed streams are purchased pre-cleaned and sealed to specified EPA protocols.

- **EPA Method 0023A glassware and containers (PCDDs/PCDFs)** - wash with soap and water, rinse three times with deionized (DI) water, bake at 400°C for 2-hours, rinse three times with pesticide grade methylene chloride, rinse three times with pesticide grade toluene and air dry. Open ends will be sealed prior to shipment to the field with brand new aluminum foil that is free of any potential contamination.

5.6.2.3 Sample Media Preparation

All reagents will be checked in accordance with AECOM's existing QC Program to minimize the probability of using contaminated solvents. This includes the use of the proper grade reagents/solvents as specified in the test method, selection of reagents from the same lot and the collection and analysis of the appropriate blanks. Sampling media will be procured and prepared in accordance with the appropriate test methods as described below:

- **XAD resin** is purchased new and packed in specially designed sorbent traps. All glass cleaning and sorbent packing procedures will follow the protocols specified in EPA Methods 0023A.

- **Glass filters** used in the Method 0023A sampling train are purchased from Pallflex Products Co. with designated technical specifications and efficiency ratings.

5.6.2.4 Other Pre-Sampling Activities

Sample team meetings will be held to designate responsibilities to each team member. Assignments will be based on individual experience and relative importance of the assigned task. Other pre-sampling activities in the office will include generation of sample checklists, printing of computer-generated sample labels, and proper packing of all equipment. Equipment will then be transported by freight or truck to the sampling location.

Site setup is the final pre-sampling activity. This task will involve moving the equipment to the vicinity of the sample collection area. A separate office trailer or other suitable onsite facility will be used to serve as a sample train setup and recovery area and sample custody area.

Normally, preliminary tests are conducted at the stack location to verify the presence or absence of cyclonic flow conditions and to determine flue gas moisture, temperature and velocity. These measurements facilitate determination of nozzle size selection and sample train operation rates for the isokinetic sampling trains. However, extensive past testing at the facility eliminates the need for such preliminary measurements on the WTI stack.

5.6.3 Sampling Locations

5.6.3.1 Waste Feed Streams

Waste feed materials will be sampled in accordance with the facility's feed stream analysis plan (FSAP). Waste feed sampling will occur upstream of any POHC or metal spiking location. Taps in the feed lines will be used to access feed streams. Samples will be collected using methodologies described in the FSAP.

5.6.3.2 Stack Sampling Location

Gaseous emissions samples will be collected from test ports that meet the minimum criteria specified in EPA Method 1. Test ports located on stack level 2 will be used to accommodate simultaneous testing of all emissions test parameters. **Figure 5-1** provides a schematic of the stack showing the location of the sampling ports and the upstream/downstream distances from flow disturbances. This schematic drawing also provides a schematic of the traverse point locations applicable to the isokinetic sampling trains as well as key stack parameters needed to select the appropriate size sampling nozzle. It should be noted that a new stack is being installed in June 2009 and two new drawings (D08-51-S1-0 and D08-51-S3A-0) are included in **Appendix B**.

5.6.4 Waste Feed Stream Sampling Procedures

Each waste feed material fed during the test will be sampled from taps in the feed lines or other appropriate locations. The waste feed streams will be sampled in accordance with the procedures and methodologies currently described in the facility's FSAP. The waste feed materials will be characterized in advance of the CFPT and the analytical results will be incorporated into the final report.

The feed streams will be characterized for total chlorine. WTI will be responsible for all waste feed analyses.

For solid waste feed streams, a sample from each container fed to the kiln will be collected and analyzed separately. For bulk solids feeds, each container that is placed into the bulk solids pits will be collected from the front, middle, and back of each container. Due to the variability of solid waste, each sample will be analyzed separately. The results of these individual samples will be averaged to represent the material that is being fed to the incinerator during the CFPT from the bulk solid pits. This is the same procedure currently used during normal operation.

5.6.5 Stack Sampling Methodologies

Gases discharged from the exhaust stack will be sampled by AECOM for the following parameters:

- Flue gas velocity, flow rate, temperature, moisture content and fixed gas (O_2 and CO_2) composition; and
- PCDDs/PCDFs.

The following sections provide summaries of the sampling methodologies to be followed. In addition, sample field data sheets to be used during the program are provided in **Appendix C**. Summaries of relevant information pertaining to setup and recovery of each isokinetic sampling train are provided in **Appendix D**.

5.6.5.1 Gas Stream Velocity, Moisture and Fixed Gases

Gas stream flowrate, moisture and fixed gas concentration will be determined concurrent with the isokinetic sampling train (Methods 0023A). Gas stream velocity will be determined using a pitot tube and water manometer in accordance with EPA Method 2. Gas stream temperature will also be determined at each of the Method 2 traverse points using a Type "K" thermocouple and pyrometer. Gas stream moisture will be will be determined as specified in EPA Method 4 concurrent with the isokinetic sampling methods. In this procedure the impinger contents are measured or weighed before and after each test run and used in conjunction with the metered gas volume to determine the gas stream moisture content. Fixed gases (O_2 and CO_2) for gas stream molecular weight determination and constituent oxygen correction will be determined in accordance with EPA Method 3 during each test run.

5.6.5.2 PCDDs / PCDFs

Method 0023A will be used to sample for all target PCDD / PCDF parameters. Specific sampling details for the sampling train are as follows:

- Target sampling rate - 0.75 cfm
- Sample run time - 3-hr
- Minimum sample volume required - 2.5 dscm
- Number of sampling points per stack traverse - 6
- Total number of sampling points - 12
- Number of field reagent blank sets collected - 1

5.6.5.3 Oxygen Determination and Facility CEMS

AECOM will provide measurement of oxygen (O_2) and carbon dioxide (CO_2) throughout all test run periods. These parameters will be measured using the procedures specified in 40 CFR 60, Appendix A, Method 3 (Orsat analysis). These test results will be used to calculate stack gas molecular weight and to correct measured emission results to to 7% oxygen.

WTI will provide continuous emission monitoring for a variety of other CEM parameters including total hydrocarbons (THC) corrected to 7% oxygen in accordance with existing MACT compliance requirements. These data will be collected in accordance with Revision 6 (March 4, 2005) of WTI's Quality Assurance Plan for the CEMS. A CEMs audit will be conducted within one month of the CPT test. WTI will correct their THC results using their O_2 monitoring data.

5.7 Sample Handling, Traceability and Holding Times

Sample integrity will be maintained throughout all phases of the sampling and analysis program. Samples will be held within sight of the samplers or sample custodian, or will be kept in sealed or secured containers at all times. Sealed coolers and DOT shipping boxes will be used to ship samples to the designated laboratory via Priority 1 overnight FedEx service.

Preprinted sample identification labels are used by AECOM to ensure that all required information is fully documented. When sample batches are shipped to the specified laboratory, a sample packing list (see **Figure 5-2**) accompanies the shipment. This form is based on established laboratory format and will be used to document sample transfer in the field and from sampling personnel to the laboratory.

The AECOM Field Team Leader will coordinate the packing and shipment of all samples. Worksheets specifically designed for this program will be generated prior to the field effort. These sheets will assist the Field Team Leader in assuring that all samples have been collected, accounted for and shipped under sample traceability documentation to the appropriate laboratory. Requirements pertaining to sample preservation and recommended holding times are noted in **Table 5-4**. All materials such as field and laboratory notebooks and logbooks, field and laboratory data records, correspondence, reports, sample tags, traceability records and instrument printouts will be clearly labeled with the project number and become a permanent part of the project file. Project samples will be disposed of in an appropriate manner 60 days after acceptance and approval of a final report. All project-related documentation at both AECOM and the subcontractor laboratories will be kept on file for 2 years following submittal of the final report.

5.8 Analytical Methods and Calibration Procedures

This section delineates the analytical protocols that will be used to analyze samples during this CFPT. Samples of waste feed materials and stack gas will be collected and analyzed for the parameters previously discussed using the appropriate laboratory protocols detailed in this section and as outlined previously in **Table 5-3.**

5.8.1 Total Chlorine Analysis of Waste Feed Streams

5.8.1.1 Chemical and Physical Properties of Waste Feed Streams

Analyses to determine the chemical and physical properties of the waste feed materials will be performed using appropriate ASTM or EPA SW-846 analytical methods as outlined in the Heritage-WTI FSAP. Quality assurance requirements for the determinations of chemical and physical properties of the waste feed materials are summarized in **Table 5-5**.

5.8.1.2 Reporting of Values Below Detection Limits

Analyses returning a result less than that of the specified instrument or method detection limit will be recorded as one-half of the detection limit. For example, if the detection limit is 10 and the analysis returns a result of less than 10, then a value of 5 will be recorded and used for any subsequent feed rate calculations related to this project.

5.8.2 Analysis of Stack Gas Samples

5.8.2.1 Stack Gas - Analysis for PCDDs/PCDFs

Stack flue gas samples collected using the Method 0023A sampling train will be analyzed for polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDDs/PCDFs). Each M0023A train will be prepared and split appropriately for analyses for PCDDs/PCDFs: separate front-half and back-half analyses will be done in accordance with Method 0023A.

Briefly, the XAD and filter will be spiked with internal standards and then sequentially extracted with methylene chloride and toluene. Method 0023A analyses (which include high resolution GC/MS as per EPA Method 8290) incorporate five isotopically labeled PCDD and PCDF field surrogates and nine labeled PCDD/PCDF internal standards. The field surrogates are spiked into the XAD resin prior to field sampling; their recoveries are monitored to assess overall method accuracy and precision. The internal standards are added at a level of 2,000 pg/sample prior to Soxhlet extraction. These internal standards are used for direct quantification of all surrogate and native PCDD/PCDF species. The addition of these standards prior to the extraction and cleanup procedures permits internal correction for any losses of target analytes that might occur during the preparation steps.

Method 8290 details instrument tune, GC column performance and instrument calibration requirements for the analysis of stack gas samples by high resolution gas chromatography/high resolution mass-spectrometry. Instrument calibration will be performed for all 15 2,3,7,8- substituted PCDD and PCDF isomers; data will be reported for each of these target analytes and for the total dioxins and total furans at each level of chlorination from Cl_4 through Cl_8.

QA/QC requirements for these analyses are summarized in **Table 5-7**.

5.9 Internal QA Program

Quality control checks will be performed to ensure the collection of representative samples and the generation of valid analytical results for these samples. These checks will be performed by project participants throughout the program under the direction of the Project Manager and the QA Officer.

5.9.1 Data Collection and Sampling QC Procedures

QC checks for the process data collection and sampling aspects of this program will include, but not be limited to, the following:

1. Use of standardized data sheets, checklists and field notebooks to ensure completeness, traceability, and comparability of the process information and samples collected.

2. Field checking of standardized forms by the Field Team Leader and a second person to ensure accuracy and completeness.

3. Strict adherence to the sample traceability procedures.

4. Submission of field biased blanks.

5. Leak checks of sample trains before and after sample collection and during the test, when appropriate.

5.9.1.1 Sampling Equipment QC Checks and Frequency

Calibration of the field sampling equipment will be performed prior to and at the conclusion of the field sampling effort. Copies of the calibration sheets will be available onsite during the field sampling program for inspection, will be kept in the project file and will be submitted in the final report. Calibrations will be performed as described in the EPA publication "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods;" Section 4.2.1 presents acceptance limits.

Leak checks of the sample trains will be conducted in accordance with the protocol called out for each method. Leak checks will be conducted prior to and at the end of sample collection and during the test run, when appropriate.

5.9.1.2 Sample Collection QC Checks

Field-biased blanks of reagents and collection media (deionized water, filters, impinger solutions, etc.) will be placed in appropriately cleaned and sized sample containers in the field and handled in the same way as actual field samples, to provide a QC check on sample handling.

For this program, sample collection QC checks and frequency for samples to be analyzed in the laboratory are listed below:

- One field reagent blank Method 0023A sampling train.

5.9.2 Analytical QC Procedures for Samples to be Analyzed in the Laboratory

The Quality Control program for laboratory analysis makes use of a number of different types of QC samples to document the validity of the generated data. The following types of QC samples will be used during the program.

5.9.2.1 Quality Control Samples and Blanks

Method Blanks

Method blanks contain all the reagents used in the preparation and analysis of samples and are processed through the entire analytical scheme to assess spurious contamination arising from reagents, glassware, and other materials used in the analysis.

Calibration Check Samples

One of the working calibration standards which is periodically used to check that the original calibration is still valid.

Laboratory Control Samples (LCS) or Blank Spikes

These samples are generated from spikes prepared independently from the calibration concentrates. The LCS are used to establish that an instrument or procedure is in control. An LCS is normally carried through the entire sample preparation and analysis procedure also.

Surrogate Spikes

Samples requiring analysis by GC/MS are routinely surrogate-spiked with a series of deuterated analogues of the components of interest. It is anticipated that these compounds would assess the behavior of actual components in individual program samples during the entire preparative and analysis scheme. The percent recovery for each surrogate will be calculated in accordance with method-specific procedures. Any values which fall outside the target QC limits described in the applicable analytical method will be flagged. Some of these recovery values may be outside the QC limit owing to matrix interferences. The following guidelines will be used:

1. All recovery data are evaluated to determine if the QC limits are appropriate and if a problem may exist even though the limits are being achieved (e.g., one compound that is consistently barely within the lower limit).

2. Any recovery data which are outside the established limits are investigated. This evaluation will include an independent check of the calculation.

3. Corrective action will be performed if any of the following are observed:

   - All recovery values in any one analysis are outside the established limits, where one analysis is considered to be one sample analyzed by one method,

   - Over 10 percent of the values for a given sample delivery group are outside limits, or

   - One compound is outside the limits in over 10 percent of the samples.

An analysis batch is defined as a group of ten or fewer samples carried through the entire preparation and analysis procedure in one batch.

Reagents used in the laboratory are normally of analytical reagent grade or higher purity; each lot of acid or solvent used is checked for acceptability prior to laboratory use. All reagents are labeled with the date received and date opened. The quality of the laboratory deionized water is routinely checked. All glassware used in the sampling and analysis procedures will be pre-cleaned according to the method requirements. Standard laboratory practices for laboratory cleanliness, personnel training and other general procedures are used. The results of these quality control procedures will be included in the final report.

5.9.2.2 Quality Control of Sorbents

Sorbents used for the organic sampling trains are provided by the laboratory after QC verification has been performed following recommended procedures in each applicable method. Additional details on sample media preparation were provided previously in Section 5.6.2.3.

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5.10 Data Reduction, Verification and Data Reporting

Specific QC measures will be used to ensure the generation of reliable data from sampling and analysis activities. Proper collection and organization of accurate information followed by clear and concise reporting of the data is a primary goal in all such projects.

5.10.1 Field Data Reduction

Appendix C of this CPT Plan presents the standardized forms that will be used to record field sampling data. The Field Team Leader and at least one other field crewmember will review the data collected from each train in its entirety in the field. Errors or discrepancies will be noted and dealt with accordingly. The Field Team Leader has the authority to institute correction actions in the field. The QA officer will also be notified for resolution if the situation warrants. At a minimum, the QA officer is apprised of all deviations from standard protocol. Field data reduction (checking of valid isokinetic sampling rate and other sampling parameters) is done with a laptop computer using standardized Excel spreadsheets. **Appendix D** provides sample train setup and recovery schematics and a description of solutions and reagents to be used in each isokinetic train required for the overall program. All sample recovery sheets will be checked for completeness.

5.10.2 Laboratory Analysis Data Reduction

Analytical results will be reduced to appropriate units by the laboratory using the equations given in the applicable analytical method. Unless otherwise specified, results from the analysis of waste feed and process samples for specific target constituents will be reported in units of mg/kg or % wt. Other parameters will be reported in standard units such as g/cc, Btu/lb, etc.

The laboratory typically reports results from the analysis of stack flue gas samples as total mass detected for the sample submitted. For those sample fractions where liquid impinger condensate is analyzed, the laboratory will measure the total liquid volume submitted and multiply by the measured concentrations of target analytes in these samples. The laboratories will generally report data as follows:

- PCDDs/PCDFs - total **pg** collected in each fraction (front-half and back-half)

The LSC will be responsible for reviewing all results and calculations and verifying the completeness of the data set. The laboratory reports submitted by each laboratory will include the following deliverables:

- Transmittal letter listing all samples and analyses and a case narrative identifying any difficulties associated with the analyses and any anomalous QA/QC results
- Copies of Chain of Custody Forms
- Sample Report forms with sample field and laboratory identifier, dates of sample preparation and analysis, analytical results and detection limits
- Method Blank results
- Matrix spike and matrix spike duplicate results (as applicable)
- Replicate sample analyses (as applicable)
- Laboratory Control Sample results

Reports for organics in will include the following additional information:

- Surrogate recoveries

- Summary of initial calibrations
- Continuing calibration summaries
- Instrument tunes

5.10.3 Data Verification

Data verification is the process of reviewing data and accepting, qualifying or rejecting it on the basis of method-specific criteria. The independent project QAO will use validation methods and criteria appropriate to the type of data and the purpose of the measurement. Records of all data will be maintained, even that judged to be an "outlying" or spurious value.

Field sampling data will be validated by the Field Team Leader based on a judgment of the representativeness of the sample, maintenance and cleanliness of sampling equipment and the adherence to an approved, written sample collection procedure.

Analytical data will be validated by the subcontractor laboratory QC or supervisory personnel using criteria outlined in their laboratory-specific QA Plan and/or written SOPs. Results from field and laboratory method blanks, replicate samples and internal QC samples will be used to further validate analytical results. Analytical results on field blanks and replicate field samples are valuable for validation of sample collection also. QC personnel will review all subcontractor laboratory raw analytical data to verify calculated results presented.

The following criteria will be used to evaluate the field sampling data:

- Use of approved test procedures
- Proper operation of the process being tested
- Use of properly operating and calibrated equipment
- Leak checks conducted before and after tests
- Use of reagents that have conformed to QC specified criteria
- Use of NBS traceable CEM calibration gases (as applicable)
- Proper chain-of-custody maintained
- All sample trains --check to ensure proper sample gas volume collected

The criteria listed below will be used to evaluate the analytical data:

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- Use of approved analytical procedures
- Use of properly operating and calibrated instrumentation

- Precision and accuracy achieved should be comparable to that achieved in previous analytical programs and consistent with objectives stated in this document.

5.10.4 Final Data Reporting

Stack gas concentrations for each applicable parameter will be calculated from laboratory results and field sampling data. The total weight of the analyte detected will be divided by the volume of gas sampled to provide emission concentrations. For MACT compliance, all emission concentrations are further corrected to 7% oxygen for comparison to the published standards.

A complete Final Report outlining the goals, methods and results for the program will be prepared and any deviations from this test plan will be documented. The Final Report will include a section on evaluation and discussion of QA/QC results. Results will be compared to expected limits for accuracy, precision and/or completeness as targeted in this protocol. The final test report will also include the results of any internal audits conducted on the program as well as:

- All field data sheets showing sampling method, dates, run times, personnel, equipment; sample preservation, identification and compositing records.
- Field equipment calibration data.
- Analytical lab reports and relevant supporting documentation.

5.11 Routine Maintenance Procedures and Schedules

This section provides pertinent information for field sampling equipment as well as a listing of all critical facility equipment necessary to maintain permitted operating conditions and to demonstrate continuing permit compliance. Information is provided for preventive maintenance and schedules and spare parts for key equipment and instrumentation.

5.11.1 Field Sampling Equipment

The field team follows an orderly program of positive actions to prevent the failure of equipment or instruments during use. This preventive maintenance and careful calibration helps to ensure accurate measurements and minimal field delays.

All equipment that is scheduled for field use is calibrated as outlined previously in Section 5.6.2.1. Prior to each field use for a specific project, the equipment is cleaned and checked to ensure it is in good working order. An adequate supply of spare parts and sample train glassware is brought to each site to minimize downtime and field sampling delays. Any equipment that does experience problems is appropriately tagged in the field to ensure that it is repaired upon return to the office.

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5.11.2 Facility Equipment and Instrumentation

During scheduled shutdowns, all waste feed lances are pulled and inspected. If necessary, the lance is repaired, otherwise it is replaced. All seals and expansion joints from the feed end to the stack are inspected and repaired as needed. All thermocouples and draft pressure transmitters in the SCC are pulled, inspected, calibrated and repaired as needed. The boiler is inspected cleaned and repaired as needed. All

thermocouples and draft pressure transmitters in the Spray Dryer are pulled, inspected, calibrated and repaired as needed. The spray dryer vessel is inspected and cleaned. The Atomizers in the spray dryer are pulled, cleaned and maintained according to manufacture specifications. The ESP is inspected cleaned and repaired according to manufacture specifications. All electrical connections are inspected and repaired as needed. All thermocouples and draft pressure transmitters are pulled, inspected, calibrated and repaired as needed. The four stage wet scrubber is inspected cleaned and repaired as needed. All flow, temperature, and pressure instrumentation is inspected, repaired and calibrated as needed.

5.12 QA/QC Assessment Procedures

The QA activities implemented in this program will provide a basis for assessing the accuracy and precision of the analytical measurements. Section 5.8 of this QAPP discusses the QA activity that will generate the accuracy and precision data for each sample type. A generalized form of the equations that will be used to calculate accuracy, precision and completeness follows.

5.12.1 Accuracy

Percent accuracy will be determined using the following equation:

$$\% \text{ Recovery } = \frac{(X - S)}{T} x 100$$

where:

X = experimentally determined concentration of the spiked sample

T = true concentration of the spike

S = sample concentration before spiking

5.12.2 Precision

Precision (calculated as percent relative difference) will be determined using the following equation:

$$Relative\ Percent\ Difference\ (RPD) = \left[\frac{(D_1 - D_2)}{\left\{ \frac{D_1 + D_2}{2} \right\}} \right] x 100$$

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where:

D_1 and D_2 = results of duplicate measurements or standard deviation relative to the average value expressed as relative standard deviation:

Relative standard deviation will be expressed as follows:

$$\text{Relative Standard Deviation (\% RSD)} = \quad = \left\{ \frac{\sigma_{(n-1)}}{\bar{x}\,(x_1 \cdots x_n)} \right\} \; x \;\; 100$$

where:

$\sigma_{(n-1)}$ = standard deviation of the sample data

n = number of replicates

$x_{(x1..xn)}$ = arithmetic mean of the sample data

5.12.3 Completeness

Data completeness is a measure of the extent to which the database resulting from a measurement effort fulfills objectives for the amount of data required. For this program, completeness will be defined as the percentage of valid data for the total valid tests. Completeness is assessed using the following equation:

$$Completeness\ (\%) = \left[\frac{D_r}{D_c} \right] \;\; x \;\; 100$$

where:

D_r = number of samples for which valid results are reported

D_c = number of valid samples that are collected and reach the laboratory for analysis

The completeness objective will help to evaluate the accuracy and precision of the analytical measurements.

5.13 External QA Program

The External Quality Assurance Program includes both performance and system audits as independent checks on the quality of data obtained from sampling, analysis, and data gathering activities. Every effort is made to have the audit assess the measurement process in normal operation. Either type of audit may show the need for corrective action.

5.13.1 Performance Audits

The sampling, analysis, and data handling segments of a project are checked in performance audits. A different operator/analyst prepares and conducts these audit operations to ensure the independence of the quantitative results.

EPA Quality Control concentrates or other standards will be used to assess the analytical work. Results will be reviewed by the subcontractor laboratory and QC personnel. Any additional audit samples presented by the regulatory agencies will be analyzed along with program samples, by the appropriate lab and at the same time as all other samples. It will, however, be the responsibility of the regulatory agency to obtain these samples, and present them to the facility project manager in a form that is amenable and appropriate to the analytical methods being utilized.

If the regulatory agency advises facility program manager that audit results fall outside of acceptable ranges, the analytical data will be further reviewed for error in conjunction with the agency. If a simple, correctable error is found (e.g., an arithmetic error), correction will be made and results resubmitted. If no error is found, an investigation into other causes of the failure (e.g., lack of sample integrity) will be conducted and results evaluated in terms of the impact on sample data integrity.

5.13.2 Corrective Action

The acceptance limits for the sampling and analyses to be conducted in this program will be those stated in the method or defined by the project manager. The corrective actions are likely to be immediate in nature and most often will be implemented by the analyst or Project Manager; the corrective action will usually involve recalculation, reanalysis, or repeating a sample run. Ongoing corrective action policy is described here.

5.13.2.1 Immediate Corrective Action

Specific QC procedures and checklists are designed to help analysts detect the need for corrective action. Often the person's experience will be more valuable in alerting the operator to suspicious data or malfunctioning equipment.

If a corrective action can be taken at this point, as part of normal operating procedures, the collection of poor quality data can be avoided. Instrument and equipment malfunctions are amenable to this type of action and QC procedures include troubleshooting guides and corrective action suggestions. The actions taken should be noted in field or laboratory notebooks but no other formal documentation is required, unless further corrective action is necessary. These on-the-spot corrective actions are an everyday part of the QA/QC system.

Corrective action during the field sampling portion of a program is most often a result of equipment failure or an operator oversight and may require repeating a run. When equipment is discovered to be defective (i.e., pre- and post-sampling leak check) it is repaired or replaced and a correction factor is established as per the EPA method. If a correction factor is unacceptable the run is repeated. Operator oversight is best avoided by having field crew members audit each other's work before and after a test. Every effort is made by the field team leader to ensure that all QC procedures are followed. Economically, it is preferred to repeat a run during a particular field trip rather than return at a later date.

Corrective action for analytical work would include re-calibration of instruments, reanalysis of known QC samples and, if necessary, of actual field samples.

If the problem is not solved in this way, more formalized long-term corrective action may be necessary.

5.13.2.2 Long-Term Corrective Action

The need for this action may be identified by standard QC procedures, control charts, performance or system audits. Any quality problem which cannot be solved by immediate corrective action falls into the long-term category. The condition is reported to a person responsible for correcting it who is part of the closed-loop action and follow-up plan.

The essential steps in the closed-loop corrective action system are:

- Identify and define the problem.
- Assign responsibility for investigating the problem.
- Investigate and determine the cause of the problem.
- Determine a corrective action to eliminate the problem.
- Assign and accept responsibility for implementing the corrective action.
- Establish effectiveness of the corrective action and implement it.
- Verify that the corrective action has eliminated the problem.

Documentation of the problem is important to the system. A Corrective Action Request Form is filled out by the person finding the quality problem. This form identifies the problem, possible causes and the person responsible for action on the problem. The responsible person may be an analyst, field team leader, department QC coordinator or the QA Director. If no person is identified as responsible for action, the QA Director investigates the situation and determines who is responsible in each case.

The Corrective Action Request Form includes a description of the corrective action planned and the date it was taken, and space for follow-up. The QA Director checks to be sure that initial action has been taken and appears effective and, at an appropriate later date, checks again to see if the problem has been fully solved. The QA Director receives a copy of all Corrective Action Forms and then enters them in the Corrective Action Log. This permanent record aids the QA Director in follow-up and makes any quality problems visible to management; the log may also prove valuable in listing a similar problem and its solution.

5.13.3 Quality Assurance Reports to Management

5.13.3.1 Internal Reports

The Laboratory Services Coordinator will prepare a written report on QC activities associated with this project for the Quality Assurance Director. This report will detail the results of quality control procedures, problems encountered and any corrective action, which may have been required.

All Corrective Action Forms are submitted to the QA Officer for initial approval of the corrective action planned and a copy is provided to the Program Manager. All system audit reports are provided to the Program Manager and the Quality Assurance Officer.

5.13.3.2 Reports to Client

The final report will include a section summarizing QA/QC activities during the program. The Project Manager, Laboratory Services Coordinators and the QA Officer will participate in preparing this section. This section will provide summary QA/QC results for method blanks, surrogate spikes and laboratory control spike recoveries. This section will evaluate overall data quality in terms of accuracy, precision and completeness. Any discrepancies or difficulties noted in program work, protocol deviations or documentation gaps will be identified and discussed.

Table 5-1 General Sampling and Analytical Program Overview (Stack Exhaust)

Parameter	MACT Emission Limits (a)	Sampling Method	Analytical Method	Test Condition(s)
Flow, Fixed Gases and Moisture	N/A	EPA Methods 2, 3 and 4	N/A	Normal
PCDDs/PCDFs	0.20 ng TEQ/dscm	EPA Method 0023A	EPA Method 8290 HRGC / HRMS	Normal
(a) All MACT Emission Limits corrected to 7% oxygen				

Table 5-2 QA Objectives for Field Measurements

Field Measurement	Accuracy	Precision	Completeness
Moisture (EPA Method 4)	**(a)**	± 20%	100%
Carbon Dioxide (EPA Method 3 – Orsat Analysis)	**(b)**	**N/A**	100%
Oxygen (EPA Method 3 – Orsat Analysis)	**(c)**	**N/A**	100%
(a) Not determinable.			
(b) An accuracy of ± 0.2% would be expected if a certified gas audit is performed. Otherwise individual readings must be within 0.3 g/g-mole of the mean value for three (replicate) readings.			
(c) An accuracy of 20.8% ± 0.5% would be expected if an ambient air audit is performed.			

Table 5-3 Overall Summary of CPT Stack Gas Sampling and Analysis Program

Sample Matrix and Sampling Method	Analytical Parameters	Analytical Method	Lab (a)	Total Samples Analyzed			
				Total Runs	Field Blanks	Audit	Lab QC
EPA M 0023A	PCDDs/PCDFs	EPA M 0023A / M 8290	VISTA	3	1	0	1
EPA M 3	O2 and CO_2	EPA M 3	AECOM	3	0	0	0
Facility CEM	O2 and THC	Facility CEM QA Plan	WTI	3	0	0	0

(a) AECOM = AECOM. Inc.

VISTA = Vista Analytical Laboratories, Inc. (El Dorado Hills, CA)
WTI = Heritage-WTI

Table 5-4 Sample Preservation and Holding Time Requirements

Stack Gas Samples [a]

Parameter	Matrix	Preservation	Holding Time
PCDDs/PCDFs (Method 0023A)	XAD Resin	Cool, 4°C	30 days (to extraction)
			45 days (extraction to analysis)

(a) Holding times will be calculated from the day of sample collection.

Waste Feed Samples

Parameter	Matrix	Preservation	Holding Time
Total Chlorides	Organic Liquid	Cool	30 days

Table 5-5 Summary of QA/QC Procedures for Chemical/Physical Properties of Waste Feed

Quality Parameter	Method Determination	Frequency	Target Criteria
Calibration	Initial analysis standards	Prior to sample analysis	Instrument dependant
	Continuing calibration standards	Before and after sample analysis; once every 20 samples	90%-110% of expected value
Interference check	Interference check sample	Before and after sample analysis	90%-110% of true value
Accuracy - calibration	Analysis of calibration check standard	After every calibration	90%-110% of expected value
Accuracy - spikes (chlorine)	Spike sample at twice sample level	Once every 20 samples	90% to 110% of spiked value
Precision	Duplicate preparation and analysis of at least one run's samples	Once every 20 samples	Range < 30% if sample result above lowest standard
Blank	Method blank carried through all sample preparation and analysis steps	Once every 20 samples	Below detection limit

Table 5-6 WTI Laboratory Test Methods for Waste Feed (Relative to the CFPT)

Parameter	Method Description	Analytical Methods
Ash Content	Ash from Petroleum Products	EPA M 9040
Inorganic Anions	Anions in Water by Ion Chromatography (Fluorine, Chlorine, Bromine, Sulfur, Iodine)	EPA M 300 and ASTM D 4327
Heat Content	Bomb Combustion Method for Solid Waste	EPA M 5050 and ASTM D 12964
Inorganic Preparation Methods	Acid Digestion of Sediments, Sludges & Soils (Metals)	EPA M 3050
	Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by FLAA or ICP Spectroscopy	EPA M 3005
	Microwave Assisted Acid Digestion of Aqueous Samples and Extracts (Metals)	EPA M 3015
	Microwave Assisted Acid Digestion of Sediments Sludges, Soils & Oils (Metals)	EPA M 3051
	Toxicity Characteristic Leaching Procedure (TCLP - Metals)	EPA M 1311
Paint Filter	Paint Filter Liquids Test	EPA M 9095A
Inorganic Analysis Procedures	Inductively Couples Plasma-Atomic Emission (Metals) Spectroscopy	EPA M 6010
	Mercury in Liquid Waste (Manual Cold-Vapor Technique)	EPA M 7470
	Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)	EPA M 7471
pH	pH Electrometric Measurement	EPA M 9040
	Soil & Waste pH	EPA M 9045
Physical Description	Physical Description Screening Analysis in Waste	ASTM D 4979
Radioactivity Screen	Radioactivity	WTI Method W-1002
Specific Gravity	Specific Gravity Apparent of Liquid Industrial Chemicals	ASTM D 891
Viscosity	Low Temperature Viscosity Measured by Brookfield Viscometer	ASTM D 2983-87
Water Content	Water in Crude Oils (Karl Fischer) Titration	ASTM D 4377
	Water in Paints & Paint Materials by Karl Fischer Method	ASTM D 4017

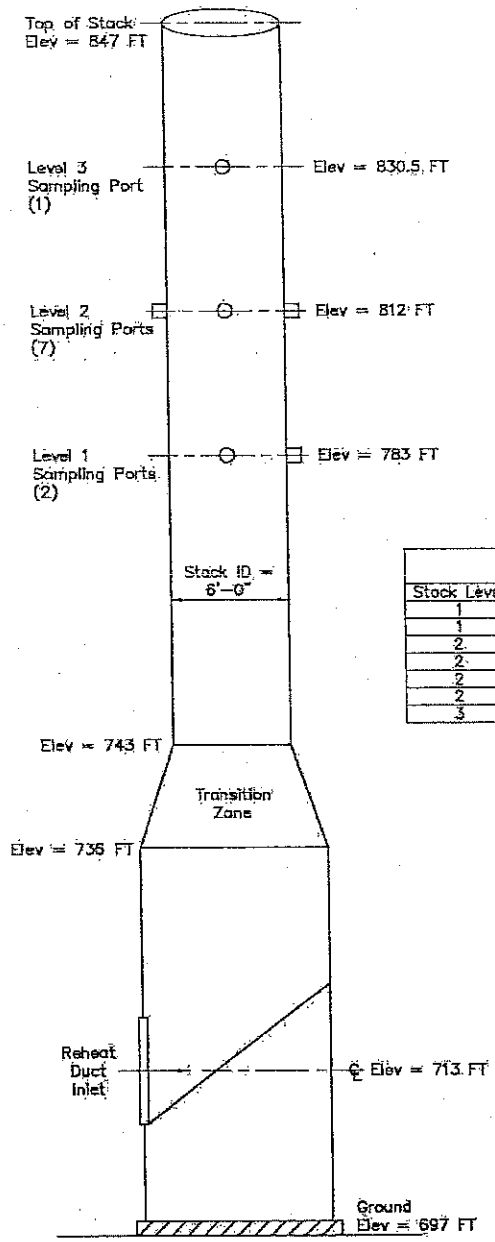
Note: Waste streams combusted during the MACT CPT will be analyzed via the test method listed in this table.

Table 5-7 QA Objectives for PCDD/PCDF Analyses of Stack Gas Samples by Method 0023A

Quality Parameter	Method Determination	Frequency	Target Criteria
Calibration	Five-level calibration curve; continuing calibration standard	At least once; continuing calibration check at beginning of each 12-hr shift	Initial: ≤ 20% RSD for unlabeled standards ≤ 30% RSD for internal standards S/N ratio ≥2.5; Isotope ratios within control limits Continuing: ≤ 20% of ICAL for 17 unlabelled stds ≤ 30% of ICAL for internal standards S/N ratio ≥ 2.5; Isotope ratios within control limits
Accuracy-calibration	Analysis of calibration check	After every initial calibration	80% - 120% of theoretical value
Accuracy-surrogates	Spiked into samples prior to sampling	Every sample	70% - 130% recovery
Accuracy-internal standards	Spiked into samples prior to extraction and analysis	Every sample	40%-135% recovery for all homologs
Accuracy – audit samples	Prepared and analyzed along with program samples, if provided	Presented by the regulatory agency	Determined by regulatory agency.
Blanks	Method blank for each component Field reagent blanks	One per batch of samples Once per test	ND or <5% of field concentration Evaluated on a case-by-case basis
Mass Spectrometer Performance	Section 8.2.2 of Method 8290	At beginning of each 12-hr period	Static resolving power of 10,000 (10% valley definition)
Qualitative Identification	Retention Time and GC Column Performance	Every sample	Compliance with Section 8.2.1 of Method 8290

S/N = Signal to Noise Ratio
RSD = Relative Standard Deviation

Figure 5-1 Stack Sampling Locations



Key Stack Parameters

Parameter	Units	Value
Temp.	F	203
Moisture	%v/v	30.0
O_2	%v/v	15.5
CO_2	%v/v	4.5
Flowrate	dscfm	52,000
Vel. Press.	in. w.c.	0.68
Static P.	in. w.c.	−0.50

Level 2 Traverse Point Data

Pt. No.	% of Diam.	Dist. Incl. Port (in.)
1	4.4%	9.7
2	14.6%	17.0
3	29.6%	27.8
4	70.4%	57.2
5	85.4%	68.0
6	95.6%	75.3

Sampling Port Details

Stack Level	No. of Ports	Port Diam.	Elev.	Length
1	2	4–inch	783 ft	8–inch
1	1	1.5–inch	779 ft	8–inch
2	2	4–inch	812 ft	6.5–inch
2	2	4–inch	811.5 ft	6.5–inch
2	2	4–inch	811 ft	6.5–inch
2	1	1.5–inch	808.5 ft	6.5–inch
3	1	1.5–inch	830.5 ft	6.5–inch

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AECOM

AECOM Environment
2 TECHNOLOGY PARK DRIVE
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PHONE: (978) 589-3000
FAX: (978) 589-3100
www.aecom.com

HERITAGE – WTI
STACK SAMPLING LOCATIONS

FIGURE NUMBER: 5-1

DRAWN BY:	DATE:	PROJECT NUMBER:	SHEET NUMBER:
K.P.B.	1/10	60138210	1

Figure 5-2 Example Sample Packing List

AECOM

Sample Packing List

Site of Program:	Sample Date:	Project Location:
Type of Program:	Date Shipped:	Analytical Lab:
Project #:	Shipper:	Lab P.O. #:
Program Office:	Contact:	FedEx Air Bill #:

Sample ID	Sample Matrix	Sample Description	Analyses	Instructions

Field Notes/ Comments

Relinquished By: Date:	Received By: Date:	**Analytical Laboratory Destination:**
Signature: Time:	Signature: Time:	

EXAMPLE SAMPLE LABEL

AECOM

Site of Program: _____
Project No.: _____

Sample Date: _____ Sample Matrix: _____
Analytical Parameters: _____
Sampler: _____
Sample Description: _____
Sample ID Code: _____
Special instructions: _____

6.0 Continuous Monitoring System Performance Evaluation Test Plan [40 CFR 63.8(e)(4) and 1207(b)(1)]

6.1 Introduction

As part of complying with the requirements of the HWC MACT regulations, facilities must submit a plan along with the CPT Plan and perform an evaluation of their "Continuous Monitoring System" (CMS) as part of the CPT. EPA defines the CMS in 40 CFR 63.2:

"Continuous Monitoring System (CMS) is a comprehensive term that may include, but is not limited to, continuous emission monitoring systems, continuous opacity monitoring systems, continuous parameter monitoring systems, or other manual or automatic monitoring that is used for demonstrating compliance with an applicable regulation on a continuous basis as defined by the regulation."

Based on the above definition, the main components of the CMS for the WTI incinerator includes the following:

- Process instruments that monitor or control key process parameters, including the Unit's Continuous Emissions Monitoring system;
- The DCS and Data Acquisition System (or DAS);
- The AWFCO system; and
- The programmable logic that utilizes regulatory set-points to assure compliance.

The CMS Performance Evaluation Test Plan utilizes a combination of activities to accomplish its objective, which is to verify that the incinerator is properly controlled and that the equipment and systems that are used are operating properly and are accurate. These activities include instrument audits or calibrations, auditing the function of the AWFCO system and the programmable logic used in the DCS. This plan describes the CMS itself, the procedures and documentation practices that will be used to verify the functionality of the CMS and the Quality Assurance requirements of the evaluation.

6.2 Continuous Monitoring System Description

This section provides an overview of the key components of the CMS. This CMS evaluation includes field instrumentation, the DCS/DAS, the programmable logic and field control (e.g., control and block valves).

6.2.1 Field Instrumentation

Tables 2-4 and 2-5 in Section 2.0 of this Plan provide information pertaining to field instruments that are part of the overall CMS. These instruments monitor and control certain process operations to assure the unit is operating safely and in compliance with applicable environmental requirements. The instruments used for these aspects of process control meet the definition of "Continuous Monitor" in 40 CFR 63.1201.

As part of initial instrument specification prior to installation and use in the process, instrument audit and calibration procedures are identified or developed. These procedures specify the frequency of auditing the instrument's function and accuracy and the actual procedure for verification. These procedures specify both

the specific steps and the acceptable accuracy requirements that the instrument must meet to "pass". Troubleshooting procedures are typically included to help plant personnel correct any problems and get the instruments operational.

6.2.2 Continuous Emissions Monitoring System

In addition to other field instrumentation, the operation of the incinerator also relies on its Continuous Emission Monitoring System (CEMS) to monitor stack emissions concentrations. This system is described in Section 2.6. When emission levels deviate from allowable limits, the DCS takes appropriate action up to and including initiating an AWFCO.

6.2.3 Process Control

The process control systems for this incinerator are described in Section 2.5 of this Plan. It detects signals from process instruments, performs calculations according to the programmable logic, adjusts control equipment and notifies operators when key process parameters deviate outside acceptable limits. In addition to notifying operating personnel the AWFCO system described in Section 2.5.1 will automatically shut down the waste feeds and the overall process itself in the event of deviations outside acceptable operating limits.

6.2.4 CMS Operation

All the components of the CMS must be operational for the incinerator to burn waste. The DCS and overall process control system are designed in such a manner as to continually verify that operation while the unit is running. Field instrumentation (both sensing and control) are connected to the DCS in "control loops" with common wiring, electrical signal transmitters, input/output devices and related programmable logic. All components of each control loop related to the feeding of a certain type of waste (i.e., liquid organic, liquid aqueous or process vents) must be operating for the incinerator to be enabled to burn that waste. The programmable logic is designed in such a way that it can sense and verify that various components of the process and the process itself are operating as required. For example, if power is lost to a flow meter on a waste feed line, the programmable logic will sense this signal loss and initiate either an alarm or shutdown. Similarly, if the actual field position of a specific control valve disagrees beyond a certain amount with what the programmable logic calculates it should be, again, appropriate alarms and/or shutdowns are initiated. (A complete listing of current and future AWFCO limits was provided previously in Table 2-4.)

6.2.5 Management of Change

A Management of Change (MOC) procedure is implemented at Heritage-WTI, Inc., to ensure that adequate levels of communication exist between all departments when changes are made which affect the process. A change made in one part of the process or other processes may have unintended effects on other parts of the process because the stationary sources are an integrated system. These proposed changes are therefore appropriately scrutinized before they are made to ensure the changes do not compromise the safety and integrity of the process and avoid adverse effects or worker and public safety and the environment.

The MOC evaluation form includes changes which impact:

- Process chemicals;
- Technology;
- Equipment;

- Procedures; and
- Employees.

Any change to these criteria triggers the use of an MOC form. This procedure does not apply to "replacement in kind" which is defined as replacements that satisfy the design specifications. A form is used to document the Management of Change procedure when the above changes are planned by facility personnel.

Each type of change requires the appropriate signatures and authorization to proceed with the change. As part of the MOC form, an action item checklist is used to identify tasks as a result of the change and to track their completion. Personnel (e.g., engineering, operations, safety) assess the potential impact of the change on safety and health through a safety checklist for minor changes or a process hazard analysis (PHA) for major changes. The following steps are taken to ensure proper implementation of the change:

- Process safety information (PSI) is updated as necessary but always prior to startup;
- Operating procedures are updated as necessary in accordance with the written operating procedure program.; and
- Employees (e.g., operations, maintenance, contract) whose job tasks are affected by the change, are trained in accordance with the written training program prior to the startup of the process.

The MOC forms and documentation of completed action items are forwarded to the appropriate personnel for authorization. The MOC records and recommendations are tracked according to the assigned checklist.

6.3 CMS Performance Evaluation Plan

As described above, the CMS Performance Evaluation Test Plan relies on a combination of activities to determine whether the CMS is operating properly. This will include the following:

- Auditing the instrument maintenance and calibration program;
- Calibrating field instruments;
- Auditing the AWFCO Testing Program; and
- Auditing portions of the programmable logic to verify that the AWFCO set-points used assure regulatory limits will be met.

Personnel who are knowledgeable of WTI incinerator operations, their process control systems and relevant regulatory requirements, will perform these activities.

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6.3.1 Instrument Audit and Calibration

As part of conducting the CMS Performance Evaluation, a two step process will be used to assess the status of the various field instruments identified in Section 2.0. First, audit/calibration records will be reviewed for these instruments to determine when their most recent audit/calibration occurred. From this review, any instruments that are approaching the end of their audit/calibration cycle will be scheduled for audit and/or calibration prior to performing the actual Trial Burn/CPT. For example, if a mass flow meter (annual audit

cycle) has been audited/calibrated within several months of the test, it will not be re-calibrated. If however, that same flow meter hasn't been audited/calibrated within the last nine to ten months, it will be audited and/or calibrated prior to the test.

Because certain instruments cannot be audited or calibrated without taking the incinerator offline, these will be scheduled over a period of time prior to the test program to minimize process interruptions and shutdowns. All instruments requiring pre-test audits/calibrations will be evaluated prior to field program implementation.

6.3.2 AWFCO System Performance Evaluation

Another component of the CMS Performance Evaluation is auditing the AWFCO system and related DCS logic. This will be accomplished by reviewing the last year of AWFCO testing logs to assess whether there are any recurring problems with the AWFCO system. Any incidence of problems with the AWFCO system will be identified for follow-up and correction prior to testing.

This evaluation will also include examining the appropriate programmable logic statements to compare the AWFCO set-points with the applicable operating parameter limits to assure that these are appropriate.

6.3.3 Auditing the CEM System

The CEM systems used at WTI's incinerator are installed, operated and maintained to comply with the provisions of the applicable performance specifications and/or EPA Reference Methods. In general, this means the CEMs are calibrated daily (zero/span), quarterly (gas audits) and annually (Relative Accuracy Test Audits). Thus, the evaluation of the performance of this system will be done as part of meeting those requirements and a separate evaluation will not be conducted under this plan.

6.3.4 Schedule

The Performance Evaluation itself will be conducted from one to three months prior to a CPT or Confirmatory Test as required by the HWC MACT regulations. All CMS Performance Evaluation activities will be completed with all components meeting their respective accuracy requirements prior to performing the CPT.

6.3.5 Reporting and Documentation

The results of the CMS Performance Evaluation will be included as part of the Notification of Compliance as required by 40 CFR 63.9(h)(2). This will include the following information:

- Description of the CMS components;
- Description of the CMS Performance Evaluation Plan;
- Listing of all field instruments that are part of the CMS and their audit/calibration status;
- Listing of field instruments that have been specifically audited/calibrated as part of the CMS Performance Evaluation;
- Copies of the most recent audit/calibration results for CMS instruments;
- AWFCO system evaluation results;
- CEM system evaluation results; and

- Copies of relevant programmable logic statements showing where calculations and regulatory alarms and set-points are used in the coding to assure compliance.

6.4 Quality Assurance

The quality assurance (QA) requirements for this Performance Evaluation are specified in Table 6-1. The QA requirements for CMS equipment components are established by other criteria outside this Performance Evaluation.

Table 6-1 QA Requirements for the CMS Performance Evaluation

CMS Component	Basis for QA Requirement	QA Specification
Field Instruments	Manufacturer recommendations	Audit/calibration meets recommended specifications for all affected instruments
AWFCO System Evaluation	MACT requirement	No failures of the AWFCO system
CEM System	40 CFR 60, Appendix A	Meets those specifications
Programmable Logic	MACT requirement	All set points programmed correctly

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Appendix A

Regulatory Agency Correspondence and Other Correspondence Regarding Scrubber and ESP Operation

(All information contained in this appendix is considered to be Confidential Business Information)

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Appendix B

Facility Process and Instrumentation Diagrams

(All information contained in this appendix is considered to be Confidential Business Information)

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Appendix C

Field Data Sample Collection Forms

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Appendix D

Isokinetic Sampling Train Setup and Recovery Schematics

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