Quality Assurance Project Plan for the 2025 Confirmatory Performance Test and RCRA Periodic Test

Veolia ES Technical Solutions, L.L.C.
Port Arthur, TX

Project number: 60736471

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September 2024

Quality information

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Veolia ES Technical Solutions, LLC
Port Arthur, Texas

APPROVALS

Don Icard Test Manager Veolia ES Technical Solutions, L.L.C.	Date
Laura Faletto Project Manager AECOM	Date
Wayne Washburn, QSTI Project QA/QC Coordinator AECOM	Date
Courtney Adkins Laboratory Project Manager Eurofins TestAmerica Laboratories	Date
Anna Barlozhetskaya QA/QC Manager Eurofins TestAmerica Laboratories	Date
Scott Neal Senior Specialist Superior Spiking Industries	Date

Note:

1) The individuals listed above have received, read, and agreed to the appropriate information pertaining to their project responsibilities listed and provided in this QAPjP.

2) The individuals listed above agree that no testing methods have been modified other than the modifications identified in this document.

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1. Introduction

Veolia ES Technical Solutions, L.L.C. (Veolia) operates a hazardous waste incinerator at its facility in Port Arthur, Texas. The incinerator treats hazardous wastes under the Resource Conservation and Recovery Act (RCRA) Permit HW-50212, Air Permit 42450 issued by the Texas Commission on Environmental Quality (TCEQ), and a Toxic Substances Control Act (TSCA) permit issued by the United States Environmental Protection Agency (US EPA). The incinerator operates in compliance with the requirements of the RCRA, Air, and TSCA permits, and the Final Replacement Standards of the *National Emission Standards for Hazardous Air Pollutants (NESHAPs) from Hazardous Waste Combustors* (Title 40 of the Code of Federal Regulations, Part 63 [40 CFR Part 63], Subpart EEE) that were promulgated on October 12, 2005 - often called the Hazardous Waste Combustor (HWC) Maximum Achievable Control Technology (MACT) standards.

The previous Comprehensive Performance Test (CPT) for the Final Replacement Standards of the HWC MACT commenced on August 31, 2022 with the performance of a Relative Accuracy Test Audit (RATA) of the carbon monoxide (CO) and oxygen (O_2) Continuous Emission Monitoring System (CEMS) on the stack of the incinerator, and was completed on October 14, 2022. The report of the CPT and a Notification of Compliance (NOC) for the Final Replacement Standards of the HWC MACT were submitted on January 20, 2023.

Per the requirements of the HWC MACT at 40 CFR 63.1207(d)(2), a Confirmatory Performance Test for polychlorinated dibenzodioxins and polychlorinated dibenzofurans (dioxins/furans) “must commence…no later than 31 months after the date of commencing the previous comprehensive performance test”. Therefore, the Confirmatory Performance Test (CfPT) must start by March 31, 2025. A CfPT Plan and a Continuous Monitoring System Performance Evaluation Test Plan (CMS PETP) must be submitted at least 60 calendar days before the start of the test as required by §63.1207(e)(1)(ii).

Section V.H.6.b of the RCRA permit for the facility requires that periodic testing be performed every two and one-half years. The permit specifies that sampling and analysis of the waste and exhaust emissions be conducted to verify compliance with the feedrate limits in Table V.H.3.b. (of the permit) and the emission limits in Table V.H.4.b. (of the permit) and to ensure achievement of the performance standards of 40 CFR 264.343.

The CfPT Plan/RCRA Periodic Test Plan and associated Quality Assurance Project Plan (QAPjP) include the testing required by the HWC MACT and the RCRA permit. Veolia plans to conduct the combined CfPT and RCRA Periodic Test commencing with the week of April 14, 2025. In addition to sampling for dioxins/furans to meet HWC MACT test requirements, this QAPjP will include sampling for particulate matter (PM), polychlorinated biphenyls (PCB), hydrogen chloride (HCl), chlorine (Cl_2), Metals, and Chromium VI, which will serve to meet RCRA, Air, and TSCA permits permit test requirements.

This document is a QAPjP for the upcoming 2025 CfPT/RCRA Periodic Test. The CfPT/RCRA Periodic Test Plan presents Veolia’s plan for testing of the incinerator to demonstrate compliance with the applicable HWC MACT incinerator emissions standard for dioxins/furans as well as the RCRA permit feedrate and emissions limits. The QAPjP provides specifications for the testing described in the CfPT/RCRA Periodic Test Plan. An engineering description of the incinerator located at the Port Arthur facility is provided in the CfPT/RCRA Periodic Test Plan.

2. Project Organization

The project organization for the performance and reporting of the CfPT/RCRA periodic test of the incinerator at Veolia's Port Arthur facility is presented in **Figure 2-1**. The responsibilities of the key personnel are outlined in this section.

Don Icard is the Veolia Test Manager and is responsible for the test program. Mr. Icard will be responsible for the overall performance and coordination of the test effort and for all agency communications concerning the CfPT/RCRA Periodic Test. Mr. Icard will coordinate with Veolia facility staff who will be responsible for spiking of 1,2-dichlorobenzene as surrogate for PCB. Veolia will determine the amount and rate of 1,2-dichlorobenzene spiking required during the CfPT/RCRA periodic test.

AECOM Staff will serve as the performance test coordinator and will perform sampling and analysis for the test. AECOM's responsibilities include coordination of unit operations, the collection of stack gas samples, transport of collected samples to the laboratory, analysis of all samples (using a subcontract laboratory), and preparation of the test report and NOC.

Laura Faletto of AECOM will serve as the Project Manager. In this role, she has the overall responsibility for the success and quality of the AECOM effort. Ms. Faletto will have primary authority for all decisions concerning sampling and analysis. In addition, she will maintain lines of communication with the Field Sampling Coordinator who will coordinate incinerator operations with sampling and analysis activities during the test program.

Ms. Faletto will also be responsible for coordinating the analysis phase of this program. She, along with the Field Sampling Coordinator, will be the focal point for communication between the field team and the analytical laboratories, as well as the key for receipt of data, and support information from the laboratories. She is responsible that the laboratories implement the QA/QC requirements in this document. She will be responsible for coordination of all analyses and preliminary review of analytical data.

Jack Hoard will serve as the Field Sampling Coordinator. In this role, he will be responsible for the day-to-day performance of the AECOM activities in the field and will be responsible for sample shipment to the laboratories. Mr. Hoard will have primary authority for decisions concerning sampling and analysis. Mr. Hoard will also be responsible for the organization and execution of the mobilization effort and will be responsible for the acquisition and calibration of all equipment and supplies.

Wayne Washburn of AECOM will serve as QA/QC Officer. He is responsible for the development of the QA/QC activities, as well as data review and reporting from a quality and data validation perspective. He will prepare the QA/QC section of the final report, focusing on data quality issues. If further discussions are required, they will be included in appropriate sections of the Test Report.

There will not be an independent 3rd party providing QA/QC oversight for the CfPT/RCRA Periodic Test. Mr. Washburn will perform data validation for the CfPT/RCRA Periodic Test. He is the Quality Control Officer of Source Testing for AECOM and has over 25 years of experience including document preparation; test protocol design and preparation; laboratory coordination; method development; plan implementation; and interpretation and reporting of sampling, analysis and QA/QC results.

Mr. Washburn will have the responsibility for preparation of the final report and NOC. Data review and reporting will be the responsibility of the task leaders described above.

Analysis of all samples collected during the CfPT/RCRA Periodic Test of the incinerator at Veolia's Port Arthur facility will be performed by Eurofins TestAmerica Laboratories in Knoxville, TN (TestAmerica).

Spiking of waste streams for RCRA compliance, and preparation of these spiking materials, will be performed by Superior Spiking Industries of Pasadena, TX. Resumes of key project personnel will be included as an appendix with the Test Report.

Laboratory Staff. The principal point of contact for the AECOM Management Team will be Ms. Courtney Adkins, the Project Manager at Eurofins TestAmerica Laboratories. Ms. Adkins will oversee project execution, completeness, and deliverables and ensure that objectives are met. She will manage the shipment and receipt of samples, track analytical progress, and review the reported data for completeness. Anna Barlozhetskaya is the laboratory quality assurance (QA) manager and will oversee QA requirements with all laboratory staff to ensure compliance with data quality objectives. The Laboratory QA/QC Manager will validate all data generated by the laboratory for this program and provide the necessary documentation for the final report.

Spiking Specialist. Superior Spiking Industries will serve as the provider of spiking materials for this program. Mr. Scott Neal will coordinate with AECOM and Veolia to determine the required spiking materials and rates. He will be responsible for administering the spiking at the specified rates during the test program and will ensure that all necessary documentation is provided for inclusion in the final report at the conclusion of the program.

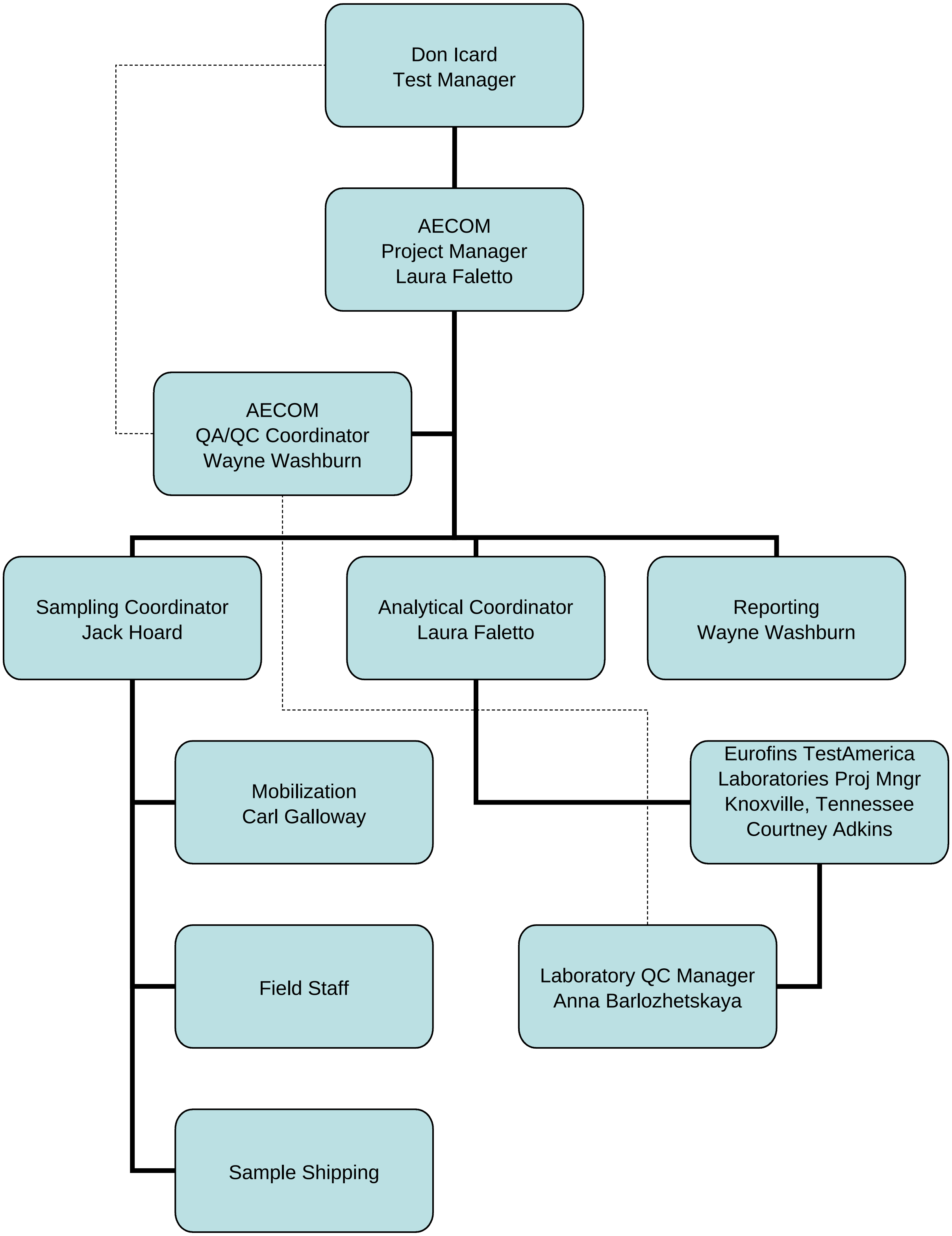


Figure 2-1. Project Organization Chart

3. Quality Assurance Objectives

This section presents quality assurance (QA) objectives for the following critical measurement parameters of the CfPT/RCRA periodic test:

- Particulate matter in the stack gas;
- HCl and Cl_2 in the stack gas;
- Metals in the stack gas;
- Chromium VI in the stack gas;
- Dioxins/furans in the stack gas;
- PCB in the stack gas;
- Metals in waste feeds; and
- Chlorine in waste feeds.

Critical measurement parameters are defined as those measurements that directly contribute to the demonstration objectives of the test. The objectives and goals of the test are delineated in Section 1.0 of this document.

Table 3-1 summarizes the QA objectives for the critical measurement parameters in terms of accuracy, precision, and completeness.

No precision or accuracy measurement for particulate matter in the stack gas, while a critical measurement, is listed in **Table 3-1** because they cannot be readily measured in a test. Adherence to the method protocol, which includes performance-related activities such as sampling equipment calibration, isokinetic sampling, balance calibration, desiccating filters to a constant weight, et cetera, is the basis for achieving acceptable method accuracy. For other critical measurement parameters, the performance objectives are expressed by conditions that can be appraised experimentally.

The completeness objective reflects the requirement to provide three valid determinations of the target measurement. There will be three runs conducted at one operating condition. The completeness objective of 100% in the table below reflects the need to develop three valid determinations. Since additional samples cannot be collected after the test, any loss of anticipated data through sample breakage or mishandling after the field portion of the test will be carefully evaluated with respect to the impact of project objectives. All QA/QC data will be thoroughly interpreted in the final report.

Table 3-1. Quality Assurance Objectives

Parameter	Precision [1]	Accuracy [2]	Completeness [3]
HCl/Cl_2 in Stack Gas	10% RPD for duplicate analysis for each sample	75-125% recovery for matrix spike	100%
Metals in Stack Gas	20% RPD for matrix spike/matrix spike duplicate As necessary, these will be post-digestion spikes or post-digestion spike duplicates	70-130% recovery for matrix spikes for all except mercury 75-125% recovery for matrix spikes for all except mercury As necessary, these will be post-digestion spikes	100%
Chromium VI in Stack Gas	RPD <20% for all duplicate analyses	90-110% recovery for matrix spikes	100%
Dioxins/Furans/PCB in Stack Gas	30% RSD for pooled surrogate recoveries [3,4]	70-130% recovery of method-specified surrogates [5]	100%
Metals in Waste Feeds	20% RPD for matrix spike/matrix spike duplicate	70-130% recovery for matrix spikes for all except mercury 75-125% recovery for matrix spikes for all except mercury	100%
Chlorine in Waste Feeds	10% RPD for matrix spike/matrix spike duplicate	80-120% recovery for matrix spikes	100%

[1] Precision is expressed according to the type of measurement. For surrogate spikes, precision is expressed as percent relative standard deviation (RSD) for the set of spike recoveries or assay results. For objectives measured by matrix spike duplicates (MSD) or duplicate analyses, precision is expressed as the relative percent difference (RPD) between MS/MSD recoveries or duplicate analyses.

[2] Accuracy is expressed in terms of percent error, or difference between a measured value and the theoretical value, expressed as a percentage of the theoretical. For assays, the objective is based on the mean measured value. For surrogate and matrix spike (MS) recoveries, the objective is based on single measurement results.

[3] Completeness is the total number of valid measurement results, expressed as a percentage of the number planned.

[4] Pooled over all samples

[5] For surrogate spiked before sampling.

If the QA objectives for accuracy and precision are not met, careful interpretation of the analytical data will be made to evaluate the associated impact on the performance demonstration. Results that are outside of these objectives may indicate matrix interferences that are sometimes present in stack emission samples. As such, results that are outside these specifications do not necessarily invalidate the data, but rather indicate the need to evaluate the data carefully and explain potential biases and/or limitations in the use of the data. The evaluation for data validity will be based (among other things) on the evaluation of the laboratory's adherence to the QC and corrective action specifications.

Other QA objectives are representativeness and comparability. Representativeness is a function of sampling strategy. Representative stack gas samples will be collected by following approved reference methods, which are specifically developed to acquire representative samples (i.e., collection over time period, sample volume, etc.). All samples will be collected only under stable and specific operating conditions.

Comparability is the degree to which data from a given study can be compared to data from other similar studies. Data comparability will be ensured by adhering to the standard methods specified in this document. Analytical results will also be presented in appropriate standard units according to industry conventions.

4. Program Summary

40 CFR 63.1207(b)(2) of the HWC MACT requires that a confirmatory performance test (CfPT) be performed within 31 months of the previous CPT to demonstrate compliance with the applicable dioxins/furans emission standard, and conduct a performance evaluation of continuous monitoring systems required for compliance assurance with the dioxins/furans standard. Veolia's RCRA permit requires that the incinerator be tested every two and one-half years to verify compliance with the feedrate limits in Table V.H.3.b. (of the permit) and the emission limits in Table V.H.4.b. (of the permit), and to ensure achievement of the performance standards of 40 CFR 264.343.

The test will be conducted to meet both HWC MACT and RCRA test objectives concurrently. The test objectives are:

- Demonstrate compliance with HWC MACT emission standard for dioxins/furans of 40 CFR 63.1219(a)(1)(ii);
- Demonstrate compliance with Section III.B.1 of the PCB permit issued pursuant to Section 6(e) of the TSCA.
- Conduct a Continuous Monitoring System (CMS) performance evaluation test for the Operating Parameter Limit (OPLs) used to demonstrate compliance with the HWC MACT standard for dioxins/furans;
- Conduct a Relative Accuracy Test Audit (RATA) for the CO and O_2 Continuous Emissions Monitoring Systems (CEMS); and
- Satisfy the periodic testing requirements of Provision V.H.6.b of the RCRA permit.

The test objective for the CfPT portion of this combined test program is to verify that the total emission concentration of dioxins/furans is less than the applicable standard at 40 CFR 63.1219(a)(1)(i)(B). The applicable dioxins/furans emission standard is 0.40 ng TEQ/dscm, corrected to 7% O_2 since the incinerator has a wet particulate matter control device.

The test objectives for the RCRA periodic test portion of this combined test program is to verify the limits from the RCRA permit as detailed below:

- Demonstrate waste feedrate limits in Table V.H.3.b. of the RCRA permit:
  - Arsenic;
  - Beryllium;
  - Cadmium;
  - Total Chromium;
  - Antimony;
  - Barium;
  - Lead;
  - Mercury;
  - Nickel, Pumpable Mode;
  - Nickel, Solids Mode;
  - Selenium;
  - Silver;
  - Thallium;

  - Zinc;
  - Total Chlorine; and
  - Ash to Afterburner.

- Demonstrate emission limits in Table V.H.4.b. of the RCRA permit:
  - Arsenic;
  - Beryllium;
  - Cadmium;
  - Chromium, Hexavalent;
  - Chromium, Total;
  - Antimony;
  - Barium;
  - Lead;
  - Mercury;
  - Nickel;
  - Selenium;
  - Silver;
  - Thallium;
  - Zinc;
  - Hydrogen Chloride;
  - Free Chlorine; and
  - Particulate Matter.

- Demonstrate the RCRA incinerator performance standards at 40 CFR 264.343:
  - A minimum 99.99% destruction and removal efficiency (DRE) of principal organic hazardous constituents (POHCs) was demonstrated in the 2006 Comprehensive Performance Test (CPT) for the Interim Standards of the HWC MACT. DRE will not be re-demonstrated during the CfPT/RCRA Periodic Test;
  - Control of hydrogen chloride emissions to less than 4 lb/hr or 1.0% of the HCl generated in the combustion process; and
  - Control of particulate emissions to less than 0.08 grain per dry standard cubic foot as corrected to 7% oxygen in the stack gas.

A relative accuracy test audit (RATA) of the CEMS on the stack of the incinerator is performed annually. A full annual RATA of all of the CEMS monitors (i.e., CO, CO_2, O_2, SO_2, and HCl) and the stack gas flowrate monitoring system will be conducted in the second Quarter of 2025. As required in the HWC MACT, a RATA of the CO and O_2 monitors will be conducted just prior to the CfPT (and RCRA permit periodic testing).

4.1 Waste Selection

Veolia proposes to feed a mix of wastes to the incinerator that is representative of typical operations. The average waste feedrates were determined for the 12-month period previous to the preparation of the

CfPT/RCRA Periodic Test Plan (i.e., September 2023 through August 2024). For the CfPT/RCRA Periodic Test, the actual waste feedstreams and target feedrates will be established to achieve the target operating conditions based on actual inventory of the waste streams at the time of testing. It is possible that the waste feedstreams and feedrates during the test may not demonstrate the 12-month average feedrates for the metals in Table V.H.3.b. of Veolia's RCRA permit. To assure that the 12-month average feedrates of the 13 metals in Table V.H.3.b. are demonstrated, Veolia will spike three metals during the test.

4.2 Operating Conditions

For the CfPT/RCRA Periodic Test, the target operating conditions must be within a particular operating range, created to reflect normal operating conditions, per §63.1207(g)(2) and RCRA Permit HW-50212. As discussed in the CfPT/RCRA Periodic Test Plan, target operating values will be within the previous 12-month average of plant process data reported in the units of the OPL (i.e., as hourly rolling averages – HRAs) recorded every minute. During the CfPT/RCRA Periodic Test, Veolia will maintain each of the parameters listed in **Table 4-1** between the 12-month average and the NOC limit. The 12-month period selected to provide data to develop the 12-month average, based on the most recent data available when the CfPT/RCRA Periodic Test Plan was written, is September 2023 through August 2024.

For CO, a wider operating range is requested for the CfPT/RCRA Periodic Test per §63.1207(g)(2)(v). The concentration of CO in the stack gas will not be targeted to be maintained between the 12-month average and the NOC limit (i.e., the HWC MACT standard of 100 ppm corrected to 7% oxygen). During the CfPT/RCRA periodic test, the concentration of CO will be maintained less than the HWC MACT standard, and the limit for CO in the RCRA permit.

4.3 Test Protocol

The approach for accomplishing the test objectives is to operate the incinerator at a single representative test condition. To accomplish this, a mix of waste streams will be fed to the incinerator typical of normal operations.

The testing will consist of a series of three test runs (i.e., three distinct test periods). During each test run, samples will be collected to measure the following parameters in the stack gas emissions.

- Dioxins/Furans/PCB;
- Metals (Arsenic, Beryllium, Cadmium, Total Chromium, Antimony, Barium, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc);
- Chromium (VI);
- Hydrogen Chloride (HCl) and Chlorine (Cl_2); and
- Particulate Matter.

In addition, waste feed streams will be sampled and analyzed to determine:

- Metals (Arsenic, Beryllium, Cadmium, Total Chromium, Antimony, Barium, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc);
- Total Chlorine; and
- Ash to the Afterburner.

Process data will be collected during the CfPT/RCRA Periodic Test to document that the incinerator was operated within the target operating ranges during the test. A Continuous Monitoring System Performance Evaluation Test (CMS PET) will be performed prior to the CfPT/RCRA Periodic Test to document performance of instrumentation used to monitor OPLs and parameters in association with the dioxins/furans standard of the HWC MACT. Instrumentation that measures waste feedrates, combustion temperatures, stack gas flowrate, and the concentrations of CO and O_2 in the stack gas will be calibrated prior to the CfPT/RCRA Periodic Test.

Table 4-1. CfPT/RCRA Periodic Test Feedrates and Operating Conditions

Operating Parameter Limit	Process Tag	Units	12-Month Average [1]	NOC Limit [1,2]	Required for CfPT	RCRA Permit Limit	Required for RCRA Periodic Test	Target Operating Range [3]
Maximum Total Hazardous Waste Feedrate to Kiln and SCC	WASTE-MAV	lb/hr	19,285			57,198	X	19,285 – 57,198
Maximum Total Hazardous Waste Feedrate to the Kiln	KILN-TOT-WST	lb/hr	17,502	42,761	X			17,502 – 42,761
Maximum Total Hazardous Waste Solids to the Kiln	KILN-SOLID	lb/hr	7537			39,400	X	7,537 – 39,400
Maximum Total Aqueous Waste Feedrate to Kiln and SCC	AY-060L5	lb/hr	7,333			16,786	X	7,333 – 16,786
Maximum Aqueous Waste Feedrate to SCC	AY-060L4	lb/hr	137			4,763	X	-- [15]
Maximum Non-Aqueous Waste Feedrate to SCC	AY-061L2	lb/hr	1646			9,009	X	1,646 – 9,009
Maximum Pumpable Hazardous Waste Feedrate to the Kiln	KILN-LIQUID	lb/hr	9,965	20,299	X	36,664	X	8,243 –20,299
Maximum Total (Pumpable) Hazardous Waste Feedrate to the SCC	SCC-TOT-WASTE	lb/hr	1,784	5,704	X	13,772	X	1,784 – 5,704
Minimum Combustion Chamber Temperature in the Kiln	HRA-512	°F	1,623	1,368	X	1,391	X	1,368 – 1,623
Minimum Combustion Chamber Temperature in the SCC	SCC-TEMP-AVG	°F	2,063	1,954	X	1,945	X	1,945 – 2,063
Maximum Combustion Chamber Temperature in the Kiln	HRA-512	°F	1,623			2,125	X	1,368 – 1,623 [4]
Maximum Combustion Chamber Temperature in the SCC	SCC-TEMP-AVG	°F	2,063			2,326	X	1,945 – 2,063 [4]
Maximum Flue Gas (Stack Gas) Flowrate	HRA-576	Dscfm	29,985	39,701	X	39,248	X	29,985 – 39,248
Maximum Stack CO Concentration[5]	STACK-CO-AVG	ppmv at 7% O_2	3.0	100	X	100	X	0 – 100 [5]
Maximum Total Chlorine/Chloride Feedrate[6]	HRA12-051L1	lb/hr	1,326 [3]	3,026 [6]	X	2,775	X	1,326 – 2,775 [7]
Maximum Ash to the Afterburner	AY-052L1	lb/hr				240	X	-- [8]
Maximum Combustion Zone pressure		Psia				14.7	X	-- [8]
Minimum IWS Water Flow	HRA-548	Gpm	3,844			2,954	X	2,954 – 3,844
Operation of Waste Firing System; Minimum Burner Atomization Pressure (Air or Steam)[9]		Psig	--	20 [10]		20	X	>20
Minimum Liquid-to-Gas Ratio in the Absorbers	HRA-LOVG	--	0.14	0.106 [10]		0.106	X	0.106 – 0.14
Minimum Liquid Feed Pressure to the Absorbers	HRA-PI573	Psig	21.3	7 [10]				7-21.3
Minimum pH at Cooling Tower Inlet	HRA-571	pH	5.33	4.55 [10]		6.0	X	4.55 – 5.33

Minimum Scrubber Blowdown Rate (Blowdown to Deepwell)	HRA12-616	Gpm	123.6	95.4 [10]			95.4 – 123.6
Maximum Conductivity of Scrubber Water	HRA-616C	µmho	49,532	124,859[10]			49,532 – 124,859
Voltage to the IWS[11]	XA-IWS-HV	kV	--	10 [10]	10	X	>10
Minimum Power to the WESP	HRA-KV577	kVA	20.5	15.8 [10]			15.8 – 20.5
Minimum Tank Level in the WESP	HRA12-LI577	%	74.7	44.0 [10]			44.0 – 74.7
Arsenic Feedrate	AY-056L4	lb/hr	0.35		4.38	X	>0.5 [16]
Pumpable Arsenic Feedrate	HRA-P056L4	lb/hr	0.03	0.26	0.26 [12]	X	-- [19]
Beryllium Feedrate	AY-057L1	lb/hr	0.29		12	X	-- [19]
Cadmium Feedrate	AY-056L1	lb/hr	0.21		19.6	X	-- [19]
Chromium Feedrate	AY-057L2	lb/hr	0.83		24.3	X	-- [19]
Antimony Feedrate	AY-054L4	lb/hr	0.87		311	X	-- [19]
Barium Feedrate	AY-055L3	lb/hr	1.07		59.6	X	-- [19]
Lead Feedrate	AY-055L4	lb/hr	0.76		352	X	>4.0 [17]
Mercury Feedrate	HRA12-056L3	lb/hr	0.007	0.101	0.0417 [13] 0.50 [14]	X	>0.01 [18]
(Pumpable) Nickel Feedrate	HRA-P057L3	lb/hr	0.11		13.7	X	-- [19]
Selenium Feedrate	AY-055L1	lb/hr	0.87		159	X	-- [19]
Silver Feedrate	AY-054L3	lb/hr	0.52		173	X	-- [19]
Thallium Feedrate	AY-064L1	lb/hr	0.38		68	X	-- [19]
Zinc Feedrate	AY-055L2	lb/hr	15.7		7,170	X	-- [19]

Notes:

[1] 12-Month Average from September 2023 through August 2024.

[2] From the Notification of Compliance dated January 20, 2023.

[3] Hourly Rolling Average (HRA)

[4] The combustion zone temperatures will be maintained between the minimum limits and the 12-month average.

[5] Requesting a wider operating range per 63.1207(g)(2)(v).

[6] 12-HRA

[7] The OPL for the maximum feedrate of total chlorine/chloride is a 12-HRA, however, the target feedrate for chlorine/chloride for the CfPT will be as a HRA because a HRA will be more indicative of the real-time feedrate of chlorine/chloride than a 12-HRA.

[8] No target is defined for this parameter, other than to be within compliance with the permit and NOC limits.

[9] Based on manufacturer’s specification. An AWFCO occurs if the atomizing medium pressure falls below 20 psig.

[10] Included at the request of EPA Region 6 prior to the 2014 CfPT/RCRA Periodic Test.

[11] Voltage to the IWS is established based on “manufacturer’s specification. For each IWS unit, voltage across the resistor in the alarm circuit is monitored. The voltage will vary from zero to a maximum value in direct response to the IWS control logic. If for any reason the maximum voltage of 10 kV is not achieved during any two-minute period, the under voltage alarm will occur (for instance, during a cleaning cycle). In the event that four units are in under voltage alarm simultaneously and Automatic Waste Feed Cutoff (AWFCO) will occur.

[12] This is a limit on arsenic in pumpable waste when using the proprietary technology to control mercury emissions.

[13] Feed rate of mercury when not using the proprietary technology to control mercury emissions.

[14] Feed rate of mercury when using the proprietary technology to control mercury emissions.

[15] Aqueous waste will not be fed to the SCC because the 12-month average Aqueous Waste Feedrate to SCC is inconsequential.

[16] The spiking rate of arsenic will be 0.5 lb/hr. The feedrate of arsenic during the test will include the spiking rate and arsenic fed with waste streams.

[17] The spiking rate of lead will be 4.0 lb/hr. The feedrate of lead during the test will include the spiking rate and lead fed with waste streams.

[18] The spiking rate of mercury will be 0.01 lb/hr. The feedrate of mercury during the test will include the spiking rate and mercury fed with waste streams.

[19] Demonstration of the 12-month average feedrate will be according to volatility as Group 3 - volatile, Group 2 - semivolatile, and Group 1 - low-volatile from the EPA document “Risk Burn Guidance for Hazardous Waste Combustion Facilities”.

4.4 Waste Feed Spiking

During the CfPT/RCRA Periodic Test, the 12-month average feedrate of total chlorine/chloride will be achieved by feeding waste streams containing chlorine. Ash will not be spiked during the CfPT/RCRA Periodic Test. There is a limit in Table V.H.3.b. of the RCRA permit for “Ash to Afterburner”. “Ash to Afterburner” is not an operating target for the CfPT/RCRA Periodic Test because it is considered that the limit for “Ash to Afterburner” is a legacy of previous permitting of the incinerator. Under the HWC MACT, there is no OPL for the feedrate of ash to the incinerator. An Alternative Monitoring Application (AMA) was approved by TCEQ on October 20, 2005 stating “Onyx (now Veolia) has provided sufficient documentation that neither the ash feedrate limit nor an alternative operating parameter limit is needed to ensure compliance with the emission standard for particulate matter”. The particulate matter standard of the HWC MACT is more stringent (i.e., lower) than the RCRA particulate matter standard. It is likely however that ash will be fed to the Afterburner (SCC) in the waste liquid(s) fed to the Afterburner during the test. The ash content of waste streams will be determined during the test, and the feedrate of ash to the Afterburner will be determined.

Veolia’s RCRA permit (in Tables V.H.3.b. and V.H.4.b.) includes feedrate limits and emission limits for 13 metals, and an emission limit for hexavalent chromium. During the CfPT/RCRA Periodic Test, the incinerator will be operated with normal “as received” waste streams. It is possible that available waste streams cannot be identified and obtained to allow the incinerator to be operated within the range of the allowable limit and the 12-month averages of the metals feedrates, and achieve at a minimum the 12-month average feedrate of metals. To achieve a minimum of the 12-month average for the feedrate of the metals, metals will be spiked into waste feedstreams to the incinerator to demonstrate the feedrate limits of the metals in the RCRA permit. Due to the thermal similarity of many of the metals and for safety and health reasons, Veolia has determined that it is not necessary to spike all 13 metals. Three (3) metals will be spiked during the RCRA Periodic Test: Mercury, Lead, and Arsenic.

Mercury will be spiked into the kiln of the incineration system as a liquid. Lead and arsenic will be spiked into the rotary kiln as solid oxides, added in pre-weighed packets attached to, or in, solid waste (i.e., drums) fed to the kiln. Metals spiking rates are presented in **Table 4-2**, and target feedrates of each of the waste streams to the incinerator, and the metals spiking rates, are presented in **Table 4-1**.

Table 4-2. Metals Spiking Rates

Constituent or Parameter		**RCRA Permit Feedrate** Limit **All** Feedstreams (lb/hr)[1]	**RCRA Permit Feedrate** Limit **Pumpable** Feedstreams (lb/hr)[2]	**RCRA Permit Emission Limit** (lb/hr)[3]	**12-Month Average** Feedrate (lb/hr)	**Spiking Rate** (lb/hr)
Group 3	Mercury	0.504	0.504	0.0191	0.007	0.01
Group 2a	Arsenic	4.38	4.385	0.0271	0.35	0.5
		4.38	0.264			
	Cadmium	19.6	19.6	0.0421	0.21	
	Selenium	159	159	0.532	0.87	
Group 2b	Antimony	311	311	2.10	0.87	
	Lead	352	294	1.06	0.076	4.0
	Thallium	68.0	68.0	0.423	0.38	
	Zinc	7,170	7,170	21.5	15.7	

Group 1	Barium	59.6	52.3	2.09	1.07
	Beryllium	12	2.43	0.00842	0.29
	Chromium, Total	24.3	24.3	0.0430	0.83
	Nickel, Pumpable	131	103		0.11
	Nickel, Solids Mode	947	13.7		
	Nickel			0.323	
	Silver	17.3	17.3	0.0419	0.52

[1] From Table V.H.3.b of RCRA Permit 50212 for “All Feedstreams”.

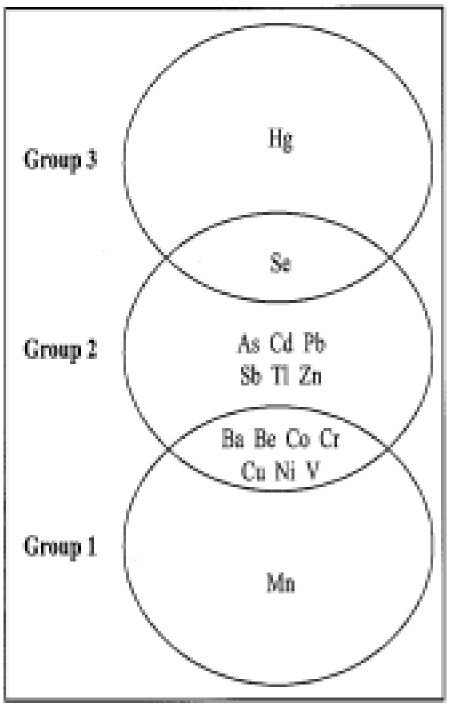
[2] From Table V.H.3.b of RCRA Permit 50212 for “Pumpable Feedstreams”.

[3] From Table V.H.4.b from RCRA Permit 50212.

[4] Feedrate when using proprietary technology to control mercury emissions.

[5] Feedrate when not using proprietary technology to control mercury emissions.

The spiking rates of the three metals that will be spiked will be more than the 12-month average feedrate of that metal, but less than permitted feedrate limits. The three metals that will be spiked will serve as surrogates, for the other ten (10) metals. Justification to only spike three (3) of the 13 permitted metals is taken from the EPA document “Risk Burn Guidance for Hazardous Waste Combustion Facilities”. Based on the Risk Burn Guidance document (in Chapter 6 Metal Emissions), metals can be grouped according to their volatility as Group 3 - volatile, Group 2 - semivolatile, and Group 1 - low-volatile. Figure 6-2 of the Risk Burn Guidance presents groupings of metals among these three groups. While silver, one of the 13 metals in the RCRA permit, is not included in this figure, the text in Chapter 6 of the Risk Burn Guidance document states that silver “would likely be classified as a low-volatile metal”. **Figure 4-1** presents the metal groupings, based on volatility, taken from *Risk Burn Guidance for Hazardous Waste Combustion Facilities*. Mercury will be spiked as the Group 3 – volatile metal; lead will be spiked as Group 2 – semivolatile metal; and arsenic will be spiked as the Group 1 - low-volatile metal. Mercury is regulated as a volatile metal under the HWC MACT; lead is regulated as a semivolatile metal under the HWC MACT, and arsenic is regulated as a low-volatile metal under the HWC MACT.



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Risk Burn Guidance for
Hazardous Waste Combustion Facilities

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Figure 4-1. Metal Volatility Groups

Table 4-2 presents the metals of the RCRA permit; the RCRA allowable feedrate of that metal; the RCRA allowable emission rate of that metal; and the metals spiking rates. There is one metal to be spiked for Group 3 – volatile, one metal to be spiked for Group 2 – semivolatile, and one metal to be spiked for Group 1 - low-volatile. Spiking rates are greater than, the 12-month average feedrate of the spiked metal, and less than the allowable limit for any of the individual metals of the group of metals – grouped as Group 3 - volatile, Group 2 - semivolatile, or Group 1 - low-volatile. The emission rates of all of the 13 metals, and hexavalent chromium, will be measured during the CfPT/RCRA Permit Periodic Test.

Arsenic and lead will be spiked as solids (arsenic oxide and lead oxide) with a nonpumpable waste stream (i.e., drums) fed to the kiln. Mercury will be spiked into the kiln of the incineration system as a liquid. The water-soluble mercury spiking compound will be $Hg(NO_3)_2$.

The liquid spiking system consists of a variable-stroke pump, a calibrated weigh scale, a mass flow meter, and a PC-based injection rate control and data acquisition system. A 55-gallon steel drum of the liquid spiking material is placed on the weigh scale and connected with flexible suction hose to a skid-mounted metering pump and the mass flow meter. At the skid, the liquid spiking material flows through the pump and the mass flow meter, and into a flexible delivery hose, which is connected to the waste feed line. Spiking rate will be adjusted by modulating stroke on the variable-stroke pump.

Spiking rate is measured and reported using weight measured over time of the weigh scale on which the drum of spiking material is located. The accuracy of the weigh scale is demonstrated using NIST-traceable standards. The weigh scale will be used as the official spiking rate measurement device. The mass flow meter provides a direct measurement of flowrate, and will be used to set the spiking rate.

The spiking system will be manned by trained personnel at all times in order to shut down the spiking equipment in the event of a waste feed cutoff as well as monitor the continuing operation of the spiking system.

Lead (Pb) and arsenic (As) will be spiked as solids to the rotary kiln. Drums will be fed to the rotary kiln during the test, and will contribute to the feedrate of nonpumpable (solid) wastes. The target feedrate of drums is 25 drums per hour. Arsenic and lead will be spiked as oxides of the respective metals as PbO and As_2O_3. Pre-weighed packets containing the lead oxide and arsenic oxide will be attached to, and fed with, each drum fed to the rotary kiln.

Spiking of mercury into a waste stream to the kiln, and preparation of the solid spiking materials packets, will be performed by Superior Spiking Industries of Pasadena, TX.

4.5 System Operation to Achieve Steady-state Conditions

The incinerator should operate under the targeted conditions until a steady-state condition has been achieved. For the CfPT/RCRA Periodic Test, sampling will not be initiated without the following conditions being met:

- The set point of any operating parameter will not be modified for a period of 30 minutes; and
- The waste feedrates will not have changed more than 5% for a period of 15 minutes.

As presented in Section 4.9 of the CfPT/RCRA Periodic Test Plan, the residence time of solids in the kiln can range from 15.5 minutes to 155 minutes, based on kiln rotational speeds ranging from 0.3 to 3 rpm. Normally, the kiln rotational speed is nominally 0.5 rpm, and at this rotational speed the solids residence time is 93 minutes.

The water treatment system of the incinerator at Port Arthur is linked among the quench, the absorbers, the IWS, and the WESP. Water losses from the system are due to evaporation of water into the flue gas, and blowdown (to the deepwell). Fresh water is fed to the system into the WESP and IWS. As the absorbers require water, they draw water from the IWS, and as the quench requires water, it draws water from the absorbers. Each of these systems includes its own recirculation circuit. Based on the water volumes of the quench, absorbers, and IWS and the water flowrates of these three systems, the respective water residence times are 3.2 minutes, 9.3 minutes, and 0.6 minutes. The residence time of water in the WESP is even less.

Mercury, spiked as a liquid into the kiln, vaporizes almost immediately on being exposed to the elevated temperatures of the SCC. The residence times of gases in the kiln and SCC are on the order of seconds, therefore metals spiked as liquids into the kiln or SCC will proceed in the gas phase to the water system of the incinerator within seconds of being injected (i.e., spiked).

For a well-mixed system, 95% of equilibrium is achieved with three (3) residence times. The absorbers have the largest water residence time of any of the four water circuits of the water treatment system of the incinerator. 95% of equilibrium of the water of the absorbers is achieved within 27.9 minutes (i.e., 3 times 9.3 minutes). Therefore, metals should be fed at their maximum rates for at least this amount of time before starting sampling.

Arsenic and lead spiked as solids (arsenic oxide and lead oxide) will be spiked into the rotary kiln approximately 45 to 60 minutes before the start of testing. Mercury spiked into the kiln of the incinerator as a liquid will be fed for 30 minutes before sampling is started.

4.6 Test Schedule

The schedule for the CfPT/RCRA Periodic Test is based upon the approval of the test plan and QAPjP. **Table 4-3** presents the tentative schedule for the test.

Table 4-3. Tentative Schedule for the CfPT/RCRA Periodic Test

	Activity	Schedule
1.	Submit CfPT/RCRA Periodic Test Plan, CMS PETP, and QAPjP	September 30, 2024
2.	Submit revised CfPT/RCRA Periodic Test Plan, CMS PETP, and QAPjP, as needed	November 30, 2024
3.	Contact TCEQ/EPA Offices for Pretest Meeting	60 Days Prior to Test
4.	Submit Notification of Intent to Conduct the Test	60 Days Prior to Test
5.	Issue Public Notice and Make CfPT/RCRA Periodic Test Plan Available to the Public	60 Days Prior to Test
6.	Pretest Meeting with TCEQ Regional Office	30 – 60 Days Prior to Test
7.	Begin Mobilization for Test	30 Days Prior to Test
8.	Approval of CfPT/RCRA Periodic Test Plan and QAPjP	30 Days Prior to Test
9.	Conduct pre-CfPT CO/O_2 CEMS RATA	Week of March 31, 2025
9.	Conduct CfPT/RCRA Periodic Emissions Test	Week of April 14, 2025
10.	Submit Results of CfPT/RCRA Periodic Test	Within 90 Days of Completion of CfPT/RCRA Periodic Test
11.	Submit Notification of Compliance	Within 90 Days of Completion of CfPT/RCRA Periodic Test

4.6.1 Planned Test Dates

The Confirmatory Performance Test/RCRA Periodic Test is expected to begin with a CO/O_2 CEMS RATA performed beginning the week of March 31, 2025 with compliance emissions testing performed during the week of April 14, 2025.

4.6.2 Duration of Each Test

The CfPT/RCRA Periodic Test will be conducted under a single test condition comprised of three replicate sampling runs. The three (3) runs of the CfPT/RCRA Periodic Test are scheduled to be completed over three days, with approximately four hours of stack gas sampling for each run conducted one run per day. A day for setup and a day for demobilization/contingency have also been scheduled during the emissions compliance test week. Pre-CfPT RATAs of the CEMS (CO and O_2) and the stack gas flowrate monitoring system on the stack will be performed prior to the CfPT/RCRA Periodic Test.

4.6.3 Detailed Schedule of Planned Test Activities

The three (3) runs of the CfPT/RCRA Periodic Test are scheduled to be completed over three days, with approximately four hours of stack gas sampling for each run during each day. Additionally, a day for setup and a day for demobilization/contingency have been scheduled. RATAs of the CO and O_2 CEMS on the stack and the stack gas flowrate monitoring system will be performed within 60 days prior to initiation of the CfPT/RCRA Periodic Test. The total time for the CfPT/RCRA Periodic Test will be kept to the minimum and is scheduled to be completed within a total operating time of about 15-18 hours over three days.

On the first day of the CfPT/RCRA Periodic Test, the mobile lab will be sited. Instrumentation needed to conduct the RATAs will be setup and checked to begin the RATA on the following day. On the second and third days of the CfPT/RCRA Periodic Test, pre-CfPT RATAs of the CEMS (CO and O_2) and the stack gas flowrate monitoring system on the stack will be performed followed by staff leaving site for the weekend. During the following week, on the fourth day of the test, compliance emissions test equipment will be readied for testing the next day. On the fourth day of the test, the first performance sampling run of the emissions test will be performed. Preparation and sampling activities for the first run will require about two hours with about one hour required to bring the incinerator to steady-state operations followed by four hours to complete sampling. Then the samples from the first run will be recovered and preparations for the sampling of the second run the next day will take place. Unit operations will be curtailed until the next day. Sampling for the second run will require about the same schedule as on the first test day. Unit operations for the first run on the fourth day of the test should be completed in about 5-6 hours. On the fifth day of the test, preparation and sampling activities for the first run of the day – the second run of the test - will require about five hours with about one hour required to bring the incinerator to steady-state operations followed by four hours to complete sampling. Unit operations for the fifth day of the test should be completed in about 5-6 hours. The schedule to perform the third test run on the sixth day will follow the same pattern.

The planned daily activities for the CfPT/RCRA Periodic Test are as follows:

- Day 1 – RATA sampling team will mobilize to site and setup/checkout CEMS RATA equipment. Coordination meeting will be conducted.
- Day 2 – Pre-CfPT RATAs of the CEMS (CO and O_2) and the stack gas flowrate monitoring system on the stack will begin.
- Day 3 – RATAs on the stack will be completed if not on the previous day. Break for weekend.
- Day 4 – Following the weekend, the full CfPT Performance Test sampling team will mobilize to site and setup/checkout emissions performance test equipment. Coordination meeting will be conducted.
- Day 5 – The unit will be brought to the desired steady-state operating conditions while the sampling team completes preparations for conducting the first run. When all preparations are complete, sampling will begin and will continue, with only short interruptions for port changes and leak checks, until the first run is complete.
- Day 6 – The 2nd test run of the CfPT/RCRA Periodic Test will be performed as for the previous run.
- Day 7 – The third test run of the CfPT/RCRA Periodic Test will be performed as for the previous run.

Day 8 – Equipment will be demobilized.

The schedule for the CfPT/RCRA Periodic Test is shown in more detail in **Table 4-4**.

Table 4-4. Daily Schedule for the CfPT/RCRA Periodic Test

Day	Start	Stop	Activity
1	8:00	17:00	On-Site Mobilization of RATA test crew and equipment
2	8:00	17:00	Begin RATAs of the CO and O_2 CEMS and the stack gas flowrate monitoring system
3	8:00	17:00	Complete RATAs if not completed on previous day, then demobilize equipment and crew for a number of weeks
4	8:00	17:00	On-Site Mobilization of full compliance test crew and test equipment
5	7:00	8:00	Incinerator Line Out
	7:30	9:00	Begin Spiking
	9:00	14:00	Run 1
		17:00	Complete Sample Recovery
6	7:00	8:00	Incinerator Line Out
	7:30	9:00	Begin Spiking
	9:00	14:00	Run 2
		17:00	Complete Sample Recovery
7	7:00	8:00	Incinerator Line Out
	7:30	9:00	Begin Spiking
	9:00	14:00	Run 3
		17:00	Complete Sample Recovery
8	8:00	17:00	Pack and Ship Samples, Demobilize from Plant

5. Sampling and Monitoring Procedures

The performance of Veolia's incinerator will be demonstrated during the CfPT/RCRA Periodic Test at one operating condition that is described in detail in the CfPT/RCRA Periodic Test Plan. During the test, stack gas and waste feeds will be sampled from locations detailed in **Table 5-1**. **Table 5-2** presents the parameters that will be measured during the CfPT/RCRA Periodic Test. **Table 5-3** summarizes the sampling methods, compositing approach, and analytical parameters for the emission test (i.e., the sampling and analytical matrix). **Table 5-4** summarizes the emissions sampling specifications (i.e., minimum sample volume and duration).

In addition to the collection of emission samples, plant instrumentation will be used to continuously monitor several stack gas parameters, process parameters, and control equipment operating parameters. A listing of monitored process parameters that must be reported is included in the CfPT/RCRA Periodic Test Plan in **Table 4-1**.

Table 5-1. Sampling Locations

Stream	Sample Point	Location
Stack Gases	Ports	Stack
Energetic Liquids and Sludges to the Rotary Kiln	Sample Tap	Pump Discharge/Sample Tap
Energetic Liquids to the SCC	Sample Tap	Pump Discharge/Sample Tap
Aqueous Waste to the Rotary Kiln	Sample Tap	Pump Discharge/Sample Tap
Solid Wastes to the Rotary Kiln	Scoop	BMHB Mixing Pit; or 10% of Drums

Table 5-2. Sampling Frequency for the CfPT/RCRA Periodic Test

Stream/Parameter	Sampling Method	Frequency
Stack Gas		
Dioxins/Furans/PCB	SW-846 Method 0023A	3
Particulate Matter HCl/Cl_2	EPA Methods 5 and 26A	3
Metals [1]	EPA Method 29	3
Chromium VI	SW-846 Method 0061	3
Moisture	EPA Method 4	3
Oxygen Carbon Dioxide	EPA Method 3A	3
Carbon Monoxide Oxygen [2]	Plant Instrumentation	3
Spiking Materials		
Liquids	Tap (Method S004)	3
Solids	Grab	
Waste Feeds		
Ash Chlorine Moisture Heating Value Viscosity [3]	Solids: Scoop (Method S007) Liquids: Tap (Method S004)	3 for each waste stream

Density [3]
Metals [1]

[1] Metals include arsenic, beryllium, cadmium, chromium, antimony, barium, lead, mercury, nickel, selenium, silver, thallium and zinc.

[2] CO and O_2 will be monitored by plant instrumentation, and reported as CO corrected to 7% O_2.

[3] Solid waste feed will not be analyzed for viscosity and density.

Table 5-3. Sampling Methods

Stream	Sampling Method	Sampling Frequency	Compositing Approach	Analytical Parameters
Waste Feeds	Liquids: Tap (Method S004)	Sub-sample collected every 30 minutes Prepare a composite for each sample run	100 mLs	Ash Chlorine Moisture Heating Value Viscosity Density Metals [1]
	Solids: Scoop (Method S007)	Sub-sample collected at beginning and end of each run. Prepare a composite for each sample run If drummed solids are used, sub-samples collected during drum preparation. Prepare a composite based on drums used in each run.	100 grams	Ash Chlorine Moisture Heating Value Metals [1]
Spiking Materials	Liquids: Tap (S004)	Beginning and end of each test period		Archive
	Solids: Grab	Each test period		Archive
Stack Gas	EPA Method 2	Concurrent with isokinetic sampling	NR	Flowrate
	EPA Method 3A	Continuous	NR	O_2, CO_2
	EPA Method 4	Concurrent with isokinetic sampling	NR	Moisture
	EPA Method 5 EPA Method 26A	2+ hour collected isokinetically	NR	PM HCl/Cl_2
	EPA Method 29	2+ hour collected isokinetically	NR	Metals 1
	SW-846 Method 0061	2+ hour collected isokinetically	NR	Chromium VI
	SW-846 Method 0023A	3+ hour collected isokinetically	NR	Dioxins/Furans/PCB
	Plant CEMS	Continuous	NR	CO, O_2

[1] Metals include arsenic, beryllium, cadmium, chromium, antimony, barium, lead, mercury, nickel, selenium, silver, thallium and zinc.

NR = Not Required

Table 5-4. Emissions Sampling Specifications

Parameter	Sampling Method	Minimum Sample Size	Minimum Sampling Duration
Particulate Matter, HCl and Cl_2	EPA Methods 5 and 26A	1.7 dscm (60 dscf)	2 hours
Metals [1]	EPA Method 29	1.7 dscm (60 dscf)	2 hours
Chromium VI	SW-846 Method 0061	45 dscf	2 hours
Dioxins/Furans/PCB	SW-846 Method 0023A	2.5 dscm (88 dscf)	3 hours
CO, O_2	Plant CEMs Certified per 40 CFR 60, App. B PS 4B	N/A[2]	Sampled over entire test run
Flowrate	40 CFR 60, Appendix A, Method 1, 2	N/A	With all isokinetic methods
CO_2, O_2	EPA Method 3A	N/A	Sampled over entire test run
Moisture	40 CFR 60, Appendix A, Method 4	N/A	With all isokinetic methods

1 Metals include arsenic, beryllium, cadmium, chromium, antimony, barium, lead, mercury, nickel, selenium, sliver, thallium and zinc.

2 N/A – Not Applicable

5.1 Method Modifications

A number of sampling and analytical method deviations were proposed and approved for use during the Comprehensive Performance Test of the incinerator performed in November/ December 2011. The requested sampling and analytical method deviations are practices that are routinely followed and are incorporated into the approved SOPs at AECOM and at the NELAC certified laboratory (Eurofins TestAmerica Knoxville). EPA commented on and disapproved a number of the requested method modifications, and in response, Eurofins TestAmerica Knoxville provided a response to EPA's comments or withdrew its request for those method modifications disapproved by EPA. The method modifications were re-submitted to EPA prior to the conduct of the 2011 CPT.

Table 5-5 presents the requested method modifications for this test effort; EPA's approval or disapproval of the originally requested method modification; and Eurofins Test America Knoxville's position regarding the method modifications. These were submitted to EPA Region 6 in a QAPjP dated November 8, 2011. EPA approved these method modifications and responses prior to the conduct of the 2011 CPT.

Table 5-5. Method Modifications

Modification	Justification	Proposed Category	Category Determination	Approved/ Disapproved
II. Metals Sampling Modifications – EPA METHOD 29				
3. A Teflon® transfer line will be used between the filter and the first impinger of the sampling train.	This is done to address space limitations on the stack, to allow for ease in probe moving and to minimize potential hazards moving the very large and heavy impinger box. Additional Information The use of a sample transfer line is authorized/discussed in EPA Method 26A, EPA Method 23 and SW-846 Method 0023A. Method 26A states that if a “flexible” line is used (i.e., a transfer line) it must be rinsed into the first impinger. Methods 23 and 0023A state that the transfer line must be Teflon®, and must be heated. The sample transfer lines for EPA Methods 5/26A and 29 will not be heated. The sample lines will be recovered in the fashions prescribed in the methods for the back-half of the filter holder into the container for the first impinger.	Minor	Minor	**3. Previously Approved** (See Item 3a below)
III. Metals Analysis Modifications – KNOX-MT-0006 based on EPA METHOD 29				
5. The digestates from each fraction will be reduced to final volumes that are lower than the volumes specified in EPA Method 29. This is done to achieve lower reporting limits. The concentrations of the reagents will be maintained at the same concentrations as stated in EPA Method 29.	This is done to achieve lower reporting limit. A lower acid volume is added to a lower final volume to keep the acid concentration constant.	Minor	Minor	**Approved**
7. Laboratory reagent water is used rather than ASTM Type II water.	The laboratory reagent water meets the ASTM criteria for electrical conductivity, but is not tested for all ASTM Type II criteria. The laboratory uses the term reagent water rather than ASTM Type II water since not all ASTM Type II criteria are evaluated. For example, the reagent water is not tested for Total Organic Carbon since this parameter is not tested for Total Organic Carbon since this parameter is not relevant to the analytical method.	Minor	Intermediate	**Approved***
8. The initial measurement of impinger	This information is not used by the laboratory to calculate sample	Minor	Minor	**Approved**

samples from nitric acid/hydrogen peroxide can be made by weighing to ± 0.5 grams or measuring volume to ± 2.5 mL (± 5 mL for large volume samples).	results and is recorded on the laboratory benchmark and provided to the client for information only.			
9. The samples are not analyzed in duplicate. Instrument and method precision are measured by analyzing the LCS/LCSD.	TestAmerica Knoxville does not require the reporting of separate duplicate analyses for mercury as specified in Section 9.2.3 of EPA Method 29. Method 29 was written allowing the use of an Atomic Absorption Spectrometer with a CVAAS attachment using a BOD bottle for sample analysis. The reference to this older style instrumentation may have required the duplicate analysis of mercury samples due to the use of BOD bottles for sample preparation and analysis. The use of automated instrumentation used for mercury analysis is referenced in section 11.1.3. Note 2. It states that “Optionally, Hg can be analyzed by using the CVAAS analysis procedures given by some instrument manufacturer’s directions. Upon completion of the digestion described in (1), analyze the sample according to the instrument manufacturer’s directions. This approach allows multiple (including duplicate) automated analyses of a digested sample aliquot.” The use of automated instrumentation allows for multiple automated analyses and processes the results of multiple readings for each sample to provide a final averaged result for mercury. For example, during a ten second period, the instrument takes a reading every 0.1 second for a total of 100 replicate measurements. The average of these replicate readings is used to determine the absorbance and resulting sample concentration. Test America Knoxville provides relevant mercury precision data for the method by performing one of the following depending on the train fraction: LCS/LCSD, MS/MSD or PDS/PDSD.	Minor	Minor	**Approved**
10. Boric acid is added after the HF microwave digestion of the front-half samples. Hydrofluoric acid is sequestered by the addition of boric acid, protecting glassware and instrumentation.	Hydrofluoric acid is sequestered by the addition of boric acid, protecting glassware and instrumentation. Do you have any data showing that the Boric acid addition does not negatively impact the metals analysis? Yes, We have MDL data and Demonstration of capability data.	Minor	Intermediate	**Approved***

11. The aliquot for mercury analysis of the nitric acid/hydrogen peroxide impingers is taken from the sample after it is reduced in volume to 100 mL. This is done to provide lower reporting limits.	This is done to provide lower reporting limit for mercury by taking an aliquot after sample concentration.	Minor	Minor	**Approved**
IV. Metals Analysis Modifications – KNOX-MT-0007 based on SW-846 METHOD 6010B				
12. Mixed calibration standard solutions are purchased from approved vendors.	For ICP Atomic Emission Spectroscopy, a vendor prepared mixed standard containing the analytes of interest is used to calibrate the instrument rather than using individual solutions of the elements.	Minor	Minor	**Approved**
13. SW-846 Method 6010B states that if the correction routine is operating properly, the determined apparent analyte(s) concentration from analysis of each interference solution should fall within a specific concentration range around the calibration blank. In determining inter-element correction factors, the laboratory uses the procedure in EPA CSP ILMO4.0.	In determining IEC's, because lack of definition in Method 6010B, the laboratory has adopted the procedure in EPA CLP ILM4.0 for the "concentration range around the calibration blank."	Minor	Intermediate	**Approved***
14. ICSA (interference check sample A) results from the non-interfering elements must fall within ± 1 RL from zero. If this is not achieved, the field sample data must be evaluated.	This is a clarification of the criteria used by the laboratory since it is not specified in the reference method.	Minor	Intermediate	**Approved***
15. The calibration blank is prepared in 5% nitric acid and 5% hydrochloric acid, rather than 2% nitric acid and 10% hydrochloric acid.	The matrix used by the laboratory provides for improved performance relative to the wide variety of digestate acid matrices which result from the various EPA preparation protocols applied.	Minor	Intermediate	**Approved***
16. Method blanks are considered acceptable if they are below the reporting limit, rather than the method detection limit.	Method 6010B does not list air as one of the applicable matrices although Method 29 references 6010. The method blank criteria have been set to support the reporting limits provided for the air matrix and is qualified to the laboratory MDL.	Minor	Intermediate	**Approved***
XI. PM and HCl/Cl_2 Sampling Modifications				
3. A Teflon® transfer line will be used between the filter and the first impinger of	This is done to address space limitations on the stack, to allow for ease in probe moving and to minimize potential hazards	Minor	Minor	**Approved (See Item 3)**

the sampling train.	moving the very large and heavy impinger box. Additional Information The use of a sample transfer line is authorized/discussed in EPA Method 26A, EPA Method 23 and SW-846 Method 0023A. Method 26A states that if a “flexible” line is used (i.e., a transfer line) it must be rinsed into the first impinger. Methods 23 and 0023A state that the transfer line must be Teflon®, and must be heated. The sample transfer lines for EPA Methods 5/26A and 29 will not be heated. The sample lines will be recovered in the fashions prescribed in the methods for the back-half of the filter holder into the container for the first impinger.			
40. The filter and probe will be maintained between 248oF and 273oF as required by EPA Method 26A (and not between 223oF and 273oF as required by EPA Method 5)		Submitted by TCEQ	Intermediate	**Approved***
41. A Teflon® union will be used to connect the quartz (glass) nozzle to the quartz probe liner.				
XIII. Dioxins/Furans Analysis Method Modifications – SW-846 METHOD 0023A/8290A (TestAmerica Laboratories, Inc. Knoxville)				
48. 8290A – Toluene volumes and cycle rates for Soxhlet extractors have been optimized for the specific size of glassware used.		Minor	Minor	**Conditionally Approved** The cycle time requirement in the Method must be met.
TestAmerica Knoxville Response: Section 7.3.5 of Method 0023A states the following: "Sample extraction - Place the thimble in the extractor and add the toluene contained in the beaker to the solvent reservoir. Pour additional toluene to fill the reservoir approximately two-thirds full. Add Teflon® boiling chips and assemble the apparatus. Adjust the heat source to cause the extractor to cycle three times per hour. Extract the sample for 16 hours." TestAmerica Knoxville's procedure provides for a cycling time of 4 to 5 times per hour which meets the method requirement.				
49a. 8290A - The carbon column used in this procedure is based on the column specified in method 8280. Silica gel is used as the carbon column support instead of Celite 545® as specified in methods 8290A and 1613B. It has been		Minor	Intermediate	**Conditionally Approved*** The laboratory must meet the recovery criteria for samples cleaned with this mixture. (34. Previously Approved* Method 8290A –

determined that silica gel is less likely to contain contaminants and interferences which are not removed by the pre-cleaning procedures than Celite 545®, yet it performs similarly. The solvents and elution schemes used are as specified in method 8280 rather than 8290A and 1613B.				URS Table)
TestAmerica Knoxville Response: We agree.				
51. 8290A - Disposable glassware (40 mL VOA vials) is used in the acid-base cleanup procedure instead of a separatory funnels. Reagent volumes are adjusted as appropriate for the size of the vials.	Modifications have been made to reduce sample cross contamination and/or reduce preparation related waste.	Minor	Minor Recategorized Intermediate	**Conditionally Approved*** Provided that care is taken to ensure that the removal of aqueous wash layers is performed in a way that avoids loss of the extraction solvent and associated sample. In particular, the glass pipette used to remove the bottom layer should be rinsed with fresh solvent after the final aqueous layer removal to ensure sample adsorbed to the surface of the pipette is recovered and returned to the sample solution.
TestAmerica Knoxville Response: We agree. We will rinse the pipet.				
53. 8290A - The Window Defining Standard and Isomer Specificity Standard are combined with the Continuing Calibration CS3 Standard into one solution.		Minor	Minor Recategorized Intermediate	**Conditionally Approved*** Provided that the standard is used at the required steps to either calibrate the analytical system (Calibration point 3) or evaluate the GC Column Performance subsequent to initial calibration. The individual concentration of

unlabeled or labeled standards in this solution must not exceed 100 ng/mL within analytical error.

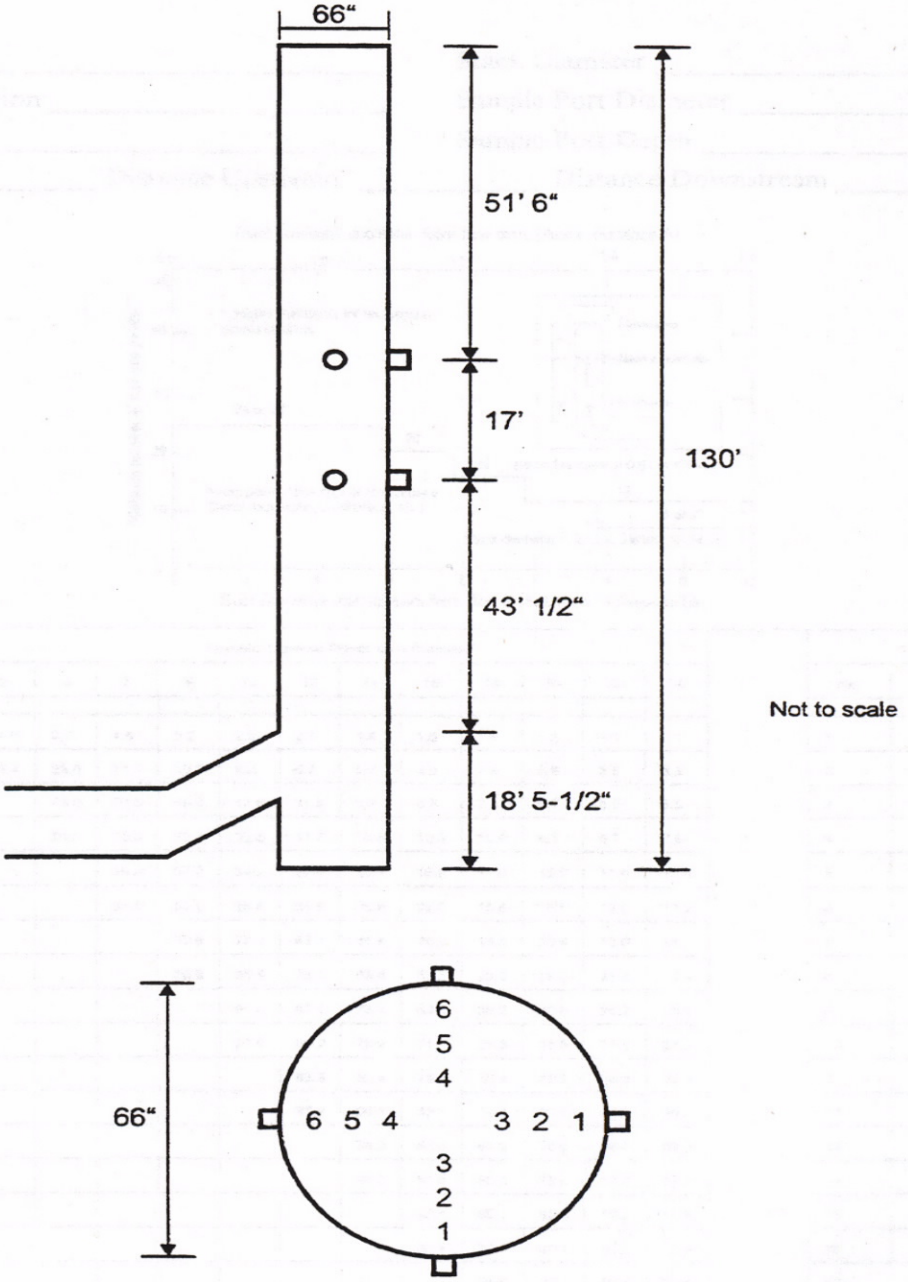
TestAmerica Knoxville Response:
TestAmerica Knoxville analyzes the Calibration Verification (CS3) and GC Column performance standard at the frequency defined in the reference method and at a concentration at or below that required by the reference method (i.e., all are less than 100 ng/mL with the exception of $^{13}C_{12}$-OCDD which is at 200 ng/mL).

5.2 Stack Gas Sampling Procedures

Stack gas samples will be collected from ports located on the stack, which has an inner diameter of 5.5 feet (66 inches). There are two sets of two orthogonal ports located at two different levels. Level 1 is 43 feet downstream of the closest upstream disturbance (i.e., 7.8 stack diameters), and 68 feet 6 inches upstream of the stack discharge point (i.e., almost 12 ½ stack diameters). Level 2 is 60 feet downstream of the closest upstream disturbance (i.e., 10.9 stack diameters), and 51 feet 6 inches upstream of the stack discharge point (i.e., 9.4 stack diameters). Per EPA Method 1, isokinetic sampling must be performed at 12 traverse points at Level 1 and at 8 traverse points at Level 2. To be consistent, isokinetic sampling is conducted using the more conservative 12 traverse points at both stack sampling levels. The configuration of the stack sampling ports and the locations of the 12 traverse points are shown in **Figure 5-1**.

Prior to the collection of any stack gas samples, the stack will be measured, and traverse points verified, per the requirements of EPA Method 1. Also, the absence of cyclonic flow will be verified by performing a cyclonic flow check of both stack traverse diameters. The Method 1 measurement will be documented on the data sheet presented as **Figure 5-2**.

During the isokinetic sampling trains velocity, flowrate, and moisture will be determined according to EPA Methods 2, 3A, and 4. During the collection of each isokinetic sampling train, differential pressure measurements across a Type-S pitot tube will be recorded to determine the isokinetic sampling rate (EPA Method 2). These data will be collected on a data sheet, an example is presented as **Figure 5-3**. The pitot tube measurements, along with the stack gas composition (CO_2 and O_2 by EPA Method 3A with N_2 by difference), moisture content (EPA Method 4), and cross-sectional area of the stack, will be used to determine the volumetric flowrate of the stack gas. The moisture content of the stack gas will be determined from the total weight gain of the impingers used for each isokinetic sampling train. The SW-846 Method 0061 sampling train for chromium VI includes alkaline impingers (0.5N KOH). The alkaline impingers will collect CO_2 in addition to condensed water, positively biasing the impinger weight gains used to determine the moisture content of the stack gas. For this reason, the moisture content of the stack gas will not be measured in the SW-846 Method 0061 sampling train. The determination of the stack gas velocity and flowrate, and the isokinetic sampling rate, for the SW-846 Method 0061 sampling train will be determined using the average moisture content of the stack gas determined by the other isokinetic sampling trains.



Traverse Point No.	Percent of Diameter	Point Location from End of Port (in.)
1	4.4	2-7/8“
2	14.6	9-5/8“
3	29.6	19-1/2“
4	70.4	46-1/2“
5	85.4	56-3/8“
6	95.6	63-1/8“

Figure 5-1. Stack Schematic

Method 1 – Circular Duct – Determination of Traverse Points

Project ______________

ProjectNumber ______________

Facility ______________

Source ______________

Operator ______________

Date ______________

☐ Velocity Only ☐ Isokinetic Sampling Number of Ports to be sampled _____	Upstream Distance (ft/in) _______ ☐ Measurement ☐ Plant Information
Duct Diameter (in) _______ ☐ Measurement ☐ Plant Information	Downstream Distance (ft/in) _______ ☐ Measurement ☐ Plant Information

Total number of Traverse Points (from Figure 2 (velocity) or 1 (all isokinetic sampling)	
Number of traverse points per po	
Port Depth	

Traverse Point	Percent of Diameter	Distance from Wall[1] (in)	Marking Location (in)	Traverse Point	Percent of Diameter	Distance from Wall (in)	Marking Location (in)
1				**13**			
2				**14**			
3				**15**			
4				**16**			
5				**17**			
6				**18**			
7				**19**			
8				**20**			
9				**21**			
10				**22**			
11				**23**			
12				**24**			

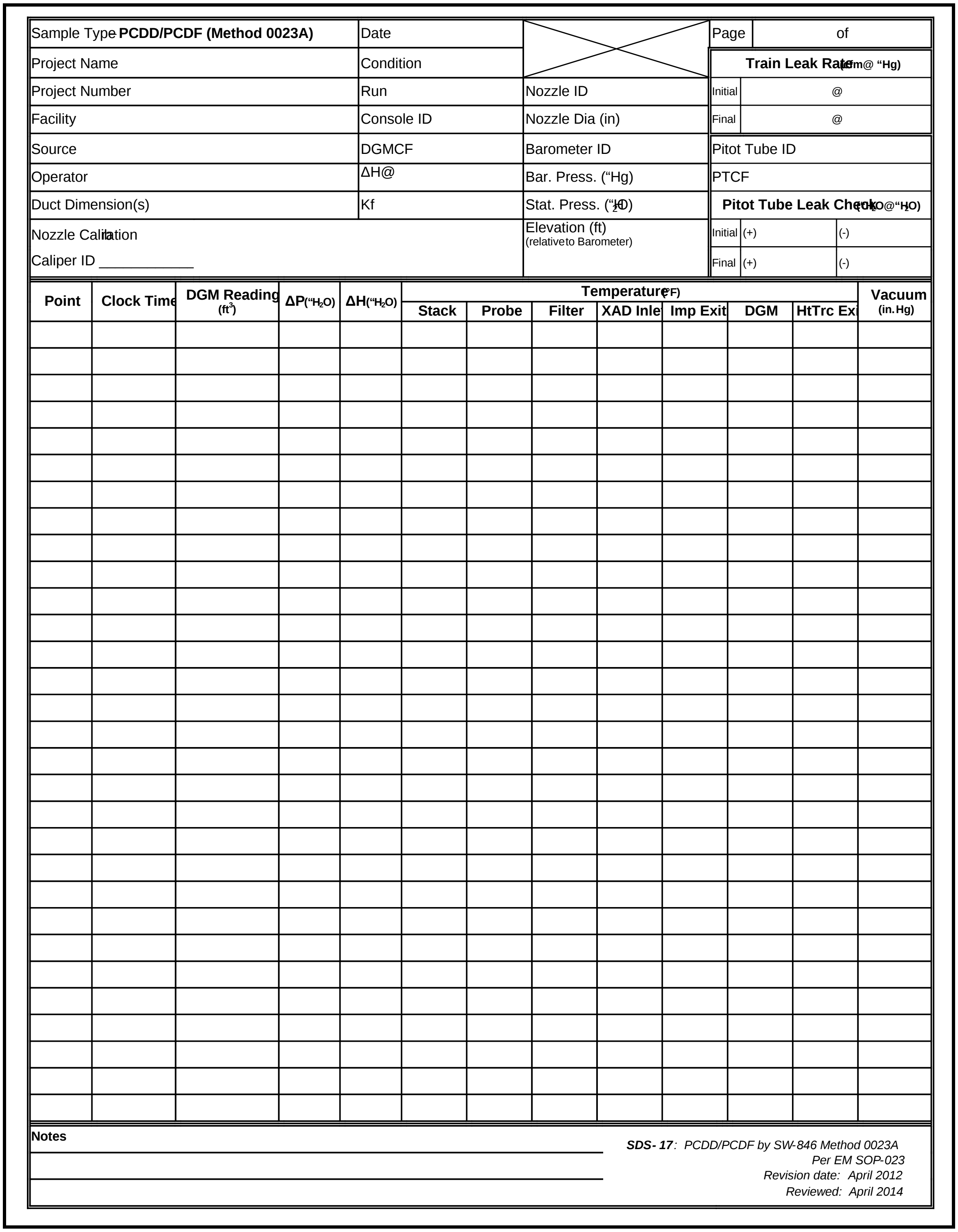
Prepare a drawing of the source, showing the ports, disturbances, and the distances

---

[1] According to Method 1, for stacks between 12 and 24”, no point may be within ½ inch of the wall. For stacks greater than 24” no point may be within 1 inch of the wall.

***FDS- 03A** Method 1 Circular Duct*
Per EM SOP-011
Revision Date: February 2012
Reviewed: March 2014

Figure 5-2. Example Traverse Point Data Sheet



Sample Type **PCDD/PCDF (Method 0023A)**	Date		Page	of
Project Name	Condition		**Train Leak Rate (cfm @ "Hg)**	
Project Number	Run	Nozzle ID	Initial	@
Facility	Console ID	Nozzle Dia (in)	Final	@
Source	DGMCF	Barometer ID	Pitot Tube ID	
Operator	ΔH@	Bar. Press. ("Hg)	PTCF	
Duct Dimension(s)	Kf	Stat. Press. ("H_2O)	**Pitot Tube Leak Check ("H_2O @ "H_2O)**	
Nozzle Calibration in Caliper ID ____________		Elevation (ft) (relative to Barometer)	Initial (+) Final (+)	(-) (-)

Point	**Clock Time**	**DGM Reading** (ft³)	**ΔP** ("H_2O)	**ΔH** ("H_2O)	**Temperature** (°F)							**Vacuum** (in. Hg)
					Stack	**Probe**	**Filter**	**XAD Inle**	**Imp Exit**	**DGM**	**HtTrc Exi**	

Notes

____

____

__SDS-17__: PCDD/PCDF by SW-846 Method 0023A
Per EM SOP-023
Revision date: April 2012
Reviewed: April 2014

Figure 5-3. Example Isokinetic Sampling Data Sheet

5.2.1 EPA Methods 2, 3A, and 4 (Flowrate, Gas Composition, and Moisture)

Concurrent with the performance of the isokinetic methods, measurements will be made to determine gas velocity in accordance with 40 CFR Part 60, Appendix A, Method 2. Moisture by EPA Method 4 will be performed in conjunction with the isokinetic sampling trains SW-846 Method 0023A, EPA Method 29, and EPA Methods 5/26A. The dry stack gas composition (CO_2, O_2, and N_2) will be determined by EPA Method 3A using continuous instrumental analyzers.

Prior to the collection of any stack gas samples, the stack will be measured, and traverse points verified, per the requirements of EPA Method 1. Also, the absence of cyclonic flow will be verified by performing a cyclonic flow check of both stack traverse diameters.

5.2.2 EPA Method 5 (Particulate Matter) and EPA Method 26A (HCl, Cl_2)

During the CfPT/RCRA Periodic Test, samples for the determination of particulate matter and HCl and Cl_2 will be collected using a single sampling train meeting the requirements of both EPA Method 5 and EPA Method 26A. Back-half, i.e., condensable, particulate matter will not be determined. A schematic diagram of this sampling train (excluding the optional impinger) is shown in **Figure 5-4**. This sample train consists of the following components:

- Glass (quartz) nozzle;
- Heated, glass (quartz)-lined probe;
- Heated Teflon mat filter with a Teflon® filter support;
- Teflon® transfer line;
- Optional empty knockout impinger;
- Greenburg-Smith impinger containing 100 mL of 0.1 N H_2SO_4;
- Greenburg-Smith impinger containing 100 mL of 0.1 N H_2SO_4;
- Modified Greenburg-Smith impinger containing 100 mL of 0.1 N NaOH;
- Modified Greenburg-Smith impinger containing 100 mL of 0.1 N NaOH; and
- Modified Greenburg-Smith impinger containing silica gel.

A minimum sampling duration and sample volume are specified in **Table 5-4**.

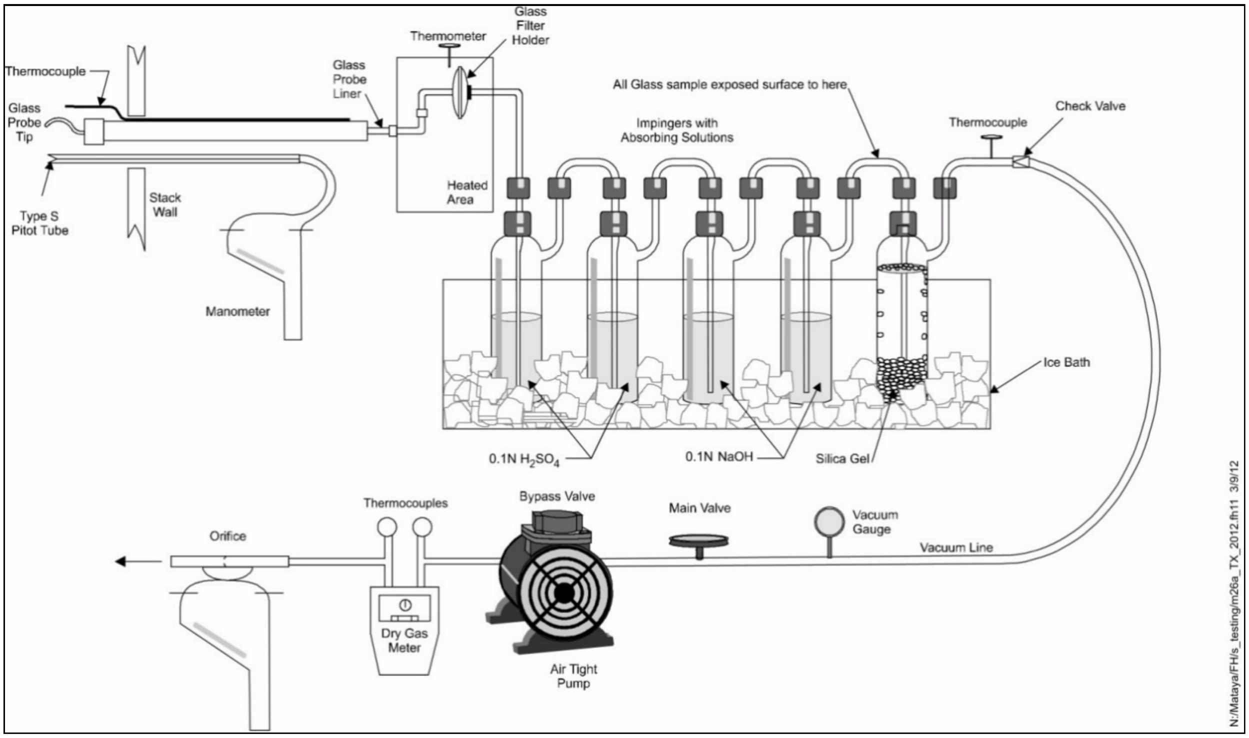


Figure 5-4. Sampling Train Schematic - PM, HCl, and Cl_2 by EPA Method 5/26A

The procedures specified in EPA Method 5 will be used to determine particulate matter. This procedure requires the isokinetic extraction of particulate matter on a filter maintained at a controlled temperature between 223 and 273ºF. However, to meet the requirements of EPA Method 26A, the filter and probe will be kept at a temperature above 248ºF, and a Teflon®-backed filter will be used. A Teflon® union will be used to connect the glass or quartz nozzle to the glass or quartz probe liner. EPA Methods 2, 3A, and 4 will be performed in conjunction with this sampling method to determine the isokinetic sampling rate. The particulate mass, which includes all material that condenses at or above the filtration temperature, is determined gravimetrically, after desiccation.

If moisture is visible on the filter at the completion of sampling, the sampling train will be purged according to Section 8.1.6 of Method 26A

A Teflon® transfer line will be used between the filter and the first impinger train. This is done to address space limitations on the stack, to allow for ease in probe moving and to minimize potential hazards moving the very large and heavy impinger box. The transfer line will be rinsed with water and combined with the contents and rinses of the acidic impingers.

After successful completion of each run, the PM, HCl and Cl_2 samples will be recovered into the following components:

- Probe and nozzle rinse with acetone for PM determination;
- Filter for PM determination;
- Rinse of transfer line and contents and rinses of the acidic impingers (and optional knockout impinger) for determination of hydrogen chloride; and
- Contents and rinses of the alkaline impingers for determination of chlorine.

PM determinations will be done according to the gravimetric method described in EPA Method 5. HCl and Cl_2, determinations will be done according to the ion chromatography method described in EPA Method

26A. Per Section 8.2.4 of Method 26A, sodium thiosulfate will be added to the collected alkaline impinge sample. This will be done in the analytical laboratory.

5.2.3 EPA Method 29 (Metals)

The multiple metals sampling train procedure described in EPA Method 29 will be used to collect stack samples isokinetically for the determination of emission rates for 13 metals, antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), cadmium (Cd), chromium (Cr), lead (Pb), mercury (Hg), nickel (Ni), selenium (Se), silver (Ag), thallium (Tl), and zinc (Zn). The multiple metals train, shown in **Figure 5-5**, consists of the following components:

- Glass nozzle;
- Heated, glass-lined probe;
- Heated filter;
- Teflon® transfer line;
- Empty modified Greenburg-Smith impinger (optional);
- Modified Greenburg-Smith impinger containing 100 mL of 5% HNO_3 and 10% H_2O_2;
- Greenburg-Smith impinger containing 100 mL of 5% HNO_3 and 10% H_2O_2;
- Empty modified Greenburg-Smith impinger;
- Modified Greenburg-Smith impinger containing 100 mL of 4% $KMnO_4$ and 10% H_2SO_4;
- Modified Greenburg-Smith impinger containing 100 mL of 4% $KMnO_4$ and 10% H_2SO_4; and
- Modified Greenburg-Smith impinger containing silica gel.

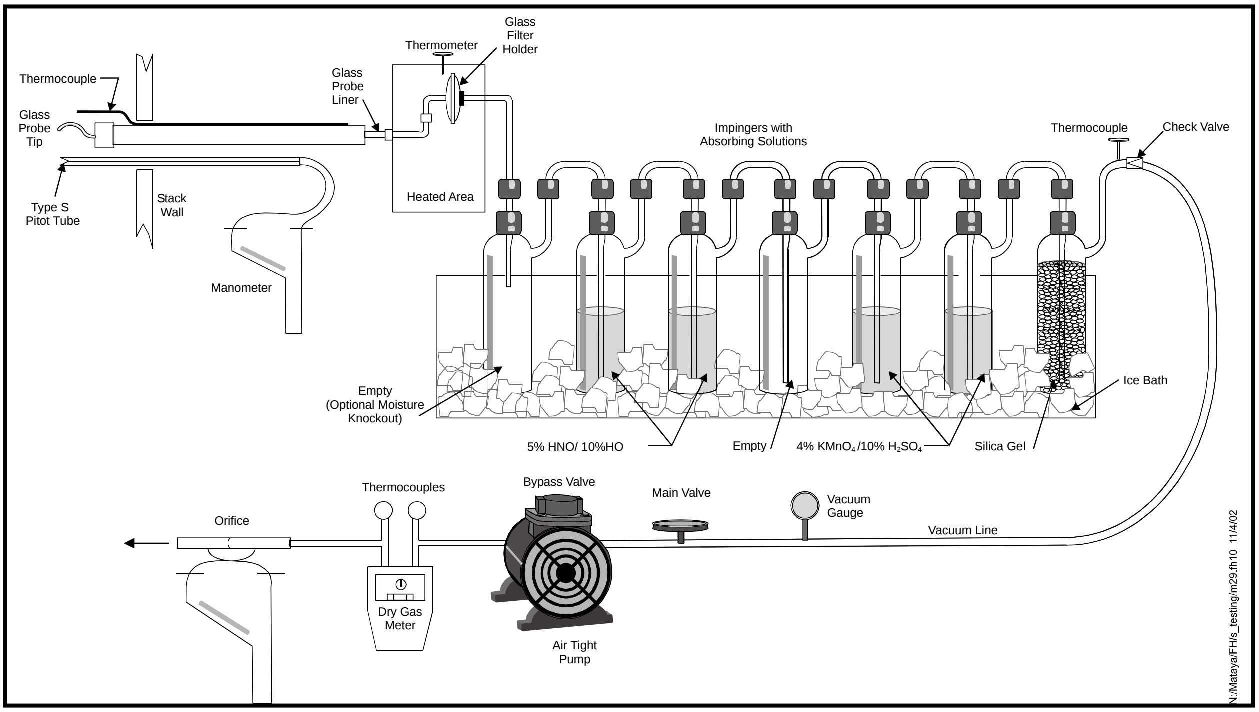


Figure 5-5. Sampling Train Schematic - Multiple Metals by EPA Method 29

The guidelines presented in EPA Method 1 will be employed to determine the number of sampling points required across the diameter of the stack for measuring the average stack gas velocity and particulate loading. EPA Methods 2, 3A and 4 will be performed in conjunction with this sampling train to determine the isokinetic sampling rate, and to measure the stack gas velocity and volumetric flowrate. The sampling will be conducted at equal time intervals along the selected traverse points, as described in the method. Minimum sample times and volumes for the Method 29 sample train are provided in **Table 5-4**.

A Teflon® transfer line will be used between the filter and the first impinger train. This is done to address space limitations on the stack, to allow for ease in probe moving and to minimize potential hazards moving the very large and heavy impinger box. The transfer line will be rinsed with 0.1 N HNO_3 and combined with the contents and rinses of the HNO_3 and H_2O_2 impingers.

Following sampling, the Method 29 sampling train will be recovered into the following six components:

- Nitric acid probe and nozzle rinse using 100 mLs of 0.1 N HNO_3;
- Filter;
- Using 100 mLs of 0.1 N HNO_3, the rinses of the transfer line and contents and rinses of knock-out impinger and HNO_3/H_2O_2 impingers;
- Using 100 mLs of 0.1 N HNO_3, the rinse of empty impinger between the HNO_3/H_2O_2 impingers and the $H_2SO_4/KMnO_4$ impingers;
- Combined contents of $H_2SO_4/KMnO_4$ impingers with impinger rinses with 100 mls of the acidic permanganate solution and 100 mLs of water; and
- HCl rinse of $H_2SO_4/KMnO_4$ impingers using 25 mLs of 8N HCl and 200 mLs of water.

The probe and nozzle rinse, filter, and contents and rinses from the knockout impinger and HNO_3/H_2O_2 impinger will be analyzed for 12 metals using Method 6010B from SW-846, including antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), cadmium (Cd), chromium (Cr), lead (Pb), nickel (Ni), selenium (Se), silver (Ag), thallium (Tl), and zinc (Zn) by SW-846 Method 6010B. These components as well as the $H_2SO_4/KMnO_4$ and HCl rinse will be analyzed for mercury by SW-846 Method 7470A.

5.2.4 Chromium VI (SW-846 Method 0061)

Samples of stack gas for determination of hexavalent chromium (Chromium VI) will be collected using SW-846 Method 0061. The sampling train (**Figure 5-6**) consists of the following components:

- Glass nozzle;
- Glass-lined probe;
- Teflon impinger containing 150 mL of 0.5 N KOH, and a pumping system capable of recirculating impinger solution through the probe;
- Teflon impinger containing 75 mL of 0.5 N KOH;
- Teflon impinger containing 75 mL of 0.5 N KOH;
- Dry Teflon impinger; and
- Modified Greenburg-Smith impinger containing silica gel.

Method 0061 samples will be collected according to the sampling rates and volumes provided in **Table 5-4**.

The method specifies the use of 0.1 or 0.5 M KOH as reagent in this train, and further specifies that the pH of the solution in the first impinger be above 8.5 at the conclusion of sampling. If the pH is below 8.5, the sample will be invalid. For this test effort, 0.5 M KOH will be used, and if necessary, the suggestions within the method (Section 7.1.6) will be followed.

Periodically during sampling, the pH of the first impinger solution will be checked. If necessary to maintain a pH greater than 8.5, 0.5 N KOH will be added to the first impinger.

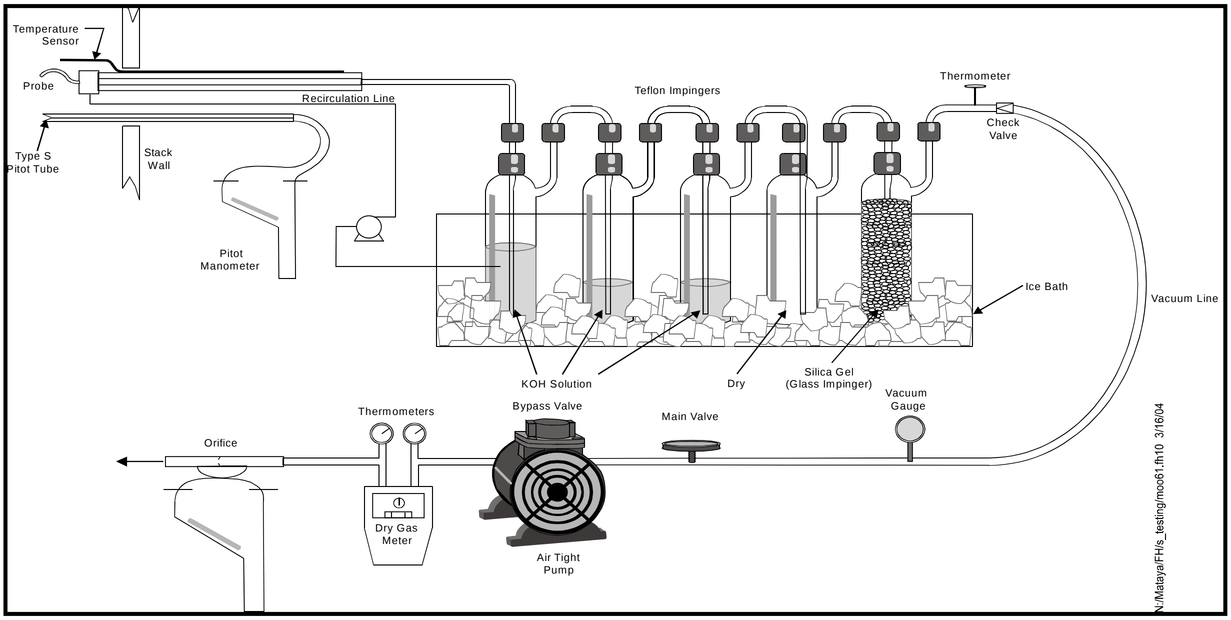


Figure 5-6. Sampling Train Schematic – Chromium VI by SW-46 Method 0061

The guidelines presented in EPA Method 1 will be employed to determine the number of sampling points required across the diameter of the stack for measuring the average stack gas velocity and particulate loading. EPA Methods 2 and 3A will be performed in conjunction with this sampling train to determine the isokinetic sampling rate, and to measure the stack gas velocity and volumetric flowrate. Due to the nature of this sampling train, moisture will not be measured in the Method 0061 train. The average moisture determination of the other isokinetic sampling trains will be used to calculate the isokinetic sampling rate and stack gas flowrate.

After sampling, the impinger solutions will be preserved by purging with nitrogen, at a rate of 10 liters per minute for 30 minutes. After weighing, the impingers will be rinsed with water, and the rinses combined with the impinger solutions. The sample will then be filtered through a 0.45 micron filter to remove any particulate matter. There will be no determination of moisture on this sampling train.

The filtered sample will be shipped to the laboratory and analyzed for chromium VI using ion chromatography coupled with a post column reactor (IC/PCR).

5.2.5 SW-846 Method 0023A (Dioxins/Furans/PCB)

Samples for the determination of dioxins/furans/PCB in stack gas will be collected according to SW-846 Method 0023A. The sampling train is shown in **Figure 5-7**.

The sampling train consists of the following components:

- Glass nozzle;
- Heated, glass-lined probe;
- Heated filter;
- Heated Teflon® transfer line;
- Sorbent module;
- Knock-out impinger;
- Greenburg-Smith impinger containing 100 mL water;
- Modified Greenburg-Smith impinger containing 100 mL water; and
- Modified Greenburg-Smith impinger containing silica gel.

From the heated filter, sample gas passes through a heated Teflon® transfer line before entering the sorbent module. The sorbent module consists of a water-cooled condenser and a resin trap containing XAD-2® resin. The condenser is used to ensure that the gas entering the resin trap is below 68ºF. EPA Methods 2, 3A, and 4 will be performed in conjunction with this sampling method to determine the isokinetic sampling rate.

The sampling method includes several unique preparation steps which ensure that the sampling train components are not contaminated with organics that may interfere with analysis. The glassware, glass fiber filters, and absorbing resin will be cleaned and the filters and resin will be checked for residues before they are packed using standard laboratory procedures.

Isotopically-labeled dioxins/furans will be spiked onto the XAD-2® resin both before field sampling (surrogate standards) and into appropriate places in the preparation prior to analysis after returning from the field. Following the completion of sampling, the SW-846 Method 0023A sampling train is recovered into the various fractions presented in Section 8.1 of this document. The recovery of the labeled compounds, spiked onto the XAD-2® resin before sampling, is used to evaluate sampling recovery, and recovery of the labeled compounds, spiked prior to analysis, is used to evaluate analytical recovery, of dioxins/furans samples.

The modifications to accommodate PCB analysis in this method include the addition of analyte specific surrogates and recovery standards, retention of the condensate and condensate rinse for analysis, and altering the sample preparation scheme to provide separate aliquots for each analysis.

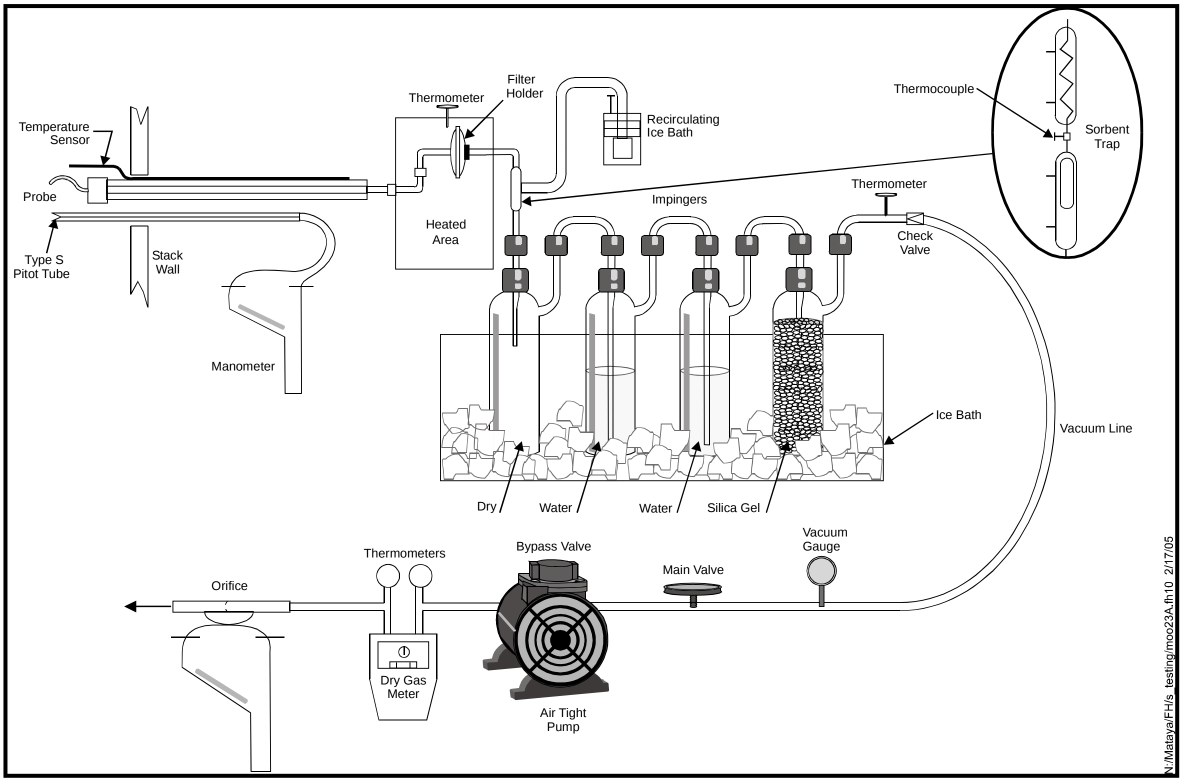


Figure 5-7. Sampling Train Schematic – Dioxins/Furans/PCB by SW-846 Method 0023A

Sampling train preparation and sample recovery will be performed in a controlled environment to reduce the possibility of sample contamination. Prior to assembly, each component of the sampling train will be rinsed thoroughly with methylene chloride. The quartz filter will also be pre-rinsed with methylene chloride. All connections in the sampling train will be installed dry or with Teflon® to reduce the possibility of contamination. Once the sampling train has been assembled, the nozzle and exit port will be sealed. After sample collection, the ends of the sampling train will once again be sealed, and the train will be returned to the clean-up area for sample retrieval. The filter will be recovered and placed in a methylene chloride-rinsed glass Petri dish. All components of the sampling train, from the nozzle through the sorbent module, including the nozzle, probe, filter glassware, and impinger glassware, will be rinsed thoroughly. The nozzle and probe will be cleaned using a Teflon® brush followed by rinsing with solvents.

The sample train returned from the sampling location will be recovered into the following components:

- Filter;
- Rinse of all glassware between the nozzle and filter with acetone, methylene chloride, and toluene;
- Rinse of all glassware between the filter and sorbent with acetone, methylene chloride, and toluene; and
- XAD-2® sorbent.

The recovered fractions will be combined to provide two extracts for analysis:

- Combination of the filter and all the rinses between the nozzle and filter; and
- Combination of the sorbent and all the rinses between the filter and sorbent.

The samples will be analyzed according to SW-846 Methods 0023A and 8290A for dioxins/furans/PCB.

5.2.6 Continuous Monitoring (EPA Method 3A for O_2 and CO_2)

The concentrations of oxygen and carbon dioxide in the stack gas will be determined using EPA Method 3A. This method utilizes continuous monitors. A schematic of the monitoring system is presented in **Figure 5-8**.

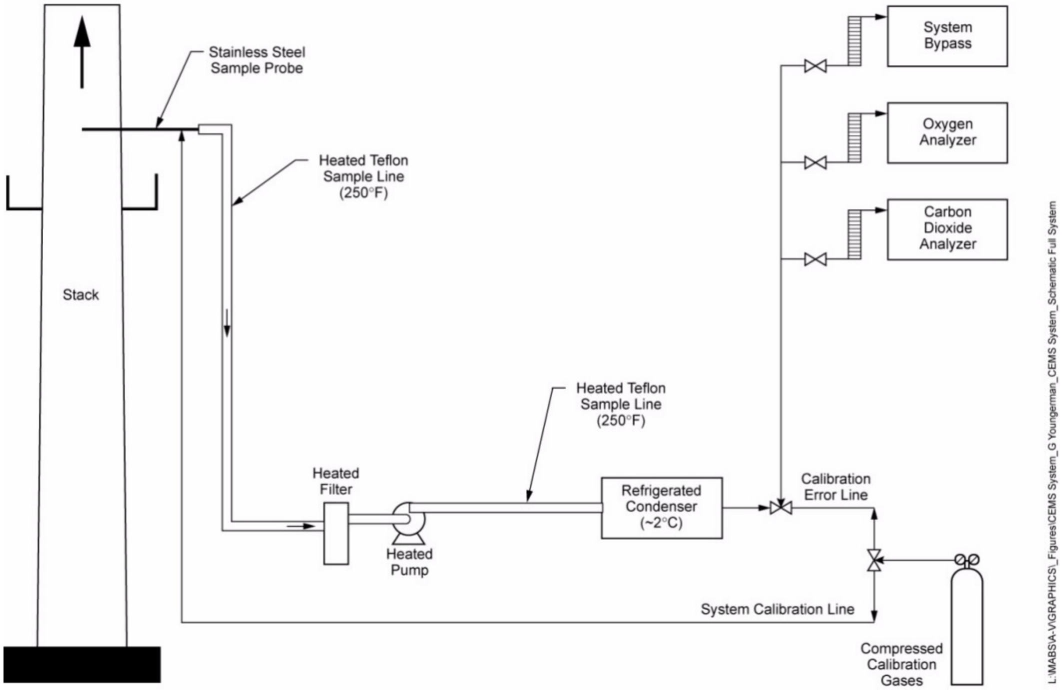


Figure 5-8. Continuous Emission Monitoring System

5.3 Waste Feed Sampling Procedures

Samples will be collected of both the liquid and solid waste feed streams. Amber glass bottles with Teflon® cap liners will be used to collect samples of the liquid and solid waste feed streams. Each sample bottle will be purchased pre-cleaned from the supplier.

The samples collected will be composited to provide one sample per test period for analysis of parameters, as indicated in **Table 5-3**. The sub-sampling container will be filled at each designated sampling time, and the collected material will be transferred into a larger container for compositing. For each sub-sampling event, the sampler will record the time and volume on the process data sampling data sheet (**Figure 5-9**).

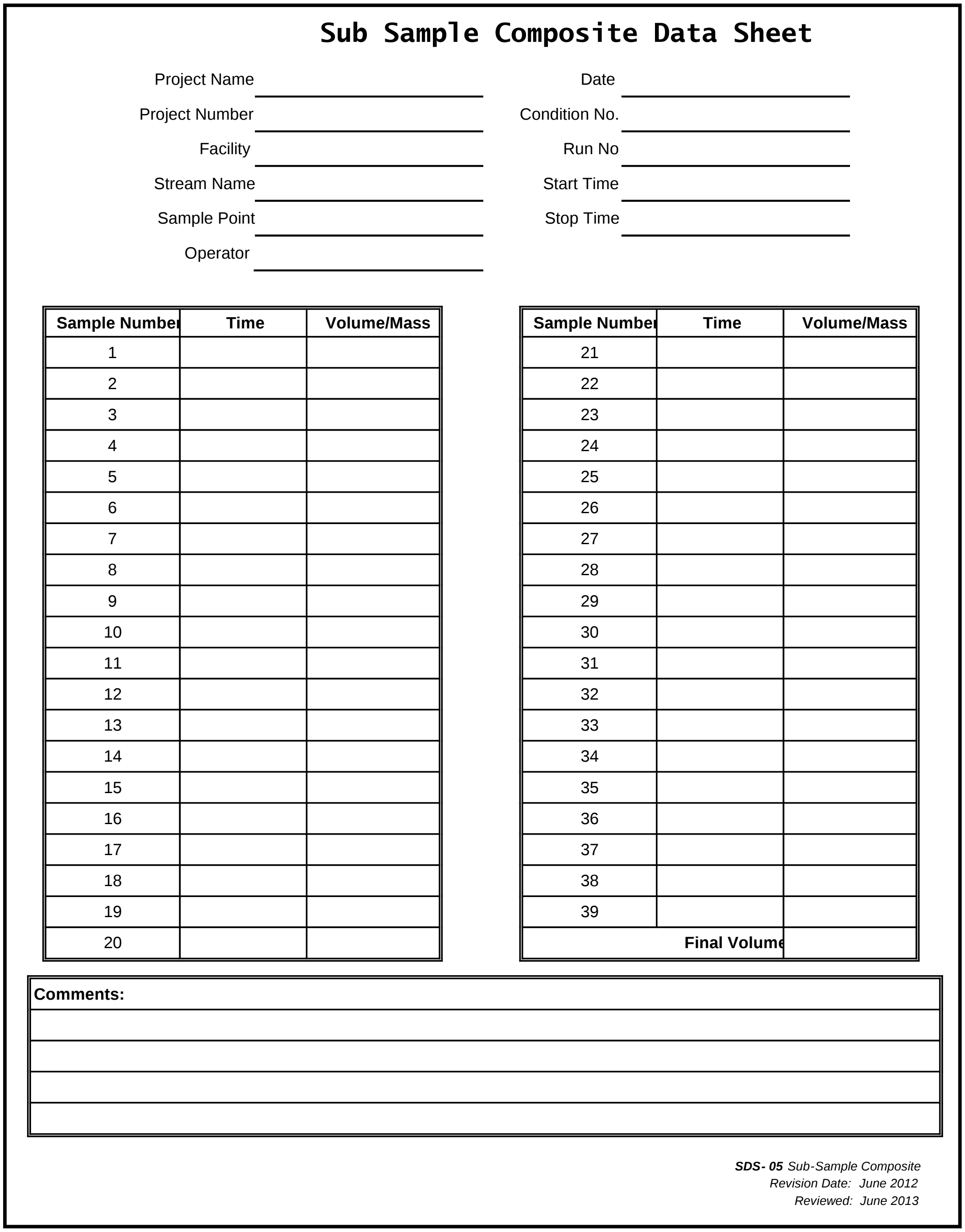
5.3.1 Liquid Waste Sampling Procedures

Samples of the liquid waste feeds will be collected in amber glass bottles with Teflon™ cap liners. Liquid spiking materials (i.e., mercury) will be sampled at the beginning and end of each test period. Samples of the spiking materials will be archived. Pre-cleaned bottles will be purchased and used to collect the samples.

Liquid samples will be collected using the tap sampling procedure specified in U.S. EPA Method S004, "Sampling and Analysis Methods for Hazardous Waste Combustion." The sample tap will be flushed each time by allowing the sample to flow briefly before the sample is collected. This will ensure that any stagnant accumulation of solids, or other contaminants that may be present in the tap, does not affect the sample integrity or its representation of the stream being sampled.

At 30-minute intervals throughout each test period, a grab sample, approximately 100 milliliters, of each liquid stream will be collected. The grab samples collected will be composited on site to provide one sample per waste feed per test run. Appendix A of the QAPjP has a Standard Operating Procedure (SOP) for the sampling of liquid waste streams.

Liquid spiking materials (i.e., mercury) will be sampled at the beginning and end of each test period. Packets of the solid spiking materials (i.e., arsenic and lead) will be collected each test period. Samples of the spiking materials will be archived and analyzed only if results dictate.



Sub Sample Composite Data Sheet

Project Name ______________
Project Number ______________
Facility ______________
Stream Name ______________
Sample Point ______________
Operator ______________

Date ______________
Condition No. ______________
Run No ______________
Start Time ______________
Stop Time ______________

Sample Number	Time	Volume/Mass
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Sample Number	Time	Volume/Mass
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
Final Volume		

Comments:

SDS- 05 *Sub-Sample Composite*
Revision Date: June 2012
Reviewed: June 2013

Figure 5-9. Example Process Sampling Data Sheet

5.3.2 Solid Waste Sampling Procedures

Solid wastes may be fed to the incinerator through multiple systems that will require different sampling approaches, if those waste streams are fed during the test. Solid wastes may be fed as bulk solids or in drums. Bulk solids may be fed as “low flash” and regular wastes”. Because of safety considerations, samples of bulk solids will be collected by Veolia personnel in accordance with procedures in the Feedstream Analysis Plan for the facility. Solid wastes identified for the test will be added to and blended in the waste pit of the Bulk Materials Handling Building (BMHB). Samples will be collected at the beginning and end of each test run. The two samples collected per test run will be composited and analyzed.

Solid waste feeds may also be fed as drummed wastes. Drummed solid waste feed samples will also be collected by Veolia personnel, possibly in advance of the test if drums wastes are identified prior to the test. Approximately 10% of the waste feed drums will be sampled. Individual samples will be composited based on drums processed during a test period.

During the sampling of the solid wastes collected from the BMHB, or 10% of the waste drums, approximately 100 grams of sample of the respective streams will be collected. To ensure that each subsample is approximately of equal size, an appropriately sized bottle, glass container, or scoop will be used to collect each subsample. The subsampling bottle will be filled when individual samples are collected. The individual samples will be composited for analysis.

If consumer products are fed during the test, they will not be sampled or analyzed. The feedrate of consumer products would be used to determine the solids feedrate, but consumer wastes will not contribute to constituent feedrates.

Packets of the solid spiking materials (i.e., arsenic and lead) will be collected each test period. Samples of the spiking materials will be archived and analyzed only if results dictate.

6. Sample Handling, Traceability, and Holding Times

Sample handling procedures, including labeling, preserving, storing, and transporting samples, will be conducted in a way to ensure the integrity of the samples and to provide an unambiguous link between the results of the analyses and the physical conditions they represent. The following sections describe general sample handling concerns, the sample labeling scheme, sample tracking procedures, and sample preservation and holding time requirements.

A case narrative will be prepared for each analysis by the analytical laboratory, Eurofins TestAmerica Laboratories of Knoxville, TN. A general statement may be added for the test method, or for all test methods, that states that the QC conditions were met except as otherwise noted. Exceptions to standard operating procedure or quality control results that are outside the target acceptance limits are identified in the narrative by including a non-conformance memo (NCM) statement, or by adding a flag or qualifier with a listed definition. Applicable SOPs will be made available, upon request. Detailed case narratives for each analysis will be provided in the final report.

6.1 Sample Handling

Samples will be protected from evaporation, contamination, and degradation. Following collection, samples will be handled in clean, ventilated work areas and will be removed to dark, cool storage, as necessary and as soon as possible. Sample containers will be labeled using waterproof ink.

The samples will be packaged for transport. All sample containers will be wiped clean before packaging. Absorbent paper, vermiculite, or equivalent material will be used to absorb shock and spills. A sample transfer form will be transported with the samples, identifying each sample and the analytical requirements. The samples will either be shipped overnight by carrier, or AECOM personnel will drive the samples to Eurofins TestAmerica Laboratories in Knoxville, Tennessee.

The samples will be locked every night inside the field laboratory and during the day they will always be in the possession of AECOM personnel. AECOM will complete portions of the chain-of-custody on the date of recovery; these portions will include sample ID and date and time of recovery. In addition, the sample logbook will be completed on the date of recovery that will contain the same information as the chain of custody with the addition of tare and final weights for each sample bottle. Sample custody will transfer when samples are handed over to the analytical laboratory by AECOM personnel.

Filters from stack sampling for dioxins/furans will be placed in glass Petri dishes, sealed with Teflon® tape, and placed in individual zip-lock plastic bags in coolers with other stack sample fractions for transport to the laboratory. Ice contained in double plastic bags will be added and refreshed, as necessary, for the duration of transport.

Chain-of-custody records will accompany the samples during transport to the laboratory. These documents will be enclosed in a waterproof plastic bag.

High-level samples (i.e., waste feed material) will be kept separate from low-level samples (i.e., stack sampling train components) during all aspects of sample handling and shipment.

Upon receipt of samples, the laboratory sample custodian will open each shipping container and check the contents for evidence of breakage or leakage. The contents of the shipping container will be inspected for chain-of-custody documents and other information or instructions. The condition of the samples, including the temperature of the samples, will be noted on the chain-of-custody document. The sample custodian will verify that all information on the sample bottle labels is correct and consistent with the chain-of-custody forms, and will acknowledge receipt on the custody form. The chain-of-custody form and the bill of lading will be retained in the project file.

Any discrepancy between the samples and the chain-of-custody information, any broken or leaking sample bottles, or any other nonconformance will be reported immediately to the Analytical Coordinator and corrective action options will be discussed and implemented. Notations of the problem and resolution will be made on the chain-of-custody or an addendum to the chain-of-custody form, initialed, and dated by the sample custodian. The Veolia Test Manager, AECOM Project Manager, and QA/QC Coordinator will be kept informed of all issues and responses.

6.2 Traceability

Traceability refers to the link between the results of analyses and the physical reality they represent. This link includes not only sample custody but also documentation of preparation of reagents or supplies that become an integral part of the sample (e.g., filters and absorbing reagents, documentation of the exact location, and specific considerations associated with sample acquisition, documentation of sample preservation, etc.). This type of data will be recorded in field logbooks and through the use of prepared sample labels and standardized field tracking forms.

Accurate documentation of field sampling data, sample collection and handling records will be maintained throughout the program by all participants involved in data and sample collection, transport, and analysis. Team leaders have been designated for the field testing effort (Section 2.0) and will be responsible for ensuring the completion of all data sheets, sample log book entries, and transfer forms. Field personnel involved in the sample collection and recovery will assist in this effort as their individual responsibility dictates.

All sampling data, including sampling times, locations, identification codes, and other pertinent and specific sample information will be recorded on pre-printed data sheets or in bound notebooks. Samples of data sheets are provided in Section 5.0. For individual samples, all pertinent information will be logged in the master sample logbook.

A master logbook will be kept for tracking and identifying all samples taken during the test effort. Each sample will be given a unique log number that will identify the project, run number, and an identification code based upon the sample type and fraction. An example of the log number format follows:

Proj-XY-ABC

Where:

Proj is a project specific identification,

XY represent the condition and run number, and

ABC is an alphanumeric sequence describing the particular sample.

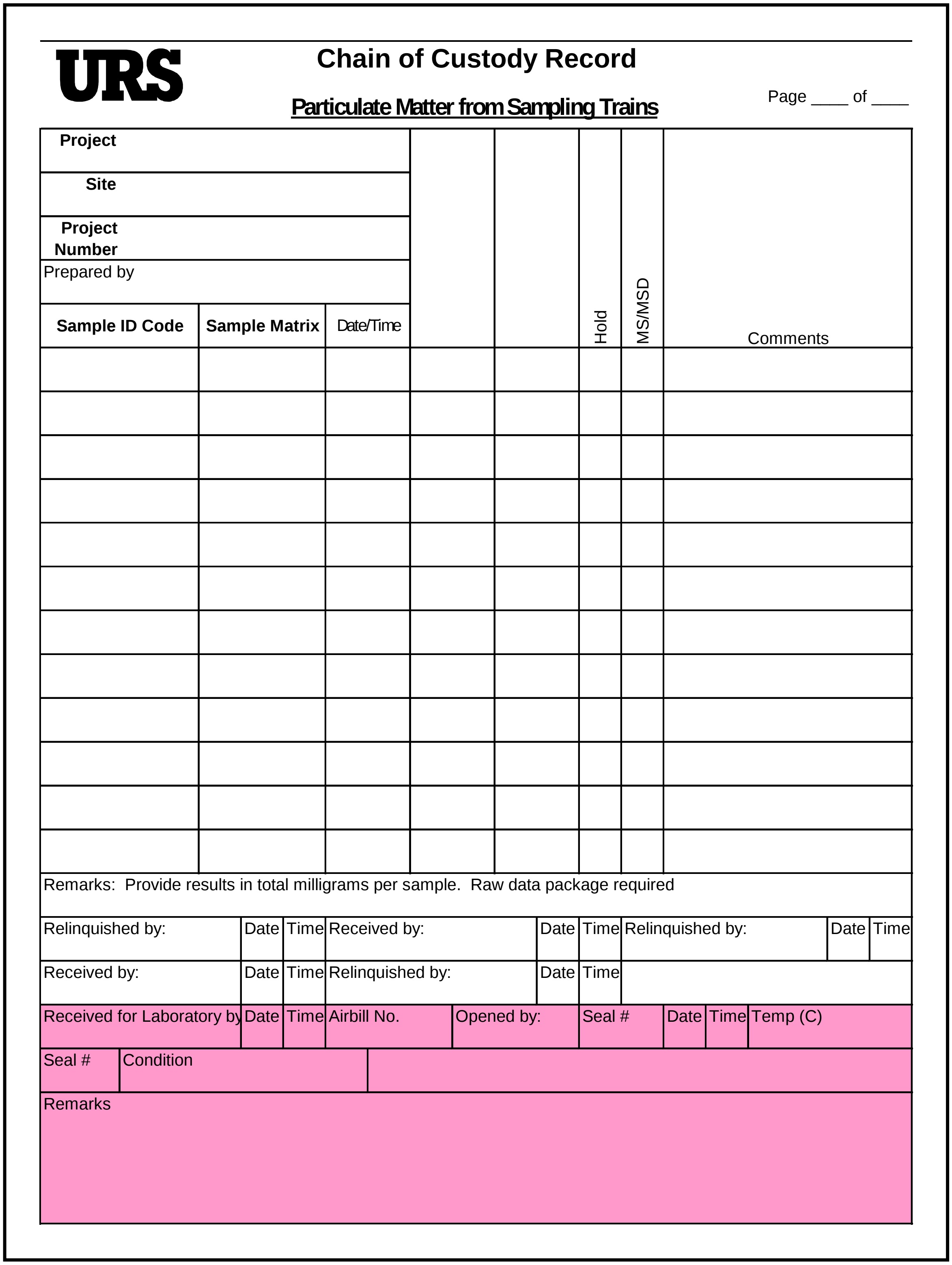
Sample labels will be affixed to all sample bottles used for sample collection. The label will be marked to include date and time(s) of collection, the sampler’s initials, and tare weight and gross weight (as appropriate), and the sample log number. Transfer forms will be completed by field personnel involved in the sample handling prior to transfer for off-site analysis. **Figure 6-1** shows an example of the transfer form.

6.3 Holding Times

A summary of sample preservation and holding times is presented in **Table 6-1**. Storage conditions will be checked on-site and upon receipt of samples at the laboratory. Any deficiencies will be recorded on the chain-of-custody and laboratory shipment receipt forms.

6.4 Sample Shipping and Logistics

Eurofins TestAmerica Laboratories in Knoxville, Tennessee will analyze the samples collected during the CfPT/RCRA Periodic Test. Samples will be packed by AECOM in the field, and either transported by overnight carrier or by AECOM personnel to the laboratory.



URS

Chain of Custody Record

Particulate Matter from Sampling Trains

Page ____ of ____

Project							
Site							
Project Number							
Prepared by							
Sample ID Code	**Sample Matrix**	Date/Time			Hold	MS/MSD	Comments

Remarks: Provide results in total milligrams per sample. Raw data package required

Relinquished by:	Date	Time	Received by:	Date	Time	Relinquished by:	Date	Time
Received by:	Date	Time	Relinquished by:	Date	Time			

Received for Laboratory by	Date	Time	Airbill No.	Opened by:	Seal #	Date	Time	Temp (C)

Seal #	Condition	

Remarks

Figure 6-1. Example Transfer Form for Samples

Table 6-1. Summary of Sample Preservation and Holding Time Requirements

Parameter	Sample Type	Preservation	Holding Time
Particulate Matter	Stack Gas	Plastic or glass containers	Analyze within 28 days
HCl, Cl_2	Stack Gas	Plastic or glass containers	Analyze within 28 days
Metals	Stack Gas	Plastic or glass containers	Analyze within 180 days Analyze Hg within 28 days
Dioxins/Furans/PCB	Stack Gas	Sealed with glass or Teflon plugs or caps; resin traps wrapped with aluminum foil; cool, ≤6°C	Extract within 30 days; Analyze within 45 days of extraction
Metals	Waste Feed	Glass containers	Analyze within 180 days Analyze Hg within 28 days
Chromium VI	Stack Gas	Plastic or glass containers, cool, ≤6°C	Analyze within 14 days
Ash Chlorine Moisture Density Viscosity Heating Value	Waste Feeds	Glass containers	Analyze within 30 days

7. Calibration Procedures

Information presented in this section pertains to the calibration of sampling systems. Included are descriptions of each procedure or references to applicable standard operating procedures, the frequency of calibrations, and the calibration standards to be used.

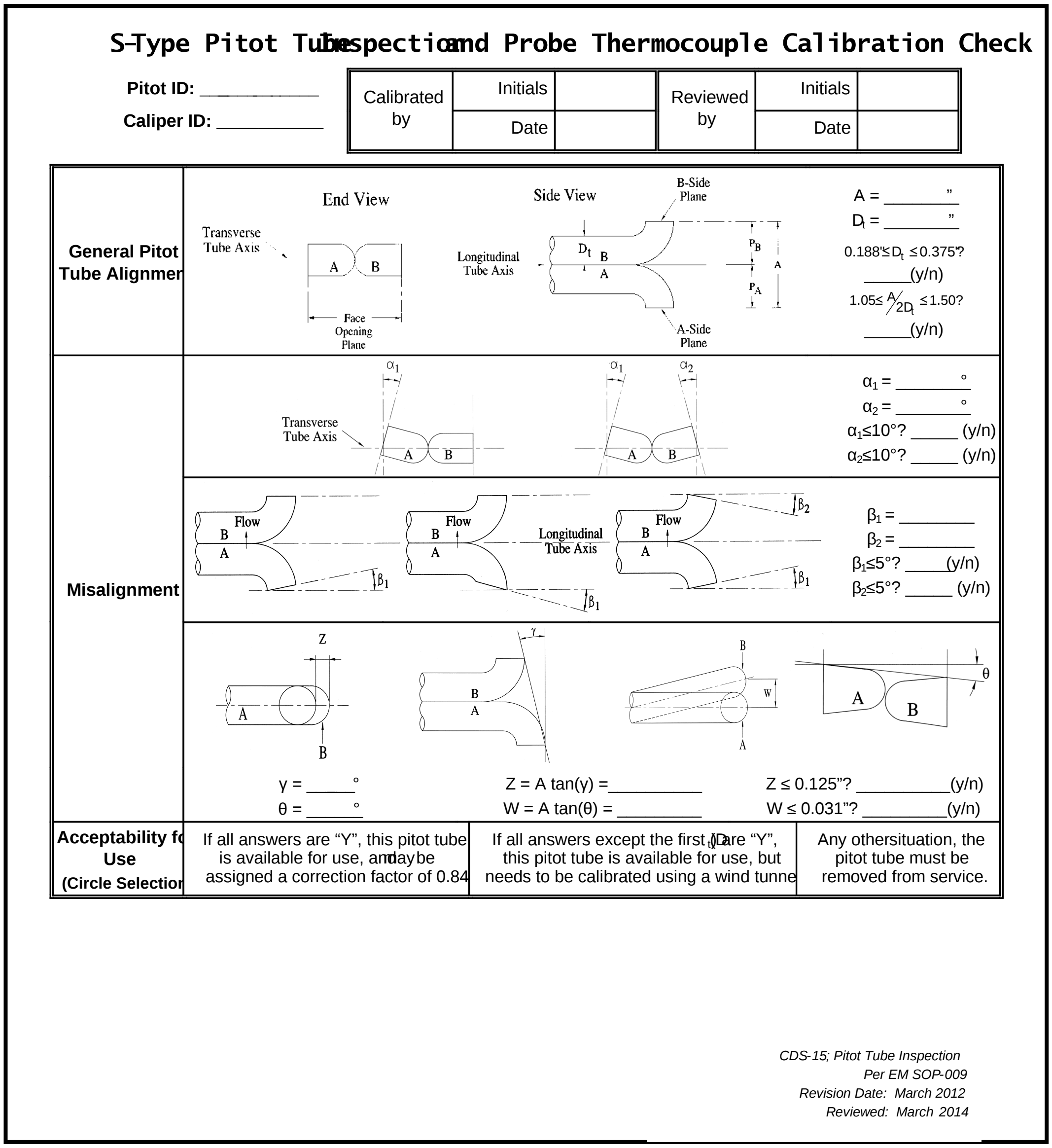
An important function in maintaining data quality is the checkout and calibration of the source sampling equipment. Prior to field sampling, the equipment will be calibrated using referenced procedures, and the results will be documented and retained. If a referenced calibration technique for a particular piece of apparatus is not available, then state-of-the-art techniques will be used. A discussion of the procedures used to calibrate this equipment is presented below.

7.1 Type-S Pitot Tube Calibration

EPA has specified guidelines concerning the construction and geometry of an acceptable Type-S pitot tube. If the specified design and construction guidelines are met, a pitot tube coefficient of 0.84 can be used. Information related to the design, construction and inspection of the Type-S pitot tube is presented in detail in Calibration Procedure 2 in *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, Stationary Source-Specific Methods, EPA Document 600/R-94/038c*. Only Type-S pitot tubes meeting the required EPA specifications will be used during this project. Prior to the field sampling, the pitot tubes will be inspected and documented as meeting EPA specifications. An example of the pitot tube inspection sheet is presented in **Figure 7-1**.

7.2 Sampling Nozzle Calibration

Calculation of the isokinetic sampling rate requires that the cross-sectional area of the sampling nozzle be accurately and precisely known. All nozzles used for isokinetic sampling will be thoroughly cleaned, visually inspected, and calibrated according to the procedure outlined in Calibration Procedure 5b in *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, Stationary Source-Specific Methods, EPA Document 600/R-94/038c.*



S-Type Pitot Tube Inspection and Probe Thermocouple Calibration Check

Pitot ID: ____________

Caliper ID: ___________

Calibrated by	Initials		Reviewed by	Initials	
	Date			Date	

General Pitot Tube Alignmen

A = ________”
Dt = ________”
0.188”≤ Dt ≤ 0.375”?
_____(y/n)
1.05≤ A/2Dt ≤ 1.50?
_____(y/n)

Misalignment

α1 = _______°
α2 = _______°
α1≤10°? _____ (y/n)
α2≤10°? _____ (y/n)

β1 = ________
β2 = ________
β1≤5°? ____(y/n)
β2≤5°? _____ (y/n)

γ = _____°
θ = ______°

Z = A tan(γ) =__________
W = A tan(θ) = _________

Z ≤ 0.125”? __________(y/n)
W ≤ 0.031”? _________(y/n)

Acceptability fo Use (Circle Selection	If all answers are “Y”, this pitot tube is available for use, and may be assigned a correction factor of 0.84	If all answers except the first (Dt) are “Y”, this pitot tube is available for use, but needs to be calibrated using a wind tunne	Any other situation, the pitot tube must be removed from service.

CDS-15; Pitot Tube Inspection
Per EM SOP-009
Revision Date: March 2012
Reviewed: March 2014

Figure 7-1. Example Pitot Tube Inspection Sheet

According to this procedure, three measurements of the inside diameter of the nozzle will be made on different cross sections. Using a caliper, measurements will be made to the nearest 0.001 inch. Nozzles will be considered acceptable if the difference between any two measurements is more than 0.004 inches. Nozzle calibrations are recorded on the field sampling data sheets. An example data sheet is presented as **Figure 5-3**.

7.3 Temperature Measuring Device Calibration

During source sampling, accurate temperature measurements are required. Thermocouple temperature sensors are calibrated at a single point against a NIST-traceable thermometer, and the linearity is confirmed using a traceable precision voltage generator. A temperature readout calibration data sheet is presented in **Figure 7-2**.

7.4 Dry Gas Meter and Orifice Calibration

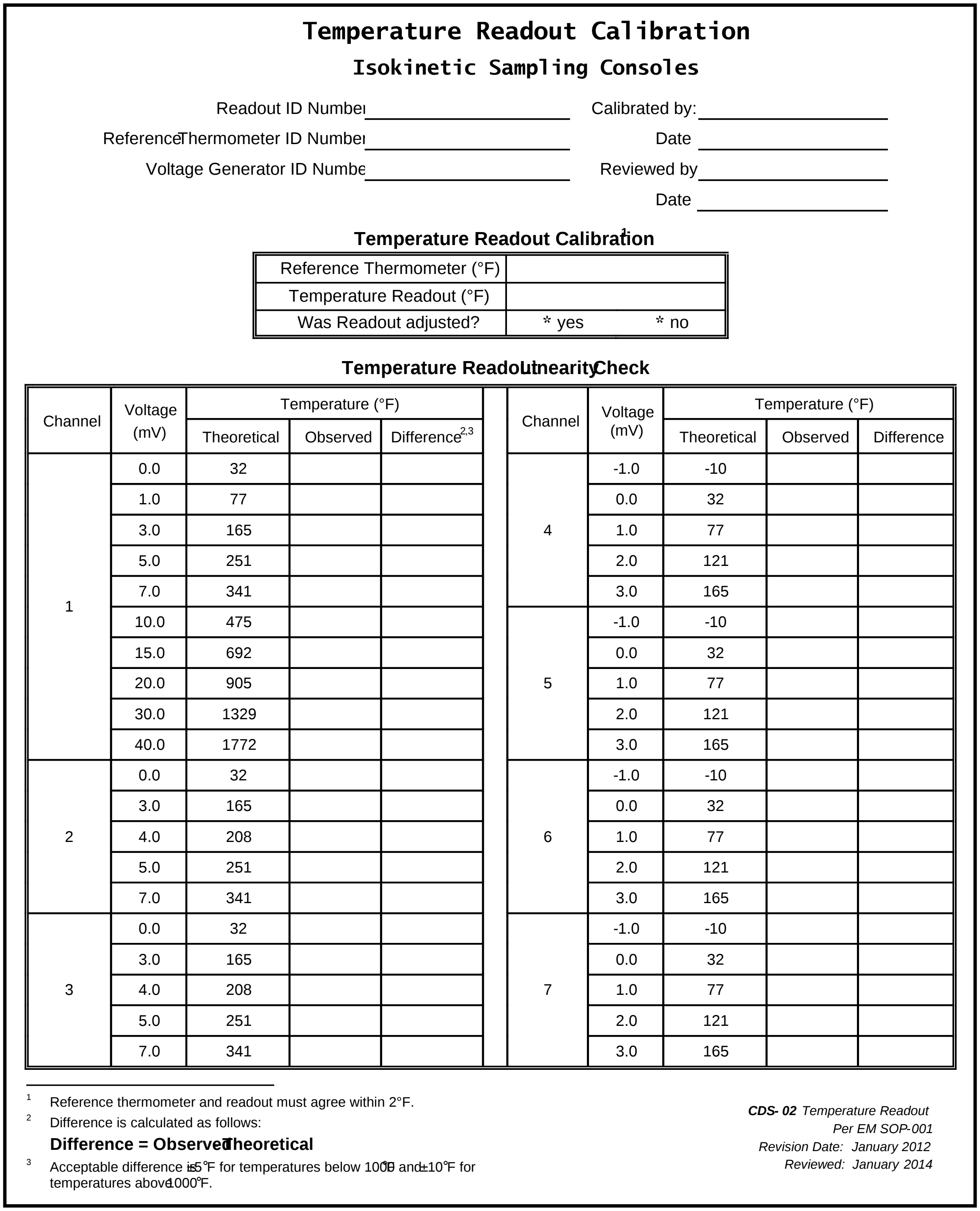
Dry gas meters (DGMs) will be used in all sampling trains to monitor the sampling rate and to measure the sample volume. Critical orifices are used as calibration tools.

All dry gas meters will be calibrated before the departure of the equipment to the field and a documented correction factor at standard conditions will be assigned. Dry gas meters are calibrated against traceable critical orifices. A 5-point calibration (at five different orifices or flowrates) is performed on each dry gas meter every 12 months. A 3-point calibration is performed as a pre-test and post-test calibration check. The 3-point calibrations must agree within 5% of the 5-point calibration. A post-test calibration check will be performed as soon as possible after the equipment has returned from the field.

A positive pressure leak-check of the system will be performed prior to calibration. To perform the leak-check, the system will be placed under approximately ten inches of water pressure and a gauge oil manometer will be used to determine if the pressure decrease can be detected over a one-minute period. If leaks are detected, they will be eliminated before actual calibrations are performed.

Before calibration of a dry gas meter, the pump is allowed to run for five minutes after the sampling console is assembled and leak-checked. Once the pump and dry gas meter are warmed up, the critical orifice is attached, and air is pulled through the dry gas meter at the specified flowrate. After ten minutes, the valve is closed and the volume of gas read by the meter is compared to the volume of gas passing through the critical orifice. Duplicate calibrations are performed at each of the five flowrates. If necessary, additional maintenance and calibrations are conducted until the calibration results (Y_1) vary by no more than 2%. The average Y_1 is then calculated and recorded on the DGM calibration data sheet. An example DGM calibration data sheet is presented in **Figure 7-3** and a post-test calibration check form is shown in **Figure 7-4**.

The critical orifice is calibrated by comparison to an independently calibrated dry gas meter. An orifice calibration factor is calculated for each of the 18 flow settings during a full calibration. The arithmetic average of the values obtained during the calibration is used.



Temperature Readout Calibration

Isokinetic Sampling Consoles

Readout ID Number ____________________ Calibrated by: ____________________

Reference Thermometer ID Number ____________________ Date ____________________

Voltage Generator ID Numbe ____________________ Reviewed by ____________________

Date ____________________

Temperature Readout Calibration[1]

Reference Thermometer (°F)	
Temperature Readout (°F)	
Was Readout adjusted?	* yes * no

Temperature Readout Linearity Check

Channel	Voltage (mV)	Temperature (°F)				Channel	Voltage (mV)	Temperature (°F)		
		Theoretical	Observed	Difference[2,3]				Theoretical	Observed	Difference
1	0.0	32				4	-1.0	-10		
	1.0	77					0.0	32		
	3.0	165					1.0	77		
	5.0	251					2.0	121		
	7.0	341					3.0	165		
	10.0	475				5	-1.0	-10		
	15.0	692					0.0	32		
	20.0	905					1.0	77		
	30.0	1329					2.0	121		
	40.0	1772					3.0	165		
2	0.0	32				6	-1.0	-10		
	3.0	165					0.0	32		
	4.0	208					1.0	77		
	5.0	251					2.0	121		
	7.0	341					3.0	165		
3	0.0	32				7	-1.0	-10		
	3.0	165					0.0	32		
	4.0	208					1.0	77		
	5.0	251					2.0	121		
	7.0	341					3.0	165		

---

[1] Reference thermometer and readout must agree within 2°F.

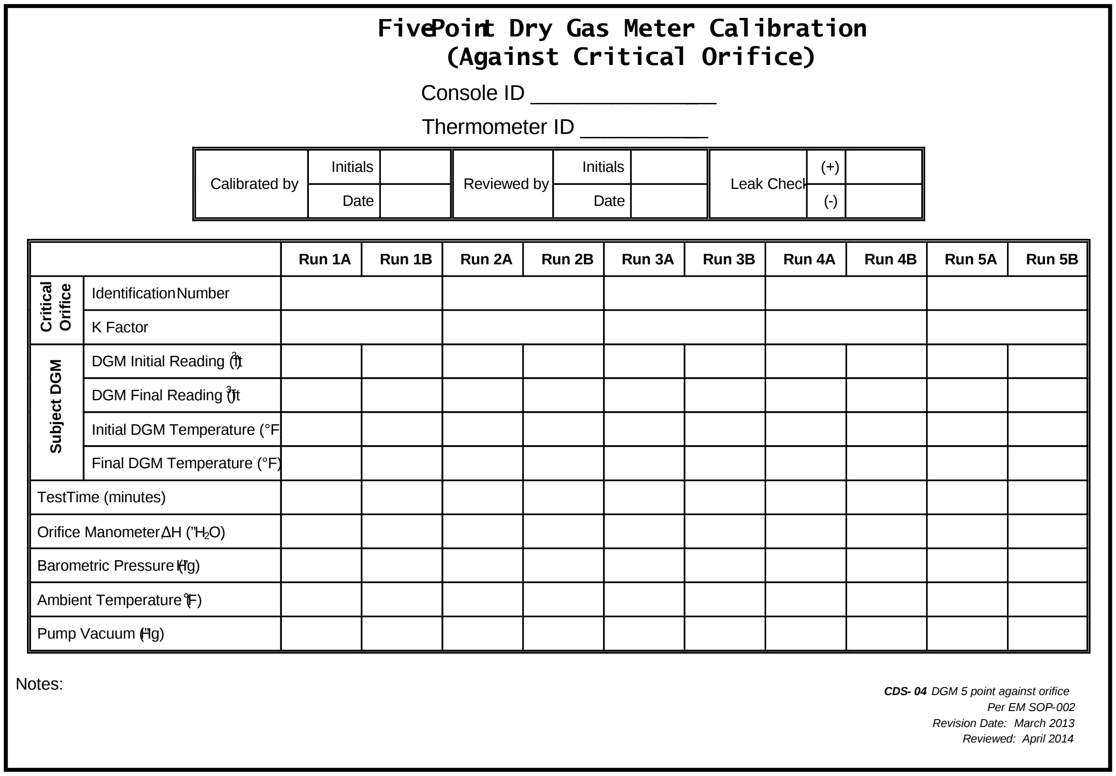
[2] Difference is calculated as follows:

Difference = Observed - Theoretical

[3] Acceptable difference is ±5°F for temperatures below 1000°F and ±10°F for temperatures above 1000°F.

CDS- 02 *Temperature Readout*
Per EM SOP-001
Revision Date: January 2012
Reviewed: January 2014

Figure 7-2. Example Temperature Readout Calibration Data Sheet



Five Point Dry Gas Meter Calibration
(Against Critical Orifice)

Console ID ________________

Thermometer ID ___________

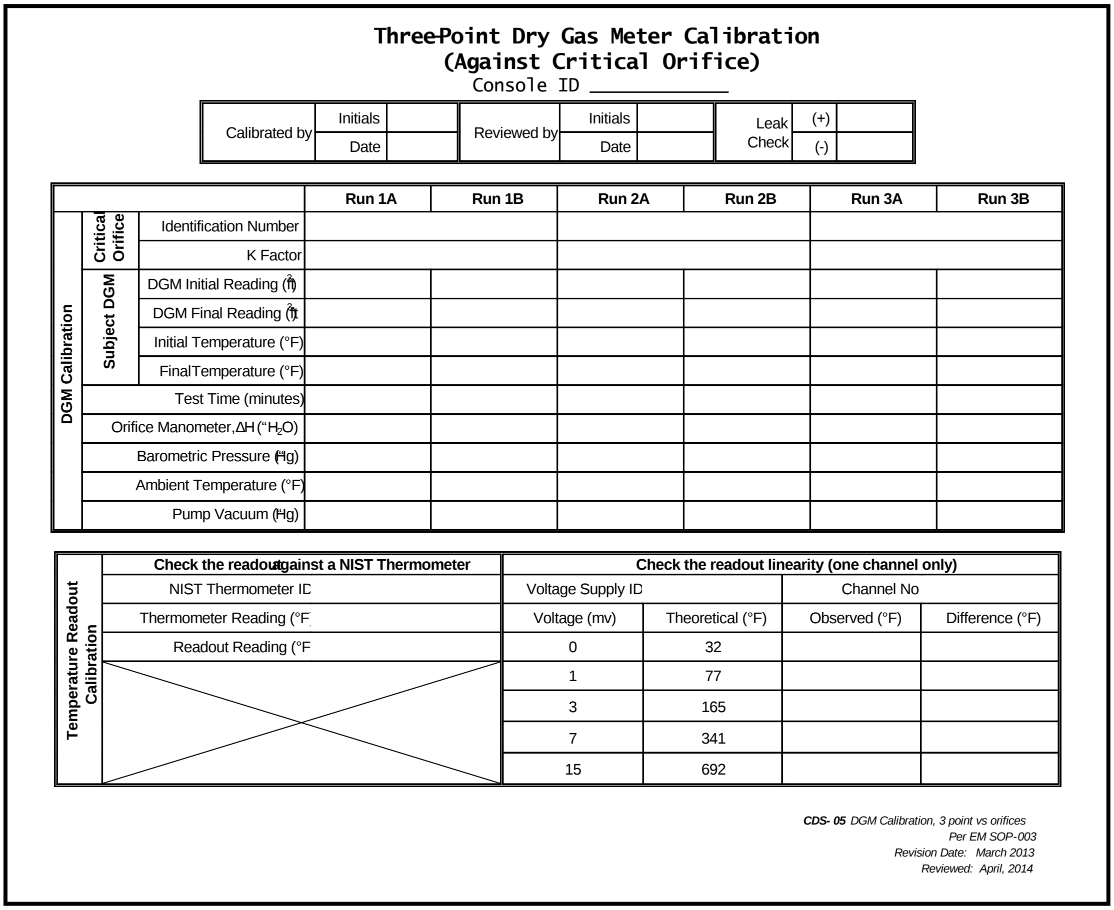
Calibrated by	Initials		Reviewed by	Initials		Leak Check	(+)	
	Date			Date			(-)	

		Run 1A	**Run 1B**	**Run 2A**	**Run 2B**	**Run 3A**	**Run 3B**	**Run 4A**	**Run 4B**	**Run 5A**	**Run 5B**
Critical Orifice	Identification Number										
	K Factor										
Subject DGM	DGM Initial Reading (ft^3)										
	DGM Final Reading (ft^3)										
	Initial DGM Temperature (°F										
	Final DGM Temperature (°F)										
Test Time (minutes)											
Orifice Manometer ΔH ("H_2O)											
Barometric Pressure ("Hg)											
Ambient Temperature (°F)											
Pump Vacuum ("Hg)											

Notes:

CDS- 04 *DGM 5 point against orifice*
Per EM SOP-002
Revision Date: March 2013
Reviewed: April 2014

Figure 7-3. Example Dry Gas Meter Calibration Data Sheet



Three-Point Dry Gas Meter Calibration
(Against Critical Orifice)
Console ID ____________

Calibrated by	Initials		Reviewed by	Initials		Leak Check	(+)	
	Date			Date			(-)	

			Run 1A	Run 1B	Run 2A	Run 2B	Run 3A	Run 3B
DGM Calibration	Critical Orifice	Identification Number						
		K Factor						
	Subject DGM	DGM Initial Reading (ft^3)						
		DGM Final Reading (ft^3)						
		Initial Temperature (°F)						
		FinalTemperature (°F)						
		Test Time (minutes)						
		Orifice Manometer, ΔH (“H$_2$O)						
		Barometric Pressure (“Hg)						
		Ambient Temperature (°F)						
		Pump Vacuum (“Hg)						

Temperature Readout Calibration	**Check the readout against a NIST Thermometer**		**Check the readout linearity (one channel only)**			
	NIST Thermometer ID		Voltage Supply ID		Channel No	
	Thermometer Reading (°F)		Voltage (mv)	Theoretical (°F)	Observed (°F)	Difference (°F)
	Readout Reading (°F)		0	32		
			1	77		
			3	165		
			7	341		
			15	692		

CDS- 05 *DGM Calibration, 3 point vs orifices*
Per EM SOP-003
Revision Date: March 2013
Reviewed: April, 2014

Figure 7-4. Example Post Test DGM Calibration Data Sheet

8. Analytical Procedures

Samples collected during the field test effort will be analyzed for the parameters specified in **Tables 5-1** and **5-2**. All analyses will be performed by Eurofins TestAmerica Laboratories in Knoxville, Tennessee. AECOM and Eurofins TestAmerica will maintain communications throughout the project, from planning stages to reporting. TestAmerica has reviewed and approved the QAPjP. AECOM and TestAmerica recognize that all due efforts are to be made to provide the lowest possible detection limits. Analytical reports provided by TestAmerica Knoxville present a detection limit, and a reporting limit, for each analyte in every sample analyzed. The numerical value of the detection limit reported by TestAmerica will be documented in appropriate tables of the Test Report.

This section describes the analytical methods that will be employed for each parameter and/or sample matrix. Most of the methods are standard reference methods with any modifications to the methods appropriately explained and detailed. The analytical methods are summarized in **Table 8-1**.

Table 8-1. Summary of Analytical Methods

Parameter	Stream	Analytical Method
Particulate Matter	Stack Gas	Gravimetric - EPA Method 5
HCl/Cl_2	Stack Gas	IC - EPA Method 26A
Metals [1]	Stack Gas Waste Feed	ICPES - SW-846 Method 6010B CVAAS - Hg, SW-846 Method 7470A or 7471A
Chromium VI	Stack Gas	SW-846 Method 7199
Dioxins/Furans/PCB	Stack Gas	HRGC/HRMS - SW-846 Method 8290A
Ash	Waste Feed	ASTM Method D-482
Total Chlorine	Waste Feed	SW-846 Methods 5050 and 9056A
Moisture	Waste Feed	ASTM E-203 (Karl-Fischer titration) for liquid waste; ASTM D-5142 or D160.3 (loss on drying) for solid waste
Calorific (Heating) Value	Waste Feed	ASTM Method D-5865/D-240
Density	Waste Feed – Liquid Only	ASTM Method D-1475
Viscosity	Waste Feed – Liquid Only	ASTM Method D-445

[1] Analysis is for As, Be, Cd, Cr, Sb, Ba, Pb, Hg, Ni, Se, Ag, Tl, and Zn.

8.1 Analysis of Stack Gas Samples for Particulate Matter

Samples for determination of particulate matter in the stack gas will be collected in a single sampling train meeting the requirements of EPA Method 5 for PM and EPA Method 26A for HCl and Cl_2, as described in Section 5.2.2. The acetone wash from the nozzle, probe liner, and glassware prior to the filter on the Method 5 sampling trains will be evaporated and desiccated and the mass will be determined using an analytical balance. The filter from the Method 5 sampling train is desiccated and weighed to determine the mass of particulate present on the filter. The weight gain of the filter and evaporated acetone wash are summed as the particulate catch.

The analytical balance will be calibrated daily, prior to weighing, using a standard set of weights and an internal calibration weight. Measured values of the standards must agree to as follows:

- The 5g weight must be within 0.1 mg of the true value;
- The 50g weight must be within 0.3 mg of the true value; and
- The 100 g weight must be within 0.5 mg of the true value.

Balance calibration data will be recorded in the laboratory notebook.

8.2 Analysis of Stack Gas Samples for Hydrogen Chloride and Chlorine

Samples for the determination of hydrogen chloride (HCl) and chlorine (Cl_2) in the stack gas are collected using a sampling train meeting the requirements of EPA Methods 5 and 26A. According to this method, sampled gas is collected isokinetically, filtered, and bubbled through a series of impingers. As described in Section 5.2.2, the sampling train is recovered to provide a solution of sulfuric acid, which removes the HCl, and a solution of sodium hydroxide, which removes the Cl_2. Both impinger solutions are analyzed for chloride by ion chromatography (IC) for determination of chloride. The chloride found in the acid impingers is reported as HCl, and the chloride determined in the alkaline impingers is reported as Cl_2. In ion chromatography, the ions in solution are separated by an ion exchange column and detected conductimetrically. Sodium thiosulfate will be added to the collected alkaline impinger sample in the analytical laboratory before analysis.

The IC will be calibrated for each sample set analyzed. This is accomplished by introducing different standard concentrations of chloride into the instrument and measuring the response for each concentration. Calibration standards will be prepared from certified standards.

A minimum of four standard concentrations for each analyte will be used to generate a calibration curve. The calibration curve is considered acceptable if the correlation coefficient is greater than 0.995.

According to Method 26A, each sample will be analyzed in duplicate.

8.3 Analysis of Stack Gas Samples for Metals

Samples of the stack gas collected using EPA Method 29, will be analyzed for 12 metals using Method 6010B from SW-846, including antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), cadmium (Cd), chromium (Cr), lead (Pb), nickel (Ni), selenium (Se), silver (Ag), thallium (Tl), and zinc (Zn). Method 6010B uses an inductively coupled plasma emission spectrometer (ICPES). Mercury (Hg) will be determined using Method 7470A of SW-846, a cold vapor atomic absorption spectrometry (CVAAS).

Samples for determination of metals in stack gas will be collected in an EPA Method 29 sampling train, as described in Section 5.2.3. The target metals and respective detection limits are specified in **Table 8-2**. Six separate fractions are recovered from the Method 29 sampling train and submitted to the laboratory for analysis:

- Nitric acid probe and nozzle rinse;
- Filter;
- Contents of knock-out impinger and HNO_3/H_2O_2 impinger (and rinses);
- Rinse of empty impinger between the HNO_3/H_2O_2 impingers and the $H_2SO_4/KMnO_4$ impinger;
- Contents (and rinses) of $H_2SO_4/KMnO_4$ impingers; and
- HCl rinse of $H_2SO_4/KMnO_4$ impingers.

The filter from the multiple metals sampling train will be combined with the probe and nozzle rinse and digested using hydrofluoric acid (HF), HCl, and HNO_3 in a microwave-assisted process. This fraction (the front half) will be analyzed for all target metals. The knock-out impinger and HNO_3/H_2O_2 impingers (combined in the field) will be combined and have an aliquot removed for analysis of mercury before concentration and analysis for other metals.

The remaining three fractions will be analyzed for mercury. In all cases, the analytical methodology is specified in Method 29. Mercury analysis will be conducted using Method 7470A, cold vapor atomic absorption, and analysis for all other metals will be conducted using Method 6010B, inductively coupled plasma emission spectroscopy (ICPES).

Table 8-2. Target Analytes for Determination of Metals

Metal	Analytical Method	Stack Emission Target Detection Limit [1,2] (μg/m^3)
Antimony (Sb)	SW-846 Method 6010B	0.96
Arsenic (As)	SW-846 Method 6010B	0.46
Barium (Ba)	SW-846 Method 6010B	0.52
Beryllium (Be)	SW-846 Method 6010B	0.19
Cadmium (Cd)	SW-846 Method 6010B	0.078
Chromium (Cr)	SW-846 Method 6010B	0.39
Lead (Pb)	SW-846 Method 6010B	0.35
Mercury (Hg)	SW-846 Method 7470A (stack and liquid waste) SW-846 Method 7471A (solid and sludge waste)	1.40
Nickel (Ni)	SW-846 Method6010B	0.68
Selenium (SE)	SW-846 Method 6010B	0.46
Silver (Ag)	SW-846 Method 6010B	0.76
Thallium (Tl)	SW-846 Method 6010B	0.73
Zinc (Zn)	SW-846 Method 6010B	0.55

[1] Based on recent data from Test America-Knoxville, and a gas sample volume of 45 dscf.

[2] If analytical interferences are present, samples will be diluted, which will raise analytical detection limits.

8.4 Analysis of Stack Gas Samples for Chromium VI

Stack samples for the determination of chromium VI will be collected using SW-846 Method 0061. Analysis will be performed using Method 7199 of SW-846. The method uses ion chromatography for determination of chromium VI in the potassium hydroxide impinger solutions and associated rinses. The ion chromatograph is run with a post column reagent (PCR) mixing and delivery system.

8.5 Analysis of Stack Gas Samples for Dioxins/Furans/PCB

Samples of the stack gas for determination of dioxins/furans/PCB will be collected in a SW-846 Method 0023A sampling train, as described in Section 5.2.5. The target analytes for dioxins/furans analysis are presented in **Table 8-3**.

Table 8-3. Target Analytes for Determination of Dioxins/Furans in Stack Gas

Analyte
2,3,7,8-TCDD
1,2,3,7,8-PeCDD
1,2,3,4,7,8-HxCDD
1,2,3,6,7,8-HxCDD
1,2,3,7,8,9-HxCDD
1,2,3,4,6,7,8-HpCDD
OCDD
2,3,7,8-TCDF
1,2,3,7,8-PeCDF
2,3,4,7,8-PeCDF
1,2,3,4,7,8-HxCDF
1,2,3,6,7,8-HxCDF
2,3,4,6,7,8-HxCDF
1,2,3,7,8,9-HxCDF
1,2,3,4,6,7,8-HpCDF
1,2,3,4,7,8,9-HpCDF
OCDF

Samples will be extracted and concentrated as described in the method 0023A for dioxins/furans with appropriate modifications made to accommodate PCB analysis using the same extracts.

Analysis for dioxins/furans will be performed using high-resolution capillary column GC/MS in accordance with SW-846 Method 8290A. This method uses matrix specific extraction and analyte specific cleanup techniques for sample preparation. Calibration of the GC/MS will be accomplished with internal standards and calibrating solutions. Acceptance criteria as outlined in the method will be met before any samples are analyzed.

Analysis for PCBs will be accomplished using the same sample employing high-resolution capillary column GC/MS in accordance with EPA Method 1668A. This includes collecting the condensate as an analytical fraction to be analyzed only for PCBs.

As described in Section 5.2.4, the sampling train is recovered to provide the following fractions:

- Filter;
- Rinse of all glassware between the nozzle and filter with acetone, methylene chloride, and toluene;
- Rinse of all glassware between the filter and sorbent with acetone, methylene chloride, and toluene; and
- XAD-2® sorbent.

The recovered fractions will be combined to provide two extracts for analysis:

- Combination of the filter and all the rinses between the nozzle and filter; and
- Combination of the sorbent and all the rinses between the filter and sorbent.

After sample cleanup and concentration procedures at the analytical laboratory, front-half extracts (i.e., probe and nozzle rinse and filter) will be combined and analyzed for dioxins/furans, and back-half extracts (i.e., mid-train rinse and XAD-2® sorbent) will be combined and analyzed for dioxins/furans. The front-half and back-half components will be analyzed separately as required by SW-846 Method 0023A. The samples will be analyzed according to SW-846 Method 8290A and EPA Method 1668A. Each individual isomer containing the 2,3,7,8-substitution pattern will be individually quantified.

8.6 Analysis of Waste Feeds

As described in Section 5.3, samples of waste feeds will be collected during each test period.

Waste feed samples will be analyzed for 13 metals. Twelve (12) of the metals will be analyzed by a trace level inductively coupled argon plasma emission spectroscopy (ICPES) using SW-846 Method 6010B. Samples will be prepared for analysis using SW-846 Method 3050B. The metals to be analyzed are antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), cadmium (Cd), chromium (Cr), lead (Pb), nickel (Ni), selenium (Se), silver (Ag), thallium (Tl), and zinc (Zn). Waste feed samples will also be analyzed for mercury (Hg) by cold vapor atomic absorption spectroscopy (CVAAS) using Method 7470A or 7471A of SW-846.

In addition, the composite waste feed samples will be analyzed for calorific value, ash, moisture, total chlorine/chloride, density (liquid waste only), and viscosity (liquid waste only).

After preparation, the samples are analyzed for the following parameters, by the referenced standard methods:

- Ash – ASTM Method ASTM D-482;
- Total chlorine – SW-846 Methods 5050 and 9056A;
- Moisture - ASTM E-203 or D-4017 (Karl-Fischer titration) for liquid waste; ASTM D-5142 or D160.3 (loss on drying) for waste sludge;
- Calorific value – ASTM Method D-5865 or D-240;
- Density – ASTM Method D-1475;
- Viscosity – ASTM Method D-445; and
- Metals – SW-846 Method 6010B (all except mercury) with sample preparation by SW-846 Method 3050B, and SW-846 Method 7470A or 7471A for mercury. The target species for metals analysis are presented in **Table 8-2**.

9. Internal Quality Control Checks

Specific QC procedures will be followed to ensure the production of useful and valid data for the CfPT/RCRA Periodic Test. Standard reference methods for sampling and analysis are detailed in Sections 5.0 and 8.0 of this document. QC procedures will be followed as described in these referenced methods. Strict adherence to prescribed procedures is quite often the most applicable QC check. This section describes procedures that are specific to this test and sets a schedule for collection of QC samples used to assess data quality.

Table 9-1 presents a summary of specific QC samples planned to assess overall measurement data quality. These include field blanks, reagent blanks, matrix spike/matrix spike duplicate (MS/MSD) pairs, laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and duplicate samples or analyses.

Table 9-1. Summary of Sampling and Analytical QC Requirements[1]

	Field Blank [2]	Trip Blank [3]	Surrogate Spike	MS/MSD[4]	LCS/LCSD	Duplicate Sample or Analysis [5]
Particulate Matter (Stack Gas)	1	1				--
HCl/Cl_2 (Stack Gas)	1	1		1	1	All
PCDD/PCDF/PCB (Stack Gas)	1	1	All		1	
Metals (Stack Gas)	1	1		1	1	
Chromium VI (Stack Gas)	1	1				All
Metals (Waste Feeds)				1	1	
Composition (Waste Feeds)				1 [7]		1 [6]

[1] Table indicates number of QC samples planned per incinerator stack test.

[2] The field blank for stack gas samples is recovered from an assembled train that has been leak checked but through which no gas sample has passed. The field blank will be analyzed.

[3] Trip blanks consist of applicable filters, sorbents, and solutions. These will be archived and analyzed only if necessary based on field blank analysis results.

[4] Matrix spiked samples will be spiked prior to sample preparation (digestion/extraction), except for metals train samples, which will be spiked following digestion.

[5] Field duplicates of waste feeds will be collected as duplicate sets of subsamples for compositing.

[6] Field duplicates will only be collected of the liquid waste feeds.

[7] MS/MSD for chlorine only.

Field blanks for stack gas samples will be prepared by recovering assembled trains that have been treated as other trains except that no stack gas will be passed through the blank trains. Media blanks consist of sampling media that are stored and shipped from the facility and handled as ordinary samples, but are never assembled in trains. Trip blanks collected will not be analyzed unless needed to identify sources of contamination found in the samples or field blanks.

A discussion of sampling and analytical QC checks to be implemented during this program is presented below.

9.1 Sampling Quality Control Checks

A sampling matrix that shows the sampling method, frequency, and analytical parameters is presented in Section 5.0. QC procedures associated with the sampling are described in the cited methods and summarized briefly below, along with specific procedures pertinent to this test.

9.1.1 Stack Gas Sampling

Prior to actual sampling on site, all of the applicable sampling equipment will be thoroughly checked to ensure that each component is clean and operable. A file of the equipment calibration data forms will be compiled and reviewed for completeness and adequacy to ensure the acceptability of the equipment. Sampling equipment calibration is described in Section 6.0. All glassware used in sampling trains will be cleaned before transport to the plant. This includes soap and water washing, as well as a 4-hour soak in a solution of 10% nitric acid. In addition, all glassware is rinsed on site with the recovery solution for that train before the assembly of a particular train. Upon arrival on site, the equipment will be unloaded, inspected for possible damage, and then assembled for use. Any damaged or faulty equipment will be tagged and removed from service until it can be repaired.

For all stack gas sampling, reagent grade solutions, including HPLC water, will be used for sample train preparation and recovery.

The following QC checks are generally applicable to source sampling techniques. If any corrective actions are taken in response to results for these QC checks or in response to supervisor review of QC procedures, the corrective action taken will be documented in the field.

The specific actions shown below follow good sampling practice and are a result of close adherence to the methods:

- Each sampling train will be inspected visually for proper assembly before every use.
- Assembly and recovery of the sample trains will be performed in a clean environment.
- All cleaned glassware, hardware, and prepared sorbent traps will be kept closed with caps (Teflon or stainless steel), precleaned foil, or Teflon film until assembly of the sample train in the field. The sorbent traps will be immediately re-capped when the train is disassembled.
- The numbers and locations of the sampling traverse points will be checked before taking measurements.
- The inclined oil manometer used to indicate the differential pressure (ΔP) across the Type-S pitot tube will be leveled and zeroed.
- The temperature measurement system will be checked visually for damage and operability by measuring the ambient temperature.
- Prior to sampling, calculations will be made to determine the proper size nozzle required for isokinetic sampling.
- The sampling nozzle will be inspected visually for damage before and after each run.
- The Type-S pitot tube will be inspected visually for damage before and after each run.
- During sampling, the roll and pitch axis of the Type-S pitot tube and the sampling nozzle will be properly maintained.
- Handling of the filters will be performed in clean areas out of drafts. Teflon-coated tweezers will be used at all times to transfer the filters.
- The field balance will be checked daily against standard weights to read within ±0.5% of the standard, or a calibration curve will be prepared for the balance. This will be documented in the field logbook.
- Any unusual conditions or occurrences will be noted on the appropriate data form during each run.
- The sampling train will be purged prior to sample collection. This will occur during the leak-checking operation and will be documented on the sampling data sheet.
- The sampling probe will be sealed properly to prevent air in-leakage.

The following activities have to do with preparation and use of material for sampling:

- All reagents will be prepared and stored according to the recipes provided in the methods.
- Separate dispensing containers will be assigned to each reagent to prevent cross-contamination.
- Sample filters will be inspected for pin-holes, tears, or other compromising conditions before use.

The following activities will be documented on the pre-printed data sheets:

- All sampling data will be recorded on standard data forms that will serve as pre-test checklists.
- Each leg of the Type-S pitot tube will be leaked-checked before and after each run.
- Dry gas meter readings, ΔP and ΔH readings, temperature readings, and pump vacuum readings will be made properly while sampling at each traverse point.
- The sampling trains will be leak-checked before and after each run. If a sampling train is moved from one sampling port to another during a run, the train will be leak-checked between ports.
- Ice will be maintained in the ice bath throughout each run.
- Filters and sorbent traps will be maintained at the proper temperature throughout the test run.
- Impingers will be weighed to the nearest 0.1 gram before and after sampling, as needed for moisture determination.

The following activities are specified and will be performed:

- A cyclonic flow check of the stack gas (both stack traverse diameters) will be performed prior to sampling to verify the absence or presence of cyclonic flow.
- A field blank will be collected by assembling and recovering one complete sampling train. The blank sample train will be leak-checked at the sampling location. No gaseous sample will be passed through the sampling train. A sampling data sheet will be filled out for the blank sample. It will be treated as an actual sample, except that no stack gas will be sampled.
- Reagent blanks consisting of sampling media that have been either prepared or transported to the site will be collected and will be analyzed in the event of suspected contamination. These samples will be assigned log numbers and will appear in the logbook and on the chain-of-custody forms.
- Isokinetic sampling will be achieved within ±10%. Calculations of isokinetic sampling rate will be performed on site, as quickly as possible after sampling is concluded.

QC procedures specific to each sampling method are discussed in the following sections.

EPA Methods 5 and 26A

Particulate matter, hydrogen chloride and chlorine will be determined in the stack gas according to EPA Methods 5 and 26A, as described above. The probe and filter holder will be maintained at a temperature between 248 and 273oF. The methods require that the leakage rate at the end of the run not exceed 0.02 cubic feet per minute. Final leak checks will be performed to confirm this. In addition, leak checks will be performed before the test, during port change, and any time a component is changed out. A component change-out may be replacement of a filter or impinger, or just emptying an impinger. All leak checks will be recorded on the sampling data sheet.

A field blank will be prepared by assembling and leak testing a sampling train, but without drawing any stack gas through the system. Media blanks of the filter, acid impinger solution, and caustic impinger solution will be prepared and retained for possible analysis. The field blank samples will be analyzed.

Isokinetic sampling will be maintained within ±10%. A field blank for the trains will be prepared by assembling and leak testing a sample train, but without drawing any gas through the system.

EPA Method 29

Metals will be determined in the stack gas during the test using EPA Method 29. The probe and the filter holder will be maintained at 248 ±25oF. The method requires that the leakage rate at the end of the run not exceed 0.02 cubic feet per minute. Final leak checks will be performed to confirm this. In addition, leak checks will be performed before the test, during port change, and any time a component is changed out. A component change-out may be replacement of a filter or impinger, or just emptying an impinger. All leak checks will be recorded on the sampling data sheet.

A field blank will be prepared by assembling and leak testing a sampling train, but without drawing any stack gas through the system. Media blanks of the filter and the impinge solutions and chemicals will be prepared and retained for possible analysis. The field blank samples will be analyzed.

Isokinetic sampling will be maintained within ±10%. A field blank will be prepared by assembling and leak testing a sample train, but without drawing any gas through the system.

SW-846 Method 0061

Chromium VI will be determined in the stack gas during the test using SW-846 Method 0061. The method requires that the leakage rate at the end of the run not exceed 0.02 cubic feet per minute. Final leak checks will be performed to confirm this. In addition, leak checks will be performed before the test, during port change, and any time a component is changed out. A component change-out may be replacement of a filter or impinger, or just emptying an impinger. All leak checks will be recorded on the sampling data sheet.

A field blank will be prepared by assembling and leak testing a sampling train, but without drawing any stack gas through the system. Media blanks of the caustic impinger solution and chemicals will be prepared and retained for possible analysis. The field blank samples will be analyzed.

Periodically during sampling, the pH of the first impinger solution will be checked. If necessary to maintain a pH greater than 8.5, 0.5 N KOH will be added to the first impinger.

SW-846 Method 0023A (Dioxins/Furans/PCB)

SW-846 Method 0023A sampling trains will be collected and analyzed for dioxins/furans/PCB. The temperature of the probe liner, filter holder, and Teflon transfer line from the filter to the impingers and sorbent module will be maintained at 248±25oF. The temperature of the gas entering the XAD-2 sorbent trap shall not exceed 68oF. The system will be leak-checked before and after each run to ensure leakage rates of less than 0.02 cfm. If leakage rates exceed this limit, sample volumes will be adjusted accordingly, as described in the methods. Isokinetic sampling will be maintained within ±10%.

A field blank will be prepared by assembling and leak testing a sampling train, but without drawing any stack gas through the system. An XAD-2 media blank will be prepared and retained for possible analysis. The field blank samples will be analyzed.

Reagent blank samples will also be prepared by collecting portions of reagents and media (filter and XAD sorbent) that have been brought to the plant and kept in the recovery area. These samples will never have contact with stack gas. The reagent blank samples will be archived and analyzed only if necessary based on stack gas and field blank analysis results.

Continuous Emission Monitoring

Oxygen (O_2) and carbon dioxide (CO_2) will be monitored in the stack gas during the test using EPA Method 3A. QC procedures include the following:

- Calibration per the manufacturer’s specification;
- Use of calibration gases of appropriate range;
- Use of documented, traceable standards;

- Performance of calibration error checks; and
- Performance of zero and upscale drift checks.

9.1.2 Waste Sampling

Liquid and sludge samples will be collected using the tap sampling procedures specified in EPA Method S-004. Individually collected liquid and sludge samples will be composited according to the schedule indicated in Section 5.0. Individual solid stream samples will be collected by Veolia personnel, using Veolia procedures, and composited for analysis as indicated in Section 5.0.

Liquid sampling QC procedures will include the following:

1. The sample tap will be flushed each time before sample is collected;
2. A new subsampling bottle will be used for each test run; and
3. A pre-printed data sheet will be used.

A Standard Operating Procedures (SOP) is included in Appendix A for the collection of liquid (including sludges) waste streams.

9.2 Analytical Quality Control Activities

A summary of analytical methods to be used for each parameter and sample stream is presented in Section 8.0 of this document. Analytical QC procedures will be followed as described in the referenced methods. This section presents a summary of QC checks used to control method performance within acceptable limits and provides details or modifications specifically designed to assess precision and accuracy in the actual sample matrices.

9.2.1 QC for Determination of Particulate Matter in Stack Gas

Samples of the stack gas for determination of particulate matter will be collected using a single sampling train meeting the requirements of EPA Methods 5 and 26A. These samples will be analyzed by TestAmerica Knoxville for total weight gain, by gravimetric analysis. This will be done according to the procedures in EPA Method 5. All method QA/QC activities and requirements will be followed and met.

9.2.2 QC for Determination of Hydrogen Chloride and Chlorine in Stack Gas

Concentrations of hydrogen chloride and chlorine in stack gas will be determined by measuring the chloride ion concentration in the acidic and caustic impinger solutions from the EPA Methods 5 and 26A sampling train. The analysis will be performed by ion chromatography, according to Method 26A. In addition to routine analytical method QC requirements (which include duplicate analysis of all samples) an MS/MSD will be performed on splits of one sample from each condition to assess accuracy and precision in the sample matrix. Two splits of the samples will be spiked identically with chloride at appropriate levels.

A summary of routine analytical QC checks for these methods is presented in **Table 9-2**.

Accuracy and precision estimates will be calculated from matrix spike recoveries. Note that the method requirement for duplicate analysis is repeated measurements within 5% of the mean, with a corrective action of analysis of another duplicate pair. For this test, the requirement has been defined as RPD <10%, with the determination of a third value.

Table 9-2. Summary of QC Checks for Hydrogen Chloride and Chlorine Analysis[1]

Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action[1]
Chloride	Multi-point calibration	Daily	R > 0.995	Repeat calibration.

QC check sample	Every 10th analysis	+ 10% error	Repeat calibration.
Method blank	One per batch	None detected	Determine source of contamination. Reanalyze affected samples.
Duplicate analyses	All samples	RPD <10%	1) Repeat duplicate analysis; and 2) Average all 4 results.
Matrix spike (Cl- only)	Once	85-115% recovery	Flag data.

1 All corrective action will be noted on laboratory reports and discussed in the QA/QC section of the final report.

9.2.3 QC for Determination of Metals in Stack Gas and Waste

Samples of the stack gas collected using EPA Method 29, will be analyzed for antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), cadmium (Cd), chromium (Cr), lead (Pb), nickel (Ni), selenium (Se), silver (Ag), thallium (Tl), and zinc (Zn) using Method 6010B from SW-846. Method 6010B uses an inductively coupled plasma emission spectrometer (ICPES). Mercury (Hg) will be determined using Method 7470A of SW-846, a cold vapor atomic absorption spectrometry (CVAAS).

Samples of the waste feeds will be analyzed for the same 13 metals using Method 6010B and Method 7470A or Method 7471A. A summary of the QC procedures for analysis of metals is presented in **Table 9-3A** and **Table 9-3B**.

Table 9-3A. Summary of Analytical QC Checks for Metals in Waste Feeds

Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action [a]
Metals (ICPES), except Hg	Initial mixed standard calibration	Daily, prior to analysis	Measured value for the initial calibration verification is within 10% of expected value	Repeat calibration
	Calibration check sample	Following calibration; 10% during sample analysis	Within 10% of expected value	Evaluate system; recalibrate
	Calibration blank	10%	< reporting limit	Repeat; evaluate system; recalibrate
	ICP interference check	Run at beginning	80-120% of true value	Repeat calibration
	Method Blank	1 per batch of maximum 20 samples	< reporting limit	Flag data
	Laboratory Control Sample	1 per batch of maximum 20 samples	80-120% recovery	Flag data
	Post Digestion Spike	1 per batch of maximum 20 samples	75-125% recovery	Flag data
	MS/MSD	1 per batch of maximum 20 samples	20% RPD; 70-130% recovery	Flag data; notify lab project manager
Mercury (CVAAS)	Multi-point calibration plus zero	Daily, prior to analysis	Correlation coefficient >0.995	Repeat calibration.
	Calibration check	Following calibration; 10% during sample analysis	Recovery between 80 – 120%	Repeat calibration.
	Calibration blank	10%	< reporting limit or 1/10th the lower samples level	Repeat; evaluate system; recalibrate
	Method Blank	1 per batch of	< reporting limit	Flag data

		maximum 20 samples		
	Laboratory Control Sample	1 per batch of maximum 20 samples	80-120% recovery	Flag data
	MS/MSD	1 per batch, max 20 samples per batch	20% RPD; 75-125% recovery	Flag data; notify lab manager; notify QA officer

a All corrective action will be noted on laboratory reports, and discussed in the QA/QC section of the final report.

Table 9-3B. Summary of Analytical QC Checks for Metals in Stack Gas (Method 29)

Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action [a]
Metals (ICPES), except Hg	Initial mixed standard calibration	Daily, prior to analysis	Measured value for the initial calibration verification is within 10% of expected value	Repeat calibration
	Calibration check sample	Following calibration; 2 runs during sample analysis	Within 10% of expected value	Evaluate system; recalibrate
	Calibration blank	2 runs during sample analysis	< reporting limit	Repeat; evaluate system; recalibrate
	ICP interference check	Run at beginning	80-120% of true value	Repeat calibration
	Method Blank	1 per batch of maximum 20 samples	< reporting limit	Flag data
	Laboratory Control Sample	1 per batch of maximum 20 samples	80-120% recovery	Flag data
	Post Digestion Spike	1 per batch of maximum 20 samples	75-125% recovery	Flag data
	MS/MSD	1 per batch of maximum 20 samples	20% RPD; 70-130% recovery	Flag data; notify lab project manager
	Duplicate analysis	1 per batch of maximum 20 samples	Within 20% of average	Flag data; notify lab project manager
Mercury (CVAAS)	Multi-point calibration plus zero	Daily, prior to analysis	Correlation coefficient >0.995	Repeat calibration.
	Calibration check	Following calibration; 2 runs during sample analysis	Recovery between 80 – 120%	Repeat calibration.
	Calibration blank	2 runs during sample analysis	< reporting limit or 1/10th the lower samples level	Repeat; evaluate system; recalibrate
	Method Blank	1 per batch of maximum 20 samples	< reporting limit	Flag data
	Laboratory Control Sample	1 per batch of maximum 20 samples	80-120% recovery	Flag data
	MS/MSD	1 per batch, max 20 samples per batch	20% RPD; 75-125% recovery	Flag data; notify lab manager; notify QA officer
	Duplicate analysis	1 per batch of maximum 20 samples	Within 20% of average	Flag data; notify lab project manager

a All corrective action will be noted on laboratory reports, and discussed in the QA/QC section of the final report.

9.2.4 QC for Determination of Chromium VI

The concentration of chromium VI in the stack gas will be determined by analyzing the potassium hydroxide solution from the chromium VI sampling train, SW-846 Method 0061. The analysis is performed using ion chromatography. The QC checks associated with this analysis are presented in **Table 9-4**.

Table 9-4. Summary of Analytical QC Checks for Chromium VI Analysis [1]

Quality Control Check	Frequency	Acceptance Criteria	Corrective Action [2]
Multipoint Calibration	Daily, prior to analysis	Correlation coefficient >0.995	Repeat calibration
Duplicate analysis	All samples	RPD ≤20%	Repeat duplicate analysis
QC check sample	Every 10th analysis	± 10% of expected value	Repeat calibration
Method blank	One per batch	None detected	Determine source of contamination; reanalyze affected samples; flag data
MS/MSD	Once	90 - 110% recovery	Flag data

1 Analysis to be performed by TestAmerica Knoxville.

2 All corrective action will be noted on laboratory reports and discussed in the QA/QC section of the final report.

9.2.5 QC for Determination of Dioxins/Furans/PCB in Stack Gas

The concentration of dioxins/furans in the stack gas will be determined by analysis of the recovered components of the SW-846 Method 0023A sampling train. Samples will be analyzed for dioxins/furans using HRGC/HRMS according to SW-846 Method 8290A and EPA Method 1668A. A summary of method QC checks is presented in **Table 9-5**.

Table 9-5. Summary of Analytical QC Checks for Dioxins/Furans/PCB Analysis by HRGC/HRMS [1]

Quality Control Check	Frequency	Acceptance Criteria	Corrective Action [2]
Mass Resolution Check	Daily	10,000 resolution	Adjust
GC Column Performance Check	At beginning of 12-hour shifts	≤25% valley	Recalibrate or column maintenance
Initial Calibration	Prior to analyzing samples.	≤25 or 30% RSD for multi-point calibration. See Table 5 in SW-846 Method 0023A. 3 Ion ratios between 0.65 and 1.78. See SW-846 Method 0023A, Table 4. [3]	Perform repairs, maintenance, or adjustments, repeat.
Calibration/Retention Time Window Check	At beginning of 12-hour shifts	1st and last eluters within window.	Adjust group times
Continuing Calibration	At beginning of 12-hour shifts	Within 25 or 30% of relative response factor from initial calibration. See Table 5 in SW-846 Method 0023A. [3]	Adjust and re-analyze Continuing Calibration Standard
Method Blank 4	At beginning of 12-hour shifts	Less than the lowest calibration standard	Re-analyze all positive samples in batch
Internal Standards	All samples	40-130% recovery for tetra, penta- and hexa- substituted species. 25-130% recovery for hepta- and octa- substituted species.	Flag Data
LCS/LCSD	Once per Batch	70-130% Recovery	Flag Data
Surrogate Spiking	All samples	70-130% recovery for all five surrogates	Flag Data

1 Analysis to be performed by Test America Knoxville.

2 All corrective action will be noted on laboratory reports and discussed in the QA/QC section of the final report.

3 Refer to method for specific isomers.

4 Method blank consists of an extraction of clean XAD, taken through concentration and analysis

9.2.6 QC for Determination of Composition by ASTM Methods

Samples of the waste feeds will be analyzed for ash, total chlorine, moisture, heating value, viscosity, and density using EPA and ASTM standard methods. The measurement parameters and corresponding reference methods are listed in Section 8 of this document. Routine QC procedures as defined in the methods will be followed for all analyses. This usually includes the analysis of a standard reference material to determine recovery and demonstrate the method performance. The QC procedures for the compositional analyses are presented in **Table 9-6**.

Table 9-6. Summary of Analytical QC Checks for Analysis of Waste Feed Samples for Heating Value, Density, Ash, Viscosity and Total Chlorine [1,2]

Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action [3]
Heating Value	Initial Calibration—running average of 10 daily calibration standards	Prior to analysis	%RSD <1%	Correct problem; add standards until %RSD criterion is met.
	Calibration Check Standard (also added to running list of 10 previous calibrations)	Daily	%Difference <1%	Correct problem, retest
	Laboratory Control Sample (LCS)	One per sample batch of up to 20 samples	98-102% of accepted value.	Retest. If the re-test fails, correct the cause and retest all samples.
	Laboratory Control Sample Duplicate (LCSD)	One per sample batch of up to 20 samples	RPD ≤2.0%.	Retest. If the re-test fails, correct the cause and retest all samples.
	Laboratory Duplicate	One per sample batch of up to 20 samples or one per trial burn.	RPD ≤10.0%.	Flag the data, note in narrative.
Density (Liquid Wastes Only)	Pycnometer Calibration	Prior to use	3 Measurements, %RSD < 0.5%	Repeat Calibration
	Calibration Check	Daily	Pycnometer Mass Difference < 0.01g	Recalibrate
	Laboratory Control Sample (LCS)	One per sample preparation batch of up to 20 samples.	Percent accuracy within 99-101%	Determine cause and reanalyze all associated samples.
	Analytical Duplicate	One every 10 samples (minimum one per trial burn).	RPD ≤10%	Flag the data.
Viscosity (Liquid Wastes Only)	Calibration Check Sample	Before sample analysis begins, analyze one calibration check standard per batch of up to 20 samples, for each viscometer used in the batch.	Percent difference ≤1%.	Correct the problem. Obtain an acceptable result before beginning sample analysis.
	Analytical Duplicate	One every 10 samples (minimum one per trial burn). Duplicate samples should be performed using different, but same size viscometers, if	RPD ≤10%	Flag the data.

		available.		
Ash	Laboratory Method Blank (LMB)	Every 20 samples or once per sample batch.	The result must be less than the RL. Exception: If all sample results are greater than 10x the blank concentration or less than the RL, do not reanalyze.	Return all of the samples to the muffle furnace and re-fire them. Re-weigh after cooling.
	Laboratory Control Sample (LCS)	Every 20 samples or once per sample batch.	90-110% recovery	Re-fire all associated samples and reanalyze if recovery exceeds upper limit. If recovery is less than lower limit, terminate analysis and reanalyze all associated samples.
	Laboratory Control Sample Duplicate	Every 20 samples or once per sample batch.	RPD ≤ 10 %	Re-fire all associated samples and reanalyze. If RPD value continues to exceed 10%, reanalyze all related samples.
	Laboratory Duplicate	Every 10 samples, once per sample batch. Once for each trial burn project.	RPD ≤ 10 % of mean value.	Flag data.
Total Chlorine	Method Blank	One per sample preparation batch of up to 20 samples.	The result should be less than or equal to the RL. Sample results greater than 20x the blank concentration or samples for which the contaminant is < RL do not require reprep.	Reprep and reanalyze samples.
	Laboratory Control Sample (LCS)	One per sample preparation batch of up to 20 samples.	80-120% Recovery	Reprep and/or reanalyze all samples associated with the LCS.
	Laboratory Duplicate	One per sample preparation batch of up to 10 samples. (Minimum one duplicate per trial burn)	RPD ≤ 10%	Flag the data if RPD > 10%.
	Matrix Spike	One per sample preparation batch of up to 20 samples. For trial burn samples, one per trial burn.	80-120% Recovery	Flag the data if % Recovery is outside QC acceptance limits
	Matrix Spike Duplicate	One per sample preparation batch of up to 20 samples. For trial	RPD ≤ 10%	Flag the data if RPD > 10%.

		burn samples, one per trial burn.		
Moisture – Percent Water for Liquids	Laboratory Control Sample (LCS)	One per sample preparation batch of up to 20 samples. For CfPT samples, one per CfPT.	95-105% Recovery	Flag data
	Laboratory Control Sample Duplicate (LCSD)	One per sample preparation batch of up to 20 samples. For CfPT samples, one per CfPT.	RPD ≤ 5%	Flag data
	Analytical Duplicate	One per sample preparation batch of up to 20 samples. For CfPT samples, one per CfPT.	RPD ≤10% for % water > 1%	Flag data
Moisture – Solids	Analytical Duplicate	One per sample preparation batch of up to 20 samples. For CfPT samples, one per CfPT.	RPD ≤ 25% or ≤ 4% Absolute for samples having < 18.0% moisture	Flag data

1 Analysis to be performed by TestAmerica Knoxville.

2 All specifications are laboratory specifications.

3 All corrective action will be noted on laboratory reports, and discussed in the QA/QC section of the final report.

10. Data Reduction, Validation, and Reporting

Details of data reduction, validation, and reporting are discussed in this section.

10.1 Calculations

The following sections detail the calculations which will be performed for data presentation.

The stack gas concentration of the parameters tested will be reported as the average of three test runs to document compliance. Stack gas concentration for a parameter may include analytical results for multiple components. For the determination of stack gas concentration measured in an individual sample, or run, for those sampling systems as applicable (other than SW-846 Method 0023A), the following convention will be used to sum the results of multiple analyses:

- In cases where all analytical results are hits (i.e., not “non-detects”), all analytical results will be summed.
- In cases where all analytical results are “non-detects,” all method detection limits will be summed, and the summed result reported as a maximum (“<”).
- In cases where one or more analytical results are hits, and one or more analytical results are “non-detects,” the hits and the “non-detects” will be summed and reported as a maximum (“<”).

Results for dioxins/furans will be converted to 2,3,7,8-tetrachlorodibenzo-dioxin toxicity equivalents (TEQ). Note that Section §1208(b)(1)(iii) of the HWC MACT states that non-detects of dioxins/furans can be assumed to be at zero concentrations.

In those circumstances where a constituent is not detected in a waste feed (i.e., is not analyzed above the method detection limit), the concentration of that parameter will be treated as zero "0" in subsequent calculations.

10.1.1 Stack Gas Mass Emission Rate Calculations

Mass emission rates (MERs) will be calculated for the following stack gas components:

- HCl and Cl_2;
- Metals; and
- Chromium VI.

The MERs, in pounds per hour, will be calculated as follows:

Where:

M_n = Mass of compound collected (µg);
Q_{sd} = Dry volumetric flowrate at standard conditions (dscfm);
V_d = Dry gas volume sampled at standard conditions (dscf);
60 = Conversion from hours to minutes;
454 = Conversion of grams to pounds; and
1,000,000 = conversion of µg to grams.

10.1.2 Constituent Feedrate Calculations

The concentrations of metals, ash, and chlorine will be determined in the waste feed streams in each test period. The total mass feedrates of metals and chlorine during each test period will be calculated from concentrations in the waste streams, and the feedrates of the waste streams recorded by the facility. The feedrate of ash to the afterburner will be calculated from the ash concentrations in the waste streams fed to the SCC, and the feedrates of the waste streams recorded by the facility.

10.1.3 Correction to 7% Oxygen

The emission limits of the HWC MACT are expressed in concentrations "corrected to 7% oxygen". Stack gas concentrations for dioxins and furans will be corrected to 7% oxygen using the concentration of oxygen measured by EPA Method 3A during the stack sampling for dioxins/furans. This correction is done according to the following equation:

Where:

P_c = Pollutant concentration corrected to 7% oxygen;

P_m = Pollutant concentration in the stack gas; and

Oxygen = Concentration of oxygen in the stack gas (in percent).

10.1.4 Stack Gas Volumetric Flowrate

The stack gas volumetric flowrate will be determined during all isokinetic sampling and calculated as described in EPA Reference Method 2.

Stack Gas Velocity Calculation

The velocity of the stack gases based on EPA Reference Method 2 will be calculated as:

Where:

V_S = Velocity of the stack gas (ft/sec);

ΔP = Root mean square average differential pressure measured by Type S pitot (in. H2O);

T_s = Average gas temperature in duct (R);

P_s = Absolute duct pressure (in. Hg);

M_w = Wet gas molecular weight (lb/lb-mole); and

C_p = Type-S pitot correction factor (normally 0.84).

Gas Volumetric Flowrate Calculation--Actual Conditions

The volumetric flowrate of the stack gas based on EPA Reference Method 2 will be calculated as:

Where:

Q_{ac} = Actual volumetric flowrate (acfm);

V_s = Velocity of the stack gas (ft/sec);

A = Cross-sectional area of the stack (ft^2); and

60 = Conversion from second to minutes.

Gas Volumetric Flowrate Calculation--Dry Standard Conditions

The volumetric flowrate of the stack gas at dry standard conditions based on EPA Reference Method 2 will be calculated as:

Where:

Q_{sd} = Dry volumetric flowrate at standard conditions (dscfm);

Q_{ac} = Actual volumetric flowrate (acfm);

B_w = Moisture fraction;

528 = Standard temperature (oR);

T_s = Average gas temperature in stack (oR);

29.92 = Standard pressure (in. Hg); and

P_s = Absolute stack pressure (in. Hg).

10.2 Data Validation

All measurement data will be validated based upon the following:

- Representative process conditions during sampling;
- Acceptable sample collection and testing procedures;
- Consistency with expected and/or other results; and
- Adherence to prescribed QC procedures.

This will be accomplished by making a critical, comparative data review. For example, upon the completion of a SW-846 Method 0023A sampling run, the data will be calculated, and the percent isokinetics determined. The results of all runs will be compared with each other for internal consistency. The laboratory personnel for analytical QA/QC will review the results from the analysis, and then the results (in analytical terms) converted into gas concentrations. These results are compared within the testing effort for reproducibility and consistency with engineering principles. Any suspect data will be flagged and identified with respect to the nature of the problem with validity.

10.3 Chain-of-Custody Documentation

Chain-of-custody procedures will be followed for the transfer of field samples to the laboratory. When samples are transported, they will be accompanied by a sample tracking and custody form indicating:

- Every sample shipped (by identifier);
- Sample preservation requirements;
- Analysis and preparation procedures required;
- Special requirements [e.g., matrix spikes/matrix spike duplicate (MS/MSD)];
- Sample packaging; and
- Signature of individual relinquishing sample custody.

Upon receipt by the laboratory, the following will be recorded on the sample tracking and custody form or an attachment to the form:

- Condition of samples received;
- Temperature of samples upon receipt;
- Any discrepancy between information on form and sample labels; and
- Signature of person receiving samples.

Following inspection and completion of chain-of-custody documentation, the samples will be moved to a restricted access storage area prior to analysis.

10.4 Reporting

The results of the CfPT/RCRA Periodic Test will be evaluated for completeness and representativeness and will include all collected data. The report will be submitted – a single report for the CfPT/RCRA Periodic Test - within 90 days after completion of the test. Data and results interpretation will be presented as necessary in the reports. A detailed case narrative will be provided in the final reports for each analysis.

A Notification of Compliance (NOC) will be filed within 90 days of completion of the CfPT. The NOC and the report will be submitted to TCEQ. Any data collected during the CfPT/RCRA Periodic Test that is used to document compliance or establish OPLs is qualified, those qualified data will be presented and discussed in the Test Report and NOC.

11. Assessment of Precision, Accuracy, and Completeness

The QC analyses to be conducted during the testing program are designed to provide a quantitative assessment of the measurement system data. The two aspects of data quality that are of primary concern are precision and accuracy. Accuracy reflects the degree to which the measured value represents the actual or "true" value for a given parameter and includes elements of both bias and precision. Precision is a measure of the variability associated with the measurement system. The completeness of the data will be evaluated based upon the number of valid sample results compared with the number planned.

11.1 Precision

Precision is defined by EPA as "a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions." For this project, precision estimates will be based on conditions that encompass as many components of variability as are feasible, which includes variability in the sample matrix itself, as well as imprecision in sample collection, preparation, and analysis. Precision data will be reported for matrix spike duplicates and analytical duplicate samples.

Selected surrogates will be spiked into samples analyzed by GC/MS. Precision for these analyses will be expressed as the percent coefficient of variation (CV) for surrogate spike recoveries. Percent CV (also known as relative standard deviation (RSD)) is calculated as follows:

$$\%CV = \frac{\text{Standard Deviation}}{\text{Mean}} \times 100$$

11.2 Accuracy

Accuracy, according to EPA's definition is "the degree of agreement of a measurement (or an average of measurements of the same thing), X, with an accepted reference or true value, T." Accuracy includes components of both bias (systematic error) and imprecision (random error). Bias may be estimated from the average of a set of individual accuracy measurements.

For this project, accuracy objectives are expressed in terms of individual measurements. Individual measurements will be compared with the objectives presented in Section 3.0 of this QAPjP. In the final analysis, the average accuracy (i.e., bias) calculated as percent recovery, will be reported and used to assess the impact on project objectives. Percent recovery is calculated as follows:

In the case of matrix spiked samples, measured value in the above equation represents the difference between the spiked sample measurement result and the unspiked sample results. The reference value represents the amount of spike added to the sample.

Consistent with reporting conventions for continuous monitor performance specifications, accuracy will be expressed in terms of percent error, which is directly related to the percent recovery calculation. Percent error is calculated as follows:

It follows that percent recovery and percent error are related by:

11.3 Completeness

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 primarily in terms of the number of valid sample results collected compared with the number planned.

12. Audit Procedures, Corrective Action and QA Reporting

This section describes planned general corrective action procedures to be taken in response to identified problems and QA reporting.

12.1 Audit Procedures

Eurofins TestAmerica Laboratories in Knoxville, TN will be performing the analyses for the CfPT/RCRA Periodic Test, and will perform the quality control analyses, and the analysis of any audit samples. The U.S. EPA has instituted an audit program, the SSAP (Stationary Source Audit Program), in which the owner firm or test contractor purchases audit samples from laboratories approved by, and accredited by, the EPA to provide the audit samples. The EPA restructured program requires that two accredited providers be available, and available audit samples must be listed on the EPA Emission Measurement Center website 60 days before audits are required. To date, the EPA has approved two vendors to provide audit samples as an Accredited Audit Sample Provider for metals and hydrogen chloride, but not for dioxins/furans.

The following audit sample is applicable to the CfPT of Veolia's incinerator. Audit samples are not mandated by TCEQ for the RCRA Periodic Test.

- Dioxins and Furans

If audit samples for dioxins and furans are available prior to the CfPT/RCRA Periodic Test, audit samples will be acquired. The acquired audit samples would be taken to Veolia Port Arthur and would be onsite during the conduct of the CfPT/RCRA Periodic Test. The audit samples would be transported to Eurofins TestAmerica – Knoxville with samples collected during the test. Any audit samples would be analyzed by Eurofins TestAmerica – Knoxville along with the samples from the test.

12.2 Corrective Action

During the course of the test program, it will be the responsibility of the field task leader and the sampling team members to see that all measurement procedures are followed as specified and that measurement data meet the prescribed acceptance criteria. In the event a problem arises, prompt action will be taken to correct the problem. Corrective action may also be initiated by the QA Coordinator or team members.

The laboratory supervisors will initiate corrective action if analytical performance (as determined by sample matrix-independent QC checks) does not meet method specifications. Since these QC checks generally occur before analysis of any samples, little or no effect would be expected on project data quality. If there was an impact expected on actual project data, the project director and QA/QC coordinator would be contacted and the problem resolved. If matrix-specific QC checks indicate that the measurement data will not meet the quality assurance objectives, the project director will be notified immediately. The project manager, laboratory analytical coordinator, and project QA/QC coordinator will then meet and resolve the issue.

The impact of measurement bias or matrix effects on the project objectives (and any endeavors to mitigate these problems) will be assessed and reported in the report.

12.3 Quality Assurance Reporting

Effective management of a field sampling and analytical effort requires timely assessment and review of field activities. This will require effective interaction and feedback between the field team leader, the Project Manager, and the QA Coordinator.

The project final report will include a separate QA/QC section that will address QA/QC aspects of the project. The QA/QC section will address the results of all QA/QC activities specified in the QAPjP and in the sampling and analytical methods, and will compare those results with the data quality objectives (DQOs) stated in Section 3.0 of this QAPjP. The effect of any DQOs (or other QA/QC activities) not achieved will be discussed in detail. The effect of these on the data and conclusions will also be discussed in detail. Any incidents or requirements for corrective action will be documented and discussed.

Appendix A

SOP for Liquid and Sludge Waste Sampling

SAMPLING INSTRUCTIONS
Liquid and Sludge Waste Feeds

1.0 BACKGROUND

These instructions are for sampling the Liquid and Sludge Waste Feeds.

The referenced sampling method is Method S004 in EPA's "Sampling and Analysis Methods for Hazardous Waste Incineration".

2.0 SAFETY

The liquid and sludge waste feeds are hazardous. Personal protection equipment (PPE) for this location consists of a hard hat, goggles, steel-toed boots, respirator, Tyvek suit, and appropriate gloves.

3.0 SUPPLIES: TO BE STORED AT THE SAMPLING AREA FOR EACH RUN

1 – Pre-cleaned 125-mL wide-mouth amber glass bottle
1 – Pre-cleaned 1-gallon wide-mouth glass jar
1 – Data sheet
1 – Clipboard
2 – Black ballpoint pens
1 – Sample tray
1 – Watch/Timer
1 – Heavy plastic sheeting (10')
1 – Absorbent towels (roll)
1 – 5-gallon bucket

4.0 SAMPLING PREPARATIONS

1. Obtain supplies.
2. Transport sampling materials to sample location.
3. Check sampling location to ensure that the data sheet, sampling location and sample containers are correctly marked, and labels for the samples. All data sheet and sample containers will be labeled by the sampler.
4. Spread plastic sheeting under the sample tap and the immediate work area with absorbent pads along the edge.
5. Place sample tray near the sample tap on the plastic sheeting.
6. Place the 5-gallon plastic bucket under the sample tap.
7. Mark the 125-mL bottle for about 100-mL.
8. Organize the sampling location and verify that you have the proper tools and documentation paperwork.
9. Legibly record sampler's name and date on the data sheet.

5.0 SAMPLING PROCEDURE

When directed by project coordinator, do the following activities at 30-minute intervals until directed to stop sampling.

1. Locate the sample tap and verify that the sample tap valve is placed in the "off" position.
2. Locate the flow control valve and verify that it is in the "on" position.

3. Verify that the 5-gallon bucket is under the sample tap, and then open the sample tap until a full stream of liquid is flowing into the bucket to flush the sample line. The stream should not be so fast as to be uncontrollable nor so slow as to not flush the sample line. Fill the 50-mL bottle and dump the collected liquid in the 5-gallon bucket.
4. Collect about 100-mL into the 125-mL bottle, shut off the sample valve, and pour the contents into the 1-gallon jar.
5. Record sample time and test run number on data sheet.
6. Cap the 1-gallon jar. It is important that the time the jar is open to the atmosphere be kept to a minimum.
7. Place the 125-mL bottle in sample tray and wait for the next sample period.

(NOTE: If at any time during the sampling event you observe changes in the stream, contact the project coordinator immediately. Examples of changes in the streams are loss of flow, color changes of the material being collected, plugging of the sample lines, etc.)

6.0 COMPLETION OF SAMPLING, CLEAN-UP, SAMPLE CUSTODY

At the end of the sampling period, upon direction, perform the following activities.

1. Verify that the data sheet has been completed.
2. Verify that the 1-gallon jar is capped.
3. Locate the valve that controls flow to the sample tap and place in the “off” position.
4. Open the sample tap valve and drain the line into the 5-gallon bucket, then close the valve.
5. Carefully transport the 5-gallon bucket containing the waste liquid to designated disposal drum and transfer the contents.
6. Return the bucket to the sampling location.
7. Clean up the sample location by folding the plastic sheeting as to contain any spilled material and absorbent pads, and dispose appropriately.
8. Remove all disposable PPE and dispose appropriately.
9. Return the 1-gallon bottle and the data sheets to the sample accumulation area.

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