APPENDIX A

QUALITY ASSURANCE PROJECT PLAN

TRAIN I INCINERATOR SYSTEM

TSCA TRIAL BURN

CLEAN HARBORS DEER PARK, LLC

PREPARED FOR:

CLEAN HARBORS ENVIRONMENTAL SERVICES, INC.
CLEAN HARBORS DEER PARK, LLC (CHDP)
2027 INDEPENDENCE PKWY SOUTH
LA PORTE, TX 77571

REVISION: 1
FEBRUARY 2026
FOCUS PROJECT NO. P-001616

FOCUS ENVIRONMENTAL INC.
4700 PAPERMILL DRIVE
KNOXVILLE, TENNESSEE 37909
(865) 694-7517
http://www.focusenv.com

1.0 QUALITY ASSURANCE PROJECT PLAN APPROVAL FORM AND DISTRIBUTION LIST

Project Title: TRAIN I INCINERATOR SYSTEM
TSCA TRIAL BURN
CLEAN HARBORS DEER PARK, LLC
LAPORTE, TEXAS

Expected Test Date: May 2026 (Concurrent with HWC MACT CPT)

CLEAN HARBORS DEER PARK, LLC APPROVALS

_____	_____
William L. Simmons, Facility Manager	Date
_____	_____
Randolph Jackson, CHDP Laboratory Manager / CHDP Laboratory QA/QC Manager	Date
_____	_____
Marc Poppe, CHDP Senior Compliance Manager	Date

CPT PROJECT MANAGER

_____	_____
Chris McBride, Focus Environmental, Inc.	Date

QAPP Approval Statement: The individuals listed above:

1) Have received, read, and agreed to the appropriate information pertaining to assigned project responsibilities listed and provided in this QAPP, and

2) Agree that no testing methods will be modified. If modifications do occur to any sampling and analytical methods as specified in the associated CPT plan, they are to be identified and explained in the sampling and analytical narratives, and discussed in the body of the test report. Modifications to the test program specified sampling or analytical methods must be approved by EPA Region 6.

STACK TEST COMPANY APPROVALS (ALLIANCE TECHNICAL GROUP)

_____ _____

TBD, Project Manager Date

QAPP Approval Statement: The individuals listed above:

1) Have received, read, and agreed to the appropriate information pertaining to assigned project responsibilities listed and provided in this QAPP, and

2) Agree that no testing methods will be modified. If modifications do occur to any sampling and analytical methods as specified in the associated CPT plan, they are to be identified and explained in the sampling and analytical narratives, and discussed in the body of the test report. Modifications to the test program specified sampling or analytical methods must be approved by EPA Region 6.

STACK GAS ANALYSIS LABORATORY APPROVAL

(EUROFINS ENVIRONMENT TESTING AMERICA)

_____ _____

Courtney Adkins, Laboratory Project Manager Date

QAPP Approval Statement: The individuals listed above:

1) Have received, read, and agreed to the appropriate information pertaining to assigned project responsibilities listed and provided in this QAPP, and

2) Agree that no testing methods will be modified. If modifications do occur to any sampling and analytical methods as specified in the associated CPT plan, they are to be identified and explained in the sampling and analytical narratives, and discussed in the body of the test report. Modifications to the test program specified sampling or analytical methods must be approved by EPA Region 6.

QUALITY ASSURANCE OFFICER

_____ _____

Teresa Bales, Focus Environmental, Inc. Date

QAPP Approval Statement: The individuals listed above:

1) Have received, read, and agreed to the appropriate information pertaining to assigned project responsibilities listed and provided in this QAPP, and

2) Agree that no testing methods will be modified. If modifications do occur to any sampling and analytical methods as specified in the associated CPT plan, they are to be identified and explained in the sampling and analytical narratives, and discussed in the body of the test report. Modifications to the test program specified sampling or analytical methods must be approved by EPA Region 6.

QAPP Distribution List

Project Organization Title	Organization/Name	No. of Copies
CHDP Project Manager	Clean Harbors Deer Park, LLC	1
CHDP Laboratory Manager/ QA/QC Manager	Clean Harbors Deer Park, LLC	1
CPT Project Manager	Focus Environmental, Inc.	1
Stack Sampling Coordinator	Alliance Technical Group	1
Laboratory Project Manager	Eurofins Environment Testing	1
Quality Assurance Officer	Focus Environmental, Inc.	1
EPA Region 6	RCRA Permits & Solid Waste Section	1
Texas Commission on Environmental Quality	TCEQ, Industrial and Hazardous Waste Permits Section	1

QAPP Distribution Contact Information

Name/Project/Title/Organization	Phone/Email
Marc PoppeCHDP Senior Environmental Compliance Manager Clean Harbors Deer Park LLC	281-930-2412 poppe.marc@cleanharbors.com
Randolph Jackson CHDP Laboratory Manager/ CHDP Laboratory QA/QC Manager Clean Harbors Deer Park LLC	281-930-2363 Jackson.randolph@cleanharbors.com
Chris McBride CPT Project Manager Focus Environmental, Inc.	(865) 271-7776 cemcbride@focusenv.com
TBD Stack Test Company Project Manager Alliance Technical Group	TBD
Teresa Bales Quality Assurance Officer Focus Environmental, Inc.	Teresa Bales (865) 591-4141 teribales@gmail.com
Courtney Adkins Laboratory Project Manager Eurofins Environment Testing	(865) 291-3019 Courtney.Adkins@ET.EurofinsUS.com
Sunita Baniya RCRA Permits & Solid Waste Section (6LCR-RP) Land, Chemical, & Redevelopment Division EPA Region 6	(214)-665-7121 baniya.sunita@epa.gov
Industrial and Hazardous Waste Permits Section Texas Commission of Environmental Quality	(512) 239-2335

2.0 TABLE OF CONTENTS

LIST OF ATTACHMENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing Materials
B.P.	boiling point
CAR	corrective action request
CCB	continuing calibration blank
CCC	calibration check compound
CCV	continuing calibration verification
CEM	continuous emissions monitor
CEMS	continuous emissions monitoring system
CF	calibration factor
cfm	cubic feet per minute
CFR	Code of Federal Regulations
Cl_2	molecular chlorine
CLP	Contract Laboratory Program
CO	carbon monoxide
CMS	continuous monitoring system
COC	chain of custody
DF	polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran
DI	deionized (water)
DOT	U.S. Department of Transportation
DQO	data quality objective
DRE	destruction and removal efficiency
dscf	dry standard cubic foot
dscfm	dry standard cubic feet per minute
dscm	dry standard cubic meter
dscmm	dry standard cubic meters per minute
EDL	estimated detection limit
EPA	U.S. Environmental Protection Agency
GC	gas chromatography
GC/ECD	gas chromatography/electron capture detector
GC/FID	gas chromatography/flame ionization detector
GC/MS	gas chromatography/mass spectrometry
g	grams
gr	grains
HCl	hydrogen chloride (gas) or hydrochloric acid (aqueous)
HRGC/HRMS	high resolution gas chromatography/ high resolution mass spectrometry
IATA	International Air Transport Association
ICB	initial calibration blank
Cl^-	chloride ion
ICV	initial calibration verification
IDL	instrument detection limit
inwc	inches water column
kg	kilograms
L	liter

lpm	liters per minute
lb or lbs	pounds
LCS	laboratory control standard
LCSD	laboratory control standard duplicate
m^3/min	cubic meters per minute
MDL	method detection limit
mg	milligrams
mg/L or mg/l	milligrams/liter
µg or ug	micrograms
µg/m^3 or ug/m^3	micrograms/cubic meter
min	minute
mL or ml	milliliters
mm	millimeters
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
NaOH	sodium hydroxide
ND	non-detect
NELAP	National Environmental Laboratory Accreditation Program
ηg or ng	nanograms
non-Hg	non-mercury
O_2	oxygen
OCl^-	hypochlorite
OSW	EPA Office of Solid Waste
OTS	Office of Toxic Substances
PCDD	polychlorinated dibenzo-p-dioxin
PCDF	polychlorinated dibenzofuran
PCB	polychlorinated biphenyl
PDS	post-digestion spike
PE	performance evaluation
pg	picograms
PIC	product of incomplete combustion
PID	product of incomplete destruction
PM	particulate matter
ppm	parts per million
ppmv or ppmdv	parts per million dry volume
QA	quality assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	quality control
RCl	total chlorinated organic content
RDL	reliable detection limit
RF	response factor

RFA	request for analysis
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RRT	relative retention time
RSD	relative standard deviation
RT	retention time
SPCC	system performance check
SOP	standard operating procedure
SRE	system removal efficiency
SQL	sample quantitation limit
SVOC	semi-volatile organic compound
SW-846	"Test Methods for Evaluating Solid Wastes Physical/Chemical Methods (SW-846)," Third Edition, 1986 and updates (December 1997).
TCL	target compound list
TSCA	Toxic Substances Control Act
wc	water column
WM	wide-mouth
VOA	volatile organic analysis
VOC	volatile organic compound
SMVOC	volatile organic sampling train

3.0 PROJECT DESCRIPTION

3.1 GENERAL

This Quality Assurance Project Plan (QAPP) is an integral part of the Clean Harbors Deer Park, LLC (CHDP) Train I Incinerator System Toxic Substances Control Act (TSCA) Trial Burn Plan (TBP), and must be used in conjunction with this plan. This section provides a brief description of the test objectives, the unit operating protocol, the associated sampling and analytical protocol, and how they relate to testing of Train I. Refer to the TBP for more detailed information on the scope of the testing.

3.2 QUALITY ASSURANCE PROJECT PLAN SCOPE

This QAPP presents the organization, objectives, functional activities, and specific Quality Assurance (QA) and Quality Control (QC) activities for test data collection. This QAPP also describes the specific QA/QC protocols that will be followed for sampling, sample handling and storage, chain-of-custody, and laboratory analysis during the test program.

All QA/QC procedures will be in accordance with applicable professional technical standards, government regulations and guidelines, and specific project goals and requirements. The TBP and this associated QAPP have been prepared in accordance with EPA hazardous waste thermal treatment system testing and QAPP guidance documents, in particular the following:

- EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5 EPA/240/B-01/003), March 2001
- Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans (QAMS-005/80)
- Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration, EPA/625/6-89/023, January 1990.
- EPA, "New Source Performance Standards, Test Methods and Procedures," Appendix A, 40 CFR 60.
- EPA, "Test Methods for Evaluating Solid Wastes Physical/Chemical Methods (SW-846)", Third Edition, 1986 and updates.

3.3 FACILITY BACKGROUND INFORMATION

Clean Harbors Deer Park LLC (CHDP) operates a commercial hazardous waste incineration facility located in LaPorte, Texas. CHDP operates two incinerator systems at this facility, Train I and Train II. Train I is permitted under the Toxic Substances Control Act (TSCA) to treat polychlorinated biphenyl (PCB) wastes. Environmental Protection Agency (EPA) Region 6 is requiring TSCA compliance testing to be performed to reauthorize Train I to treat PCB-bearing materials. CHDP plans to perform this testing concurrent with the comprehensive performance test (CPT) to demonstrate compliance with the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Hazardous Waste Combustors (HWC), a.k.a., HWC Maximum

Achievable Control Technology MACT rule [40 CFR Part 63, Subpart EEE]. The CPT is required by May 2026. The CPT Plan is submitted separately to the Texas Commission on Environmental Quality (TCEQ) and is pending review and approval. Where HWC MACT CPT and TSCA required sampling and analyses overlap, CHDP will use the concurrent test data to demonstrate compliance with both programs, e.g., Method 23 dioxin/furan emissions measured for HWC NESHAP compliance will also be used for TSCA reauthorization.

3.4 UNIT CONFIGURATION AND GENERAL OPERATION

Train I includes a rotary kiln, 3.6 meters in diameter, routinely referred to as the "3.6". The kiln is refractory-lined and equipped with a solid feed chute, a combination liquid/gas burner, a sludge feed port, and a gas vent port. Inert solids exit the kiln in the form of slag, dropping into a water bath "deslagger." Hot gases exit the drop-out chamber through refractory lined duct, to the afterburner chamber (ABC).

The Loddby liquid waste burner is the primary heat source for the Train I ABC. The Loddby is a horizontal burner for liquid wastes, natural gas and fuel / used oil. The small eductor and cylinder processing systems feed into the ABC. Finally, the ABC has connections for injection of two separate aqueous (low BTU) liquid waste feeds.

The combined hot gases exit the ABC through a vertical duct that turns down to enter the rapid quench or saturator. The rapid quench cools these hot exhaust gases to the point of adiabatic saturation, typically less than 190^{o}F. Combustion gas quenching is by evaporating water into the gases, and doing so in a co-current configuration that minimizes dioxin/furan formation.

The cooled gases then enter two parallel condensers, which use recirculating cooling water to remove heat from the gases. The parallel condensers begin the scrubbing process for all contaminants, and thoroughly remove HCl formed from combustion of chlorinated organics. The scrubbing water is cooled and neutralized before being recirculated. Next, the gases enter the Calvert collision scrubber, a venturi scrubber that conditions the gas for treatment in the wet electrostatic precipitators (WESPs). The Calvert scrubber uses water, which is recirculated within that system alone. This system blows down into the main water treatment system discussed below. Two WESPs in-series remove fine particulate matter (PM) and metals from the combustion gases.

An induced draft (ID) fan pulls the combustion gas flow through the system. The gases then flow through the selective catalytic reduction (SCR) nitrogen oxides (NO_X) control system. The gases then flow out the stack, from which they are sampled by the continuous emissions monitoring system (CEMS) for carbon monoxide (CO), carbon dioxide (CO_2), total hydrocarbons (THC), oxygen (O_2), and moisture.

3.5 TEST OPERATING AND SAMPLING PROTOCOLS

The CPT is planned as two (2) operating conditions: 1) 2-WESP operation and 2) 1-WESP operation. The TSCA compliance testing will be conducted concurrently during the 2-WESP operating condition. This test condition will be performed to demonstrate worst-case operation of the combustion and emissions control system operation for DRE performance, and dioxin/furan, particulate, HCl/Cl_2, and regulated metals emissions. The current HWC MACT 2-WESP operating parameter limits (OPLs) and test target operating conditions are summarized in Table 3-1.

3.6 TSCA SAMPLING AND ANALYTICAL PROTOCOLS

Table 3-2 summarizes the TSCA compliance emissions sampling and analysis. This sampling and analysis will be integrated with the CPT program sampling and analyses as delineated in the footnotes to Table 3-2.

The Train I CPT program already includes sampling for the following:

- PCDD/PCDF and PCB via EPA Method 23
- Particulate and HCl/Cl2 via EPA Method 5/26A
- Vinyl Chloride via SW-846 Method 0031
- CO, CO_2, O_2, and NO_X via CEMS.

To collect the additional TSCA required emissions data and demonstrate DRE, the following are being expanded or added:

- Expanding the target analyte list for SMVOC to include VOC RCIs
- Adding SW-846 Method 0010 sampling for the DRE POHC ODCB and SVOC RCIs
- Adding Method 5/202 for total particulate emissions.

This QAPP focuses on the QA/QC associated with the TSCA emissions data collection.

The TBP proposes using ortho-dichlorobenzene (1,2-DCB or ODCB) as a surrogate POHC for PCB. The selection justification is presented in the TBP.

Table 3-1. Train I 2-WESP Mode Test Target Operating Conditions

Operating Parameter	Units	Current HWC Limit 2-WESP Operation	CPT Target Range	Avg. Period
Total Kiln Waste	lb/hr	20,666	21,000-22,000	Maximum HRA
Total ABC Waste	lb/hr	16,848	16,800-18,000	Maximum HRA
Total Pumpable Feed	lb/hr	23,025	23,000-24,000	Maximum HRA
Total ODCB and PCB Feed Rate	lb/hr	3,057 (current TSCA authorization)	3,000	Test Run Average
Ash Feed	lb/hr	10,961	10,000 -13,000	Maximum 12-HRA
Chlorine/Chloride Feed	lb/hr	5,261	4,500 -5,500	Maximum 12-HRA
Mercury (Hg)	lb/hr	0.136	0.05 -0.06 (2)	Maximum 12-HRA
Total SVM (Pb, Cd)	lb/hr	69.2	35-45 (2)	Maximum 12-HRA
Total LVM (As, Be, Cr) Feed	lb/hr	79.7	25 -30 (2)	Maximum 12-HRA
Pumpable LVM (As, Be, Cr) Feed	lb/hr	76.1	25 -30 (2)	Maximum 12-HRA
Kiln Temperature	deg F	1,672	1,650-1,750	Minimum HRA
ABC Temperature	deg F	1,882	1,830-1,930	Minimum HRA
Stack Flow	dscfm	48,634	48,000 –50,000	Maximum HRA
THC	ppmv @ 7%O_2	10	<10	Maximum HRA
CO (1)	ppmv @ 7%O_2	100 (1)	NA (1)	Maximum HRA
Combustion Chamber Pressure	Alternative Monitoring Approved			
Condenser (Scrubber) Liquid Flow	gpm	3,396 gpm	3,450 – 3,600	Minimum HRA
Condenser Inlet pH	SU	5.6 SU	5.5. – 6.0	Minimum HRA
Calvert Scrubber dP	inwc	33 inwc	30 -35	Minimum HRA
Calvert Scrubber flow	gpm	151	110 -300	Minimum HRA
Calvert Scrubber Blowdown	gpm	175	120 – 200	Minimum HRA
Calvert Scrubber Tank Level	%	23.0%	20-25%	Minimum HRA
WESP 1 Power	On/Off	On	0.5	Minimum HRA
WESP 2 Power	kVA	6.6	6.0-8.0	Minimum HRA

Table 3-2. Train I 2-WESP Minimum Temperature DRE Test TSCA Emissions Sampling and Analysis

Sample Name	Sampling Location/ Access	Sampling Equipment	Sampling Reference Method [a]	Sample Size/Frequency	Analytical Parameters	Analytical Reference Method [a]
Stack Gas	Isokinetic Port	Method 23 Sampling Train	EPA Method 23[d]	Minimum of 3 hours and 2.5 dry standard cubic meters [b,c]	Dioxin/Furan PCB	EPA Method 23/SW846-8290 (Dioxin/Furan) EPA Method 23/EPA Method 1668C (PCB)
Stack Gas	Isokinetic Port	Method 0010 Sampling Train	SW846 0010	Minimum of 3.0 dry standard cubic meters [b,c]	ODCB Semivolatile Organic RCIs	SW846 3542/8270E with Selected Ion Monitoring (SIM) (ODCB) SW846 3542/8270E (SVOC RCIs)
Stack Gas	Non-Isokinetic Port	SMVOC	SW846 0031 (SMVOC)[e]	80 L integrated sample; 0.5 to 1.0 L/min, four tube sets, 20 L per Tube set	Volatile Organic RCIs	SW846 5041A/8260D
Stack Gas	Isokinetic Port	Method 26A	EPA Method 26A[f]	120 minutes [b,c]	HCl/Cl_2	EPA Method 26A/SW-846 Method 9056A
Stack Gas	Isokinetic Port	Method 5/202	EPA Method 5/202	120 minutes [b,c]	Total Particulate (Filterable + Condensable)	EPA Method 5 (Filterable Particulate) EPA Method 202 (Condensable Particulate)
Stack Gas	CEMS Port	Installed CO and O_2 CEMS	40 CFR 60 Appendix B Specification 4B[g]	Continuous	CO and O_2	40 CFR 60 Appendix B Specification 4B
Stack Gas	CEMS Port	Installed CO_2 CEMS	40 CFR 60 Appendix B Specification 4B	Continuous	CO_2	40 CFR 60 Appendix B Specification 3
Stack Gas	Non-Isokinetic Port	Temporary NO_X CEMS	EPA Method 7E[h]	Continuous	NO_X	40 CFR 60 Appendix A Method 7E

Table 3-2. Train I 2-WESP Minimum Temperature DRE Test TSCA Emissions Sampling and Analysis

Sample Name	Sampling Location/ Access	Sampling Equipment	Sampling Reference Method [a]	Sample Size/Frequency	Analytical Parameters	Analytical Reference Method [a]
Repackaged Containerized Solid TSCA Waste Feeds[i]	Solids Bin	Sampling scoop or thief scoop/rod and glass sample jar	Minimum of five (5) grab samples taken from the each bin being used for the repackaging.	Single analysis of composite created from five (5) grab samples taken from each solids bin	PCB	SW846 8082A
Bulk Solid TSCA Waste Feeds[i]	Solids Bin	Sampling scoop or thief scoop/rod and glass sample jar	Minimum of five (5) grab samples taken from each bin transferred into bulk solids feed tank	Single analysis of composite created from five (5) grab samples taken from solids bin	PCB	SW846 8082A
Bulk Liquid TSCA Waste Feeds	Tap on Feed Line	Glass grab and compositing sample bottles	Collect equal volume grab samples during each test run and use to build composite for each test run.	Grab samples every hour during each test run used to build run composite sample. Samples for analysis prepared from the homogenized composite sample at end of each test run.	PCB	SW846 8082A
Direct Burn Tanker Liquid TSCA Waste Feeds	Tap on tanker discharge line or from manhole access using thief sampler	Glass grab sample bottle	Collect single grab sample of each tanker per the facility FAP/WAP for analysis prior to feeding	Collect single grab sample of each tanker per the facility FAP/WAP for analysis prior to feeding	PCB	SW846 8082A

Table 3-2. Train I 2-WESP Minimum Temperature DRE Test TSCA Emissions Sampling and Analysis

Notes:

(a) Reference Method Sources:

- "ASTM" refers to American Society for Testing Materials, Annual Book of ASTM Standards, Annual Series
- "SW846" refers to Test Methods for Evaluating Solid Waste, Third Edition, November 1986, and Updates.
- "EPA Method" refers to New Source Performance Standards, Test Methods and Procedures, Appendix A, 40 CFR 60.

(b)The exact volume of gas sampled will depend on the isokinetic sampling rate.

(c) Isokinetic sampling trains include:

- Collecting one set of bag samples (or using CEM) for oxygen and carbon dioxide to determine stack gas molecular weight (EPA Method 3)
- Performing stack gas velocity, pressure and temperature profile measurement for each sampling location (EPA Method 2)
- Determining the moisture content of the stack gas for each sampling train sample (EPA Method 4).

(d) Method 23 sampling train is being performed concurrently for demonstrating HWC MACT dioxin/furan emissions compliance and Air Permit PCB emissions compliance.

(e) Method 0031 sampling is being performed concurrently for demonstrating Air Permit vinyl chloride emissions compliance.

(f) Method 26A sampling is being performed concurrently for demonstrating HWC MACT HCl/Cl_2 and filterable PM emissions compliance.

(g) CO and O_2 emissions sampling is being performed concurrently for demonstrating HWC MACT CO emissions compliance.

(h) Method 7E sampling is being performed concurrently for demonstrating Air Permit NO_X emissions compliance.

(i) TSCA solids are typically received and handled as containerized materials. For health and safety reasons, containerized TSCA solids are not normally opened or repackaged. In these cases, the containers will not be opened or sampled by CHDP; the customer provided information related to PCB content will be utilized.

4.0 PERSONNEL, RESPONSIBILITIES, AND QUALIFICATIONS

4.1 GENERAL

This project will be conducted by CHDP in coordination with Focus Environmental, Inc. (Focus) and Alliance Technical Group (Alliance) utilizing a project team consisting of personnel experienced in the testing of hazardous waste incinerators. Alliance will be responsible for all stack sampling and their subcontracted laboratory. Eurofins Environment Testing (Eurofins) will perform all stack gas sample analyses. The project organization and lines of responsibility are shown in Figures 4-1 and 4-2.

4.2 FACILITY MANAGER

The Facility Manager is responsible for the overall management of the incinerator operation and waste feed preparation. The Train I supervisor designated by and reporting to the Facility Manager and CHDP facility employees will perform the detailed activities. The designated team will be responsible for all plant operations aspects of the CPT including the following:

- Preparing the incineration system for the CPT
- Attend pre-test meeting and designate other CHDP supervisors to attend pre-test meeting
- Preparing waste feed materials for the CPT
- Coordinating the feed of spiking materials for the CPT
- Operating the incineration system at the planned test conditions; manager on site during all testing activities.
- Providing all of the incinerator process data as required by the CPT Plan (CPTP)
- Coordinating incinerator operation with the test team activities through communication with the CPT Manager.

4.3 COMPREHENSIVE PERFORMANCE TEST MANAGER

The CPT Manager will be responsible for the on-site implementation and coordination of all aspects of the CPT. Responsibilities during the project will be as follows:

- Preparation of the CPTP
- Final planning and implementation of the CPTP
- Lead the pre-test meeting
- Coordinating the incinerator operations and test activities with facility operators and the test team
- Monitoring incinerator operations to verify conformance with the CPTP objectives
- Acting as the focal point for communications between the test team, facility personnel, and regulatory observers during the execution of the CPT program
- Deciding when a sampling run will be started, interrupted, resumed, or completed

- Preparation of the Final CPT Report; if there are any invalid or unusable data, these data will be identified and included in the Executive Summary, Summary Tables, and in the main CPT report
- Preparation of the Notification of Compliance (NOC).

4.4 STACK SAMPLING COMPANY PROJECT MANAGER

The Stack Sampling Company Project Manager will be responsible for the following:

- Attend pre-test meeting or send designated on-site coordinator to attend pre-test meeting
- Coordinating the stack test team activities in accordance with the CPTP - on site during the testing
- Providing a report of compliance on stack sampling activities with the CPTP to be included in the CPT report; if there is any invalid or unusable data, these data will be identified and included in the stack test report.
- Monitoring stack sampling operations to verify conformance with the CPTP
- Preparation and issuance of the stack sampling report
- Implementing or delegating the responsibility of the implementation of the QAPP
- Assignment of experienced stack sampling coordinator
- Submitting certified QC and sample analysis results to the CPT Manager.

For all analyses requested for this test program

- Archiving storage of sampling and analytical data
- Preparing a complete emissions sampling report for inclusion in the CPT report.

4.5 ON-SITE STACK SAMPLING COORDINATOR

The On-site Stack Sampling Coordinator will report to the CPT Stack Sampling Project Manager and CPT Manager, and will have lines of communication to the QA Officer. Responsibilities will be as follows:

- Working with site personnel to obtain stack sampling locations and platform facilities that are appropriate for the planned stack sampling activities
- Attend pre-test meeting
- Directing stack sampling activities during the CPT - onsite during the testing
- Coordinating stack sample beginning and ending times with the CPT Manager
- Notifying the CPT Manager of any interruptions in the stack sampling activities and recommending corrective actions, if necessary
- Recording field test data required by the CPTP
- Recording and transferring all CPT and QC samples to the laboratory manager or a designee
- Coordinating specialized field sampling documentation, such as request for analysis (RFA) forms and sample collection sheets

- Initiating chain-of-custody (COC) records for stack samples
- Receiving, verifying, and documenting that incoming stack samples correspond to the COC
- Maintaining records of incoming stack samples
- Tracking stack samples through processing, analysis, and disposal
- Preparing project-specific QC samples for analysis during the project.

The Onsite Stack Sampling Coordinator will also be responsible either directly or through delegation to appropriate stack team personnel for the following:

- Preparing and shipping sampling equipment, chemicals reagents, and containers to the test site
- Assigning and recording field sample numbers
- Participating, as appropriate, in air sampling activities
- Overseeing sample preservation in the field
- Documenting field sample activities in a field logbook
- Preparing air samples for shipment to the laboratory
- Carrying out assigned QA duties.

4.6 STACK SAMPLING AND ANALYTICAL QUALITY ASSURANCE OFFICER

The Stack Sampling and Analytical QA Officer for will be responsible during the project for the following:

- Assisting in the preparation and implementation of the QAPP
- Verifying that laboratory QC and analytical procedures are being followed as specified in this QAPP
- Reviewing QC and sampling data and determining if additional samples or repeat analyses are needed; if there is any invalid or unusable data, these data will be identified in the laboratory reports and case narratives.
- Providing independent data review, both operational and analytical
- Verifying that appropriate corrective actions are taken if any problems occur
- Reporting and discussing QA/QC activities, data, and results for inclusion in the CPT report.

4.7 WASTE FEED SAMPLING TEAM

The CHDP Waste Feed Sampling Team (employees of CHDP) will report to the CHDP Laboratory Manager.

The Waste Feed Sampling Team responsibilities will be as follows:

- Working with site personnel to obtain sampling locations that are appropriate for the planned waste feed sampling activities
- Attend pre-test meeting
- Directing feed sampling activities during the CPT - will be on site during all testing activities
- Coordinating waste sample beginning and ending times with the CPT Manager

- Notifying the CPT Manager of any interruptions in the waste sampling activities and recommending corrective actions, if necessary
- Recording field test data required by the CPTP
- Recording and transferring all CPT and QC waste samples to the Laboratory Analytical Coordinator or a designee
- Assigning and recording field sample numbers
- Participating, as appropriate, in feed sampling activities.

4.8 LABORATORY WASTE SAMPLE ANALYSIS MANAGER

The Laboratory Waste Sample Analysis Manager (employee of CHDP) or designee will be on-site at the facility laboratory during all testing activities. Responsibilities will be as follows:

- Coordinating specialized waste sampling documentation, such as request for analysis (RFA) forms and sample collection sheets
- Attend pre-test meeting
- Initiating chain-of-custody (COC) records for waste samples
- Receiving, verifying, and documenting that incoming waste samples correspond to the COC
- Maintaining records of incoming waste samples
- Tracking waste samples through processing, analysis, and disposal
- Preparing project-specific QC samples for analysis during the project
- Verifying that laboratory QC and analytical procedures are being followed as specified in this QAPP
- Reviewing QC and sampling data and determining if additional samples or repeat analyses are needed; if there is any invalid or unusable data, these data will be identified in the laboratory reports and case narratives.
- Submitting certified QC and sample analysis results to the CPT Manager for all analyses requested for this test program
- Archiving storage of analytical data
- Preparing a complete analytical report for inclusion in the CPT report
- Provide a copy of this QAPP to and obtain signature of designated responsible person from any subcontracted laboratory used for waste feed analysis, if for any reason a subcontract laboratory is needed to perform any waste feed analysis.

4.9 STACK SAMPLE ANALYSIS LABORATORY

The Eurofins Environment Testing (Eurofins) Knoxville, TN laboratory will appoint a project manager responsible for all stack sample analyses. Eurofins is the subcontracted laboratory to Alliance to perform the stack gas sample analysis. The Laboratory Project Manager will be responsible for reporting all analytical results, preparation of narratives and data review, and will sign all laboratory reports. The Laboratory Project Manager will participate in the pre-test meeting via phone, if possible, or will be separately briefed on project and QA requirements by Alliance and the CPT Test Manager. A close working

relationship has been established between CHDP and Eurofins during the performance of previous CPTs in 2006, 2008, 2011, 2016, and 2021. The Laboratory Project Manager responsibilities include:

- Assisting in the preparation and implementation of the QAPP
- Verifying that laboratory QC and analytical procedures are being followed as specified in this QAPP
- Reviewing QC and sampling data and determining if additional samples or repeat analyses are needed; if there is any invalid or unusable data, these data will be identified in the laboratory reports and case narratives.
- Receiving, verifying, and documenting that incoming stack samples correspond to the COC
- Maintaining records of incoming stack samples
- Tracking stack samples through processing, analysis, and disposal
- Reviewing QC and sampling data and determining if additional samples or repeat analyses are needed; if there is any invalid or unusable data, these data will be identified in the laboratory reports and case narratives.
- Submitting certified QC and sample analysis results to the CPT Waste Sampling Coordinator for all analyses requested for this test program
- Archiving storage of analytical data
- Preparing a complete analytical report for inclusion in the CPT report; if there is any invalid or unusable data, these data will be identified in the laboratory reports and case narratives.

4.10 WASTE FEED SAMPLE ANALYSIS SUB-CONTRACTED LABORATORY

CHDP may contract with Eurofins Environment Testing of Knoxville, TN or Accutest Laboratories of Houston, TX, to perform some of the waste feed analysis. Both laboratories are familiar with CHDP waste feeds and the required analyses. If Accutest is contracted to perform waste feed analyses, they will review this QAPP and the designated project manager will be added to the signature page of the QAPP. Eurofins is contracted to perform the stack sample analyses and are already familiar with the QAPP and included on the signature page.

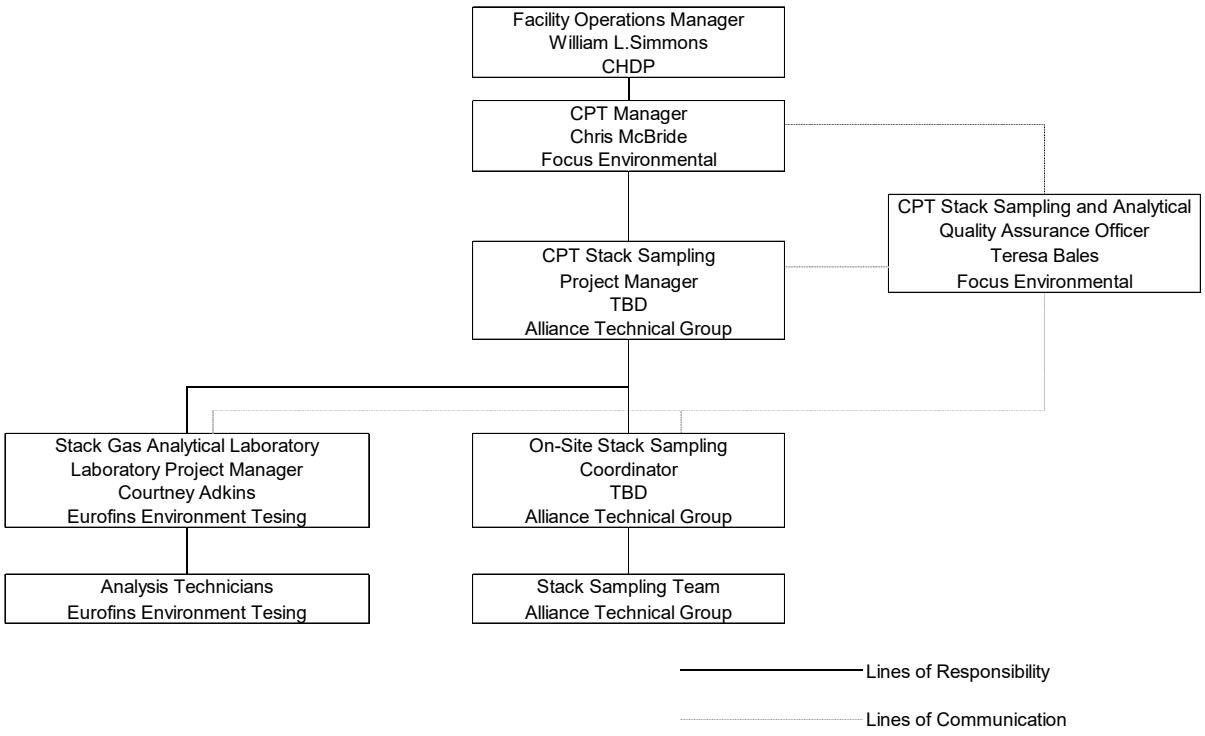


Figure 4-1. Combined Performance Test Stack Sampling Organizational Chart

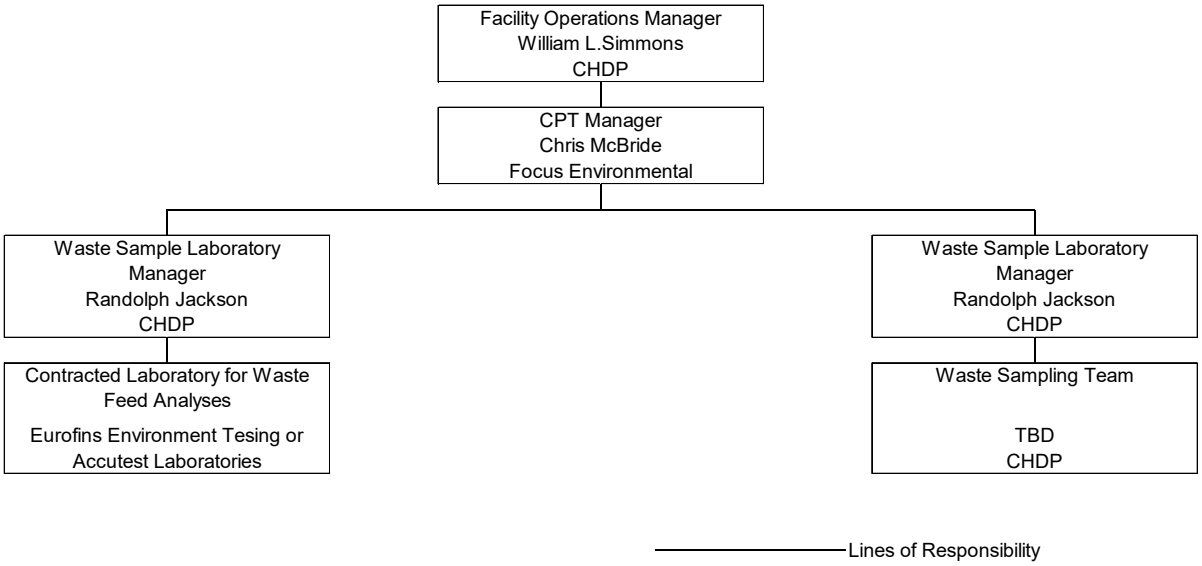


Figure 4-2. Combined Performance Test Waste Sampling Organizational Chart

5.0 QUALITY ASSURANCE OBJECTIVES AND QUALITY CONTROL OBJECTIVES

5.1 GENERAL

The collection of data to characterize the stack gas include field sampling and collection, sample packaging and delivery, and laboratory analysis be conducted with properly operated and calibrated equipment by trained personnel. Accurate field documentation and chain of custody must also be performed to ensure data integrity.

The QA objectives of this TSCA trial burn testing include identifying the complete data set, which must be generated in order to complete a quality assessment of the project during final reviews. This data set will include all data quality indicators produced during the project. In addition, the data acceptance criteria will be defined. The data acceptance criteria identify the target precision and accuracy limits that are used to assess the data quality. The overall data quality objective (DQO) is to produce a database that will be suitable for completing an assessment of the incinerator's operational performance relative to the applicable emissions and performance standards.

The analytical laboratory(s) will perform the various methods in accordance with the approved procedures with the goal of achieving the lowest possible reporting (detection) limits. Method detection limits (MDLs) will be established by the laboratory(s) for the procedures and with reporting limits (RLs) set based on sample matrix. The actual results will be carefully inspected to ensure that the reported data reflects the lowest possible detection limit for each sample matrix.

The CPT will follow the protocols established in QA/QC Procedures for Hazardous Waste Incineration (EPA/625/6-89/023, January 1990), Hazardous Waste Incineration Measurement Guidance Manual (EPA/625/6-89/021, June 1989), and the EPA Region VI Generic Trial Burn Plan, September 30, 1996 to address data precision, accuracy and completeness. The test program design allows data to be grouped into sets that can be analyzed to evaluate data precision and accuracy. The general tendency and dispersion of data is assessed by reviewing statistical analysis of precision, accuracy, and completeness.

The laboratory analysis managers and the QA officer will review the field and analytical data obtained from this CPT, and an assessment of the data quality indicators will be included in the narratives in the laboratory reports and in the CPT report as appropriate. The data quality will be discussed with regard to the planned data acceptance criteria and the overall project objectives. Data that are determined to be outside of the target data QC limits will be evaluated relative to the overall project objectives to determine their impact on defining the system's performance, and discussion of this evaluation will be included in the CPT report. The CPT data collection phase will be documented formally to provide complete traceability of the information pertinent to the incinerator's performance.

Table 5-1 displays the project's target accuracy and precision objectives, which have been defined for each type of analysis to be performed during the CPT. The target precision and accuracy objectives for the CEM systems used to monitor the stack gases also are included.

The following definitions of precision, accuracy, and completeness will be used for this project (calculation formulas may be found in Section 13.0):

Accuracy: Accuracy is a measurement of the bias in a system or the degree of agreement of a measurement X (or an average of measurements of the same parameter) with an accepted reference or "true" value T. Accuracy is typically expressed as a percent recovery calculated by the ratio of the measurement and the accepted value. Accuracy objectives are identified in Table 5-1.

Precision: Precision is a measurement of mutual agreement among individual measurements of the same property, usually under "prescribed similar conditions". Precision is expressed in terms of the relative percent difference (RPD) between duplicate determinations when the number of replicate determinations is less than four or in terms of the relative standard deviation (RSD) when four or more determinations are made. Various measurements of precision are used depending on the prescribed similar conditions. Precision objectives are shown in Table 5-1.

Completeness: Completeness is a measurement of the amount of valid data obtained from a measurement system as to the amount expected to be collected under optimal, ideal conditions. Completeness is usually expressed as a percentage, and its calculation is based on the number of samples reaching the laboratory for analysis. Samples resulting from CPT runs that are judged to be invalid on the basis of field performance indicators or aborted runs will not be submitted to the laboratory for analysis. The completeness goal for the sampling portion of this program is three valid runs for the CPT, as well as collection of 80% of the projected number of waste feed and outfall stream samples, prior to compositing. A valid run will be a run, which is to the satisfaction of CHDP and its testing contractors from the sampling and unit operations standpoints.

It should be noted, however, that the overall program objective is to have three valid runs for each condition. Some latitude will be exercised in the validation of the dioxins/furans and PCB sampling train data using surrogate recoveries. If a sufficient number of surrogates are within the target recovery ranges, then the data may be acceptable even if some of the surrogate recoveries are outside of the method defined ranges.

The objective for the CPT will be to obtain acceptable results for all parameters, for the three CPT runs under each test condition. The completeness DQO will be met if these valid tests are obtained. With regard to the objective of obtaining valid runs, the impact of any sample losses will be assessed in the CPT report. Analytical results will be reported in the CPT report for all samples that receive analytical testing per regulatory reporting requirements.

Representativeness: Representativeness is the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Representative samples are those whose results are comparable to other data sets. Representativeness in stack sampling is achieved through the use of EPA's 1990 standard stack sampling methodologies, which are found in the "Handbook – Quality Assurance/Quality Control Procedures for Hazardous Waste Incineration" (EPA/625/6-89/012) (QA/QC Handbook). The frequent grab sampling of waste feed and outfall streams during each test run will provide representative samples of these materials.

Comparability: Comparability is the expression of confidence that one data set can be compared to another. Comparability of the CPT data sets will be high due to the use of standardized methodology and the generation of data in common units..

5.2 PRECISION AND ACCURACY

A number of procedures will be implemented to assess the precision and accuracy of the sampling and analytical data. All sampling and analytical activities will be conducted following referenced procedures. All reference materials used as calibration standards, surrogate compounds, or laboratory control samples will be of the highest purity commercially available. The calibration of instruments used during analysis will be verified each day that samples are analyzed as described in later sections of this QAPP. Assessment of data precision and accuracy will be accomplished by evaluating the results from multiple analyses of the same parameter, and analysis of standards, duplicates, and spiked samples. Field and laboratory contamination will be assessed through the analysis of reagent, instrument, method, and field and trip blanks.

Precision estimates presented in Table 5-1 represent variability for replicate measurements of the same parameters, expressed in terms of relative percent difference (RPD) for duplicate samples or relative standard deviation (RSD) for three or more measurements, as appropriate. For analyses of samples with detectable concentrations of the target analytes, precision is evaluated by conducting duplicate analyses of unspiked samples and assessing the RPD. In the evaluation of larger data sets (three or more data points), the RSD is assessed. When duplicate analyses are performed, the original analysis result will be used in test calculations. If the variances in the duplicate analyses bring into question the analytical precision, additional analyses, if allowed by the method, will be performed to better determine the actual value or to evaluate the potential reason(s) for the measurement variability.

For analytical results near the detection limit, precision can be impacted. For the cases where the original and duplicate results are a combination of detect and non-detect results at the method detection limit (MDL) where precision cannot be calculated, the data will be flagged as estimated.

Accuracy values in Table 5-1 include components of both random error and bias, expressed as a percentage of the “true” of “known” value (for reference materials) or percent analyte recovery (for spiked samples). The QA/QC program will focus upon controlling measurement error within the estimated limits of measurement uncertainty, as specified in Table 5-1. It should be noted that these limits are estimates that are, in most cases, described in the referenced analytical methods or in QA/QC guidance for hazardous waste thermal treatment. They represent the range of results that can be expected from these methods based on actual field sampling results and laboratory-based QA/QC studies. Therefore, it is reasonable to expect that the measurement errors associated with this project will be within the objectives shown in Table 5-1. QA/QC determinations which fall outside of the target range will be flagged and an assessment of the impact, if any, on the usefulness of the data on the overall results and conclusions of the test program will be provided in the final test report.

The analytical laboratory’s National Environmental Laboratory Accreditation Program (NELAP) accredited standard operating procedures (SOPs) for each analysis will be followed. If during the course of test sample

analyses, an analytical result exceeds the calibrated range for a target analyte, or any other analytical anomalies are noted with any test samples, the CPT Manager is to be contacted immediately to discuss the results/issues and possible options before proceeding with the subject analyses. If ongoing QA/QC procedures reveal that a measurement's error has exceeded the estimated data quality limits, the source of the excessive error will be identified and corrective action will be taken, as described in Section 14.0. If data fall outside the acceptable range of precision and accuracy, even after corrective action has been taken, those data points will be flagged in the final analytical report. The precision and accuracy for those measurements will be reported as determined using the actual data. Also, alternative procedures (either sampling or analytical) may be considered and recommended if possible.

5.2.1 Method 23 PCB/PCDD/PCDF Sampling Precision and Accuracy

EPA Method 23 will be used to concurrently sample the stack gas for emissions of PCB and PCDD/PCDF. Prior to use in the field, all of the XAD-2 resin traps for use in the Method 23 sampling train are spiked with isotopically-labeled PCB and PCDD/PCDF sampling surrogate compounds as noted in Table 5-1. Two of the XAD-2 resin traps prepared for this project will also have PCB and PCDD/PCDF matrix spikes applied and are retained by the laboratory. These two XAD resin traps are then included with the field samples when they are returned to the laboratory for analysis. The recoveries of the PCB and PCDD/PCDF isotopically-labeled sampling surrogates and matrix spike compounds from these two retained XAD resin trap samples provide an accuracy assessment of the Method 23 analytical methodology. The recovery of the isotopically-labeled sampling surrogates spiked onto every field-use XAD resin sample provides a field through analysis accuracy assessment of the Method 23 methodology.

The recoveries of the internal standard, alternate standard, and recovery standard compounds applied during the preparation and analysis of the Method 23 sampling train components provide accuracy and precision measurements for the sample preparation and analysis steps. Table 5-1 notes the RPD and RSD values for the Method 23 PCB and PCDD/PCDF analyses.

5.2.2 Method 0010 ODCB/SVOC RCI Sampling Precision and Accuracy

SW-846 Method 0010, a.k.a., Modified Method 5, will be used to concurrently sample the stack gas for emissions of the DRE POHC and SVOC RCIs. Prior to use in the field, all of the XAD-2 resin traps for use in the Method 0010 sampling train are spiked with an isotopically-labeled SVOC sampling surrogate compound as noted in Table 5-1. Two of the XAD-2 resin traps prepared for this project will also have SVOC matrix spikes applied and are retained by the laboratory. These two XAD resin traps are then included with the field samples when they are returned to the laboratory for analysis. The recoveries of the SVOC isotopically-labeled sampling surrogate and matrix spike compounds from these two retained XAD resin trap samples provide an accuracy assessment of the Method 0010 analytical methodology. The recovery of the isotopically-labeled sampling surrogates spiked onto every field-use XAD resin sample

provides a field through analysis accuracy assessment of the Method 0010 methodology. Table 5-1 notes the RPD and RSD values for the Method 0010 analyses.

5.2.3 Method 5/202 Particulate Sampling Precision and Accuracy

The gravimetric analysis of the Method 5/202 samples for particulate analyses includes replicate weighings to assess analysis precision. The analytical balance accuracy is verified using Class S weights.

5.2.4 Method 26A Chloride Sampling Precision and Accuracy

The analysis of the Method 26A samples for chloride includes a system MS/MSD analyses to evaluate the precision and accuracy of the ion chromatography analytical methodology. Matrix spikes to Method 26A field samples and reagent blanks will be performed at the greater of 2 times (2X) the sample's apparent native concentration or 10 times (10X) the MDL used for the ion chromatography method to demonstrate the recovery and reproducibility of the method. The relative recoveries of the matrix spikes provide a measure of the accuracy of the chloride ion analysis methodology. Additionally, precision is assessed via duplicate analyses of field, reagent blank, calibration standard, and QC samples.

5.2.5 SMVOC Precision and Accuracy

The Sampling Method for Volatile Organic Compounds (SMVOC) (SW-846, Method 0031) will be used to sample stack gases for volatile organic compound (VOC) total chlorinated organic content (RCl).

During the preparation of the Tenax® and Tenax®/Charcoal tubes sets for the test program, two sets of SMVOC Tenax® and Anasorb^{TM} 747 tube sets will be spiked with the SW-846 Method 5041A/8260D specified surrogate spike compounds. These samples will be retained by the laboratory, and included with the field samples when they are returned from the field for analysis. The relative recoveries of the surrogate spikes from these samples provide an accuracy assessment of the SMVOC analytical methodology. The relative recoveries of the isotopically labeled surrogate and internal standard spikes applied to every SMVOC sample analysis provide an ongoing accuracy assessment of the SMVOC analytical methodology.

The two sets of the spiked SMVOC tubes provide a precision (reproducibility) assessment for SMVOC methodology. The consistency of the isotopically labeled surrogate spike recoveries applied to every SMVOC sample analysis provides an ongoing precision assessment of the SMVOC analytical methodology.

5.2.6 Installed CO, CO_2, and O_2 CEMS Precision and Accuracy

The precision of the installed carbon monoxide, carbon dioxide, and oxygen continuous emissions monitoring system (CEMS) analyzers will be assessed using the recommended calibration gases in accordance with 40 CFR 60, Appendix B, Performance Specification (PS) 4B for carbon monoxide and oxygen and PS-3 for carbon dioxide. Precision will be assessed using the following equation:

$$\text{Precision } (\ \%drift) = \left(\frac{R_f - R_i}{Span}\right)\ x\ 100$$

where:

R_f = Final monitor response at end of the test run

R_i = Initial monitor response at start of the test run

Span = Maximum range of the analyzer.

The accuracy of all CEMS analyzers will be evaluated by the measurement of percent accuracy as defined by the equation below:

$$\text{Accuracy}(\ \%) = \left(\frac{R_a - R_c}{Span}\right)\ x\ 100$$

where:

R_a = Analyzer indicated concentration of the calibration gas

R_c = Certified concentration of the calibration gas

Span = Maximum range of the analyzer.

During the test, the carbon monoxide, carbon dioxide, and oxygen CEMS analyzers will be calibrated daily before the start of testing. CEMS RATAs are performed annually as required by the Appendix to 40 CFR 63, Subpart EEE and 40 CFR 60, Appendix F. Clean Harbors will schedule and perform the CEMS RATA within 60 days of the planned test start date.

5.2.7 Temporary NO_X CEMS Precision and Accuracy

A temporary analyzer for nitrogen oxides will be used to measure NO_X emissions. The temporary CEMS will be calibrated and operated in accordance with 40 CFR 60, Appendix A, Method 7E. The precision and accuracy of the analyzer will be assessed during the test using the recommended calibration gases. During the test, the analyzers will be calibrated before and after each test run.

5.2.8 Waste Feed PCB

Waste feed samples will be analyzed gas chromatography/electron capture detector (GC/ECD) to determine PCB content (SW-846, Method 8082). To demonstrate the precision (reproducibility) of PCB analyses, duplicate analyses are performed as part of sample analyses. Prepared samples are spiked with analysis surrogates to demonstrate the recovery and reproducibility of the methods. The relative recoveries

of the surrogate spikes and analysis of laboratory standards will be used to demonstrate the accuracy of the analytical methods applied to the project samples.

5.3 DETECTION LIMITS AND REPORTING

How the detection limits will be used in data reduction and reporting is described in Section 11.0.

Method detection limits (MDLs) are statistically determined using guidance provided in 40 CFR Part 136, Appendix A, based on at least seven replicate samples with a concentration of the compound near the estimated MDL . Reporting limits (RLs) are based on the lowest calibration standard. PCDD/PCDFs are reported to Estimated Detection Limits (EDL) . The EDL for isotope dilution analysis methods as defined in SW-846 Method 8290A is:

> EDL (from SW-846 Method 8290A) -*"The sample specific estimated concentration of a given analyte required to produce a signal with a peak height of 2.5 times the background signal level."*

The actual detection limits may be influenced by interferences or matrix complications that cannot be predicted prior to sampling and analysis. If interferences or matrices effects are encountered then re-evaluation of detection limits may need to be performed.

For inorganic and non-isotope dilution organic analyses, the laboratory report will provide both the sample specific Method Detection Limit (MDL) and the Reporting Limit (RL) for each analysis. If the analyte is detectable at some value between either the MDL and RL, the detected value will be reported and flagged as estimated.

For the PCDD/PCDF and PCB isotope dilution analysis, the non-detects will be determined using the method-specific SW-846 definition of an Estimated Detection Limit (EDL) without the use of empirical factors or other mathematical manipulations specific to the laboratory. EPA Method 23 also requires determination of a MDL and RL. All non-detects for target PCDD/PCDF and PCB analytes will be reported at the laboratory EDL, MDL, and RL. If the analyte is detectable at some value between either the MDL or EDL and RL, the detected value will be reported and flagged as estimated.

5.3.1 Stack Gas PCB

Sampling for PCB emissions will be via use of the same Method 23 sampling train being used for PCDD/PCDF. The Method 23 sampling train XAD-2 resin traps will be pre-spiked with isotopically labeled sampling surrogate compounds for PCB as prescribed by Method 23. The recoveries of the surrogate spikes will demonstrate the required accuracy performance.

The target list of the PCB compounds includes all 209 PCB congeners. PCB will be analyzed via HRGC/HRMS. The RL, EDL, and MDL will be reported for each specific PCB compound that is non-detect in stack gas samples.

5.3.2 Stack Gas Dioxin/Furan

Sampling for PCDD/PCDF emissions will be via use of the same Method 23 sampling train being used for PCB. The Method 23 sampling train XAD-2 resin traps will be pre-spiked with isotopically labeled sampling surrogate compounds for PCDD/PCDF as prescribed by Method 23. The recoveries of the surrogate spikes will demonstrate the required accuracy performance. PCDD/PCDF will be analyzed via HRGC/HRMS. The RL, EDL and MDL will be reported for each 2,3,7,8-chlorinated dioxin and furan congener, and tetra- through octa- congener group.

5.3.3 Stack Gas ODCB and SVOC RCl

Sampling for ODCB and SVOC RCl emissions will be via use of a Method 0010 sampling train. The Method 0010 sampling train XAD-2 resin traps will be pre-spiked with and isotopically labeled sampling surrogate compound. The recoveries of the surrogate spikes will demonstrate the required accuracy performance.

ODCB analysis will be via Method 8270E as noted in Section 9.0 of the QAPP. ODCB will be analyzed via GC/MS with selected ion monitoring (SIM). The MDL and RL will be reported for ODCB.

The target list of the SVOC for analysis via Method 8270E is noted in Section 9.0 of the QAPP. SVOC will be analyzed via GC/MS. The MDL and RL will be reported for each specific target SVOC compound.

In addition to the target list of compounds, all non-target chlorinated compound peaks greater than 10% of the nearest internal standard will be tentatively identified via a GC/MS library search using the mass spectral data. Only tentatively identified compounds (TICs) that can be matched with 85% or greater confidence will be reported. SVOC RCl TICs will be quantified based on nearest internal standard. SVOC RCl TICs less than 10% of the nearest internal standard will not be reported or quantified.

5.3.4 Stack Gas SMVOC

VOC RCl emissions will be assessed using the SMVOC. A target list of VOC or analysis via Method 8260D is noted in Section 9.0 of the QAPP. The MDL and RL will be reported for each specific target VOC compound.

In addition to the target list of compounds, all non-target chlorinated compound peaks greater than 10% of the nearest internal standard will be tentatively identified via a GC/MS library search using the mass spectral data. Only tentatively identified compounds (TICs) that can be matched with 85% or greater confidence will be reported. VOC RCl TICs will be quantified based on the nearest internal standard. VOC RCl TICs less than 10% of the nearest internal standard will not be reported or quantified.

5.3.5 Stack Gas Chloride and Particulate

Non-detect results may be reported for Method 5/26A stack gas chloride. The matrix spike samples and reagent blanks of the Method 5/26A impinger solutions will show that any non-detect values are appropriate.

Matrix spikes will be performed at levels 3 to 5 times the MDL used for the ion chromatography method to demonstrate the recovery and reproducibility of the method. Each field sample, calibration standard, and QC sample will be analyzed in duplicate.

For Method 5/26A and Method 5/202 particulate analyses, duplicate measurements will entail replicate weight determinations to demonstrate reproducibility and consistency, and balance calibration standards will be used to assess analytical accuracy.

5.4 COMPLETENESS

Data completeness represents the valid data collected from the total number of valid tests conducted. Samples resulting from test runs that are judged invalid based on field performance indicators or aborted runs will not be submitted to the laboratory for analysis. Because the possibility exists that a sample may be lost or broken, the data from each individual analytical parameter may not be complete for all test runs. The impact of any occurrence of sample loss will be assessed with regard to the objective of obtaining valid runs and will be discussed in the final test report. The completeness objective of this test program is to generate sufficient data for the regulatory agencies to judge the performance of the system.

5.5 REPRESENTATIVENESS AND COMPARABILITY

The sampling procedures chosen for the test program are, wherever possible, approved EPA or American Society for Testing Materials (ASTM) sampling methods that are typically employed on thermal treatment system tests. The use of standard sampling methods affirms sample consistency and representativeness.

Use of standard, approved sampling and analysis methods, standardized data reduction procedures, and QC samples will provide data that is technically defensible and is comparable from test run to test run, test condition to test condition.

5.6 PERFORMANCE EVALUATIONS (AUDIT SAMPLES)

At the time of this TBP publication, EPA's Stationary Source Audit Sample Program (SSASP) is suspended. From EPA's website:

> https://www.epa.gov/emc/emc-technical-support#audit
>
> "*List of Accredited Audit Sample Providers and Audit Samples*
>
> *The general provisions to 40 CFR Parts 60 and 63 (see §60.8(g)(1) and §63.7(c)(2)(iii)(A)) require that the owner or operator obtain audit samples if the audit samples are "commercially available" and have defined "commercially available" as two or more independent accredited audit sample providers (AASP) to have blind audit samples available for purchase. Since there are no longer two providers, the requirement to obtain these audit samples is no longer in effect until such time as another independent AASP has audit samples available for purchase.*

> *When there are two or more AASP with audit samples available for purchase, we will update this webpage with the name or names of the providers and audit sample(s) available for purchase. At that time, this information must be listed on the EMC website for 60 days before audits are required again.*"

The two SSASP sample providers were Sigma Aldrich and ERA. Sigma Aldrich has stopped selling audit samples to support the SSASP thus suspending the SSASP requirement. However, audit sample availability for Method 26A, Method 29, and Method 23 will be determined at the time of testing and samples obtained as possible. If obtained, audit samples will be included with the other emissions samples for analysis by the selected analytical laboratory.

Table 5-1. Test Analytical Data Quality Objectives

Parameter	QC type	Precision	Accuracy
Method 23 Sampling Train (PCDD/PCDF)			
Method 23 PCDD/PCDF	Spiked Resin Blanks	≤ 25% RPD	75-125%
	PCDD/PCDF ^{13}C Labeled Sampling Surrogate Spike	≤ 35% RSD	Table 5-2
	PCDD/PCDF ^{13}C Isotope Dilution Internal Standard Spikes	---	Table 5-2
	PCDD/PCDF ^{13}C Labeled Pre-Analysis Internal Standard Spikes	---	Table 5-2
Method 23 Sampling Train (PCB)			
Method 23 PCB	Spiked Resin Blanks	≤ 25% RPD	75-125%
	PCB C^{13} Labeled Sampling Surrogate Spikes	≤ 35% RSD	Table 5-3
	PCB C^{13} Labeled Isotope Dilution Internal Standard Spikes	---	Table 5-3
	PCB C^{13} Labeled Optional Cleanup Standard Spikes	---	Table 5-3
	PCB C^{13} Labeled Pre-Analysis Internal Standard Spikes	---	Table 5-3
	Spiked Resin Blanks	≤ 25% RPD	75-125%
Method 0010 Sampling Train (ODCB and SVOC RCIs)			
Method 0010 ODCB and SVOC RCIs	Spiked Resin Blanks	≤ 25% RPD	75-125%
	C^{13} Labeled Sampling Surrogate Spike	≤ 35% RSD	Table 5-4
	Semi-volatile Surrogate Spikes	≤ 35% RSD	Table 5-4
	Semi-volatile Matrix Spikes	≤ 35% RSD	70-130%
Method 5/26A Sampling Train (Particulate, HCl/Cl_2)			
Particulate Matter	Replicate Weighings	± 0.5 mg	± 0.5 mg
Hydrogen Chloride/Chlorine	Duplicate Analysis	≤ 35% RPD	---
	Matrix Spikes	≤ 35% RPD	± 30%
	Reference Sample	---	± 10%
Method 5/202 Sampling Train			
Particulate Matter	Particulate Matter	Particulate Matter	Particulate Matter
Method 0031 Sampling Train (SMVOC)			
SMVOC Tubes	Spiked Resin Blanks	≤ 25% RPD	75-125%
SMVOC Tubes	Surrogate Spikes	≤ 35% RSD	Table 5-5
SMVOC Condensate	Surrogate Spikes	≤ 35% RSD	Table 5-5
Continuous Emissions Monitors			
Carbon Monoxide	Performance Specification 4B	± 3% of Span	± 5% of Span
Oxygen	Performance Specification 4B	± 0.5% Oxygen	± 0.5% Oxygen
Nitrogen Oxides	EPA Method 7E	± 3% of Span	± 5% of Certified Calibration Gas
EPA Method 3A			
Carbon Dioxide	Certified Calibration Gas	---	± 0.5% CO_2
Oxygen	Certified Calibration Gas	---	± 0.5% O_2
Continuous Mass Flow Metering Systems (if used)	Pre- & Post-Test Calibration	± 0.1 lb	± 0.1 lb
Waste Feed Samples for PCB Content			
Polychlorinated Biphenyls (PCB)	Duplicate Analysis	≤ 35% RPD	---
	Surrogate spikes	≤ 35% RPD	Table 5-6

Table 5-2. Dioxin/Furan Isotopically-Labeled Spike Compounds

Spike Compound	Target Recovery
Pre-sampling Adsorbent Standard	
$^{13}C_{12}$-1,2,3,4-TetraCDD	70-130%
$^{13}C_{12}$-1,2,3,4,7-PentaCDD	70-130%
$^{13}C_{12}$-1,2,3,4,6-PentaCDF	70-130%
$^{13}C_{12}$-1,2,3,4,6,9-HexaCDF	70-130%
$^{13}C_{12}$-1,2,3,4,6,8,9-HeptaCDF	70-130%
Pre-extraction Filter Recovery Standard	
$^{13}C_{12}$-1,2,7,8-TetraCDF	70-130%
$^{13}C_{12}$-1,2,3,4,6,8-HexaCDD	70-130%
Pre-extraction Standard	
$^{13}C_{12}$-2,3,7,8-TetraCDD	20-130%
$^{13}C_{12}$-2,3,7,8-TetraCDF	20-130%
$^{13}C_{12}$-1,2,3,7,8-PentaCDD	20-130%
$^{13}C_{12}$-1,2,3,7,8-PentaCDF	20-130%
$^{13}C_{12}$-2,3,4,7,8-PentaCDF	20-130%
$^{13}C_{12}$-1,2,3,4,7,8-HexaCDD	20-130%
$^{13}C_{12}$-1,2,3,6,7,8-HexaCDD	20-130%
$^{13}C_{12}$-1,2,3,7,8,9-HexaCDD	20-130%
$^{13}C_{12}$-1,2,3,4,7,8-HexaCDF	20-130%
$^{13}C_{12}$-1,2,3,6,7,8-HexaCDF	20-130%
$^{13}C_{12}$-2,3,4,6,7,8-HexaCDF	20-130%
$^{13}C_{12}$-1,2,3,7,8,9-HexaCDF	20-130%
$^{13}C_{12}$-1,2,3,4,6,7,8-HeptaCDD	20-130%
$^{13}C_{12}$-1,2,3,4,6,7,8-HeptaCDF	20-130%
$^{13}C_{12}$-1,2,3,4,7,8,9-HeptaCDF	20-130%
$^{13}C_{12}$-OctaCDD	20-130%
$^{13}C_{12}$-OctaCDF	20-130%
Pre-analysis Standard	
$^{13}C_{12}$-1,3,6,8-TetraCDD	S/N≥10
$^{13}C_{12}$-1,2,3,4-TetraCDF	S/N≥10
$^{13}C_{12}$-1,2,3,4,6,7-HexaCDD	S/N≥10
$^{13}C_{12}$-1,2,3,4,6,7,9-HeptaCDD	S/N≥10
Alternate Recovery Standard	
$^{13}C_{12}$-1,3,7,8-TetraCDD	20-130%
$^{13}C_{12}$-1,2,4,7,8-PentaCDD	20-130%

Table 5-3. PCB Isotopically-Labeled Spike Compounds

Spike Compound	BZ No.	Target Recovery
Pre-sampling Adsorbent Standard		
$^{13}C_{12}$-3,3'-DiCB	11L	70-130%
$^{13}C_{12}$-2,4',5-TriCB	31L	70-130%
$^{13}C_{12}$-2,2',3,5',6-PentaCB	95L	70-130%
$^{13}C_{12}$-2,2',4,4',5,5'-HexaCB	153L	70-130%
Pre-extraction Filter Recovery Standard		
$^{13}C_{12}$-2,3,3',4,5,5'-HexaCB	159L	70-130%
Pre-extraction Standard		
$^{13}C_{12}$-2-MonoCB	1L	20-145%
$^{13}C_{12}$-4-MonoCB	3L	20-145%
$^{13}C_{12}$-2,2'-DiCB	4L	20-145%
$^{13}C_{12}$-4,4'-DiCB	15L	20-145%
$^{13}C_{12}$-2,2',6-TriCB	19L	20-145%
$^{13}C_{12}$-3,4',4'-TriCB	37L	20-145%
$^{13}C_{12}$-2,2',6,6'-TetraCB	54L	20-145%
$^{13}C_{12}$-3,3',4,4'-TetraCB	77L	20-145%
$^{13}C_{12}$-3,4,4',5-TetraCB	81L	20-145%
$^{13}C_{12}$-2,2',4,6,6'-PentaCB	104L	20-145%
$^{13}C_{12}$-2,3,3',4,4'-PentaCB	105L	20-145%
$^{13}C_{12}$-2,3,4,4',5-PentaCB	114L	20-145%
$^{13}C_{12}$-2,3',4,4',5-PentaCB	118L	20-145%
$^{13}C_{12}$-2',3,4,4',5-PentaCB	123L	20-145%
$^{13}C_{12}$-3,3',4,4',5-PentaCB	126L	20-145%
$^{13}C_{12}$-2,2',4,4',6,6'-HexaCB	155L	20-145%
$^{13}C_{12}$-2,3,3',4,4',5-HexaCB	156L	20-145%
$^{13}C_{12}$-2,3,3',4,4',5'-HexaCB	157L	20-145%
$^{13}C_{12}$-2,3',4,4',5,5'-HexaCB	167L	20-145%
$^{13}C_{12}$-3,3',4,4',5,5'-HexaCB	169L	20-145%
$^{13}C_{12}$-2,2',3,3',4,4',5'-HeptaCB	170L	20-145%
$^{13}C_{12}$-2,2',3,4,4',5,5'-HeptaCB	180L	20-145%
$^{13}C_{12}$-2,2',3,4',5,6,6'-HeptaCB	188L	20-145%
$^{13}C_{12}$-2,3,3',4,4',5,5'-HeptaCB	189L	20-145%
$^{13}C_{12}$-2,2',3',3',5,5',6,6'-OctaCB	202L	20-145%
$^{13}C_{12}$-2,3',3',4,4',5,5',6-OctaCB	205L	20-145%
$^{13}C_{12}$-2,2',3,3',4,4',5,5',6-NanoCB	206L	20-145%
$^{13}C_{12}$-2,2',3,3',4,5,5',6,6'-NanoCB	208L	20-145%
$^{13}C_{12}$-DeCB	209L	20-145%
Pre-analysis Standard		
$^{13}C_{12}$-2,5-DiCB	9L	S/N≥10
$^{13}C_{12}$-2,2',5,5'-TetraCB	52L	S/N≥10
$^{13}C_{12}$-2,2',4,5,5'-PentaCB	101L	S/N≥10
$^{13}C_{12}$-2,2',3,4,4',5'-HexaCB	138L	S/N≥10
$^{13}C_{12}$-2,2',3,3',4,4',5,5'-OctaCB	194L	S/N≥10
Optional Cleanup Standard		
$^{13}C_{12}$-2-MonoCB	28L	20-130%
$^{13}C_{12}$-2,2',4,5,5'-PentaCB	111L	20-130%
$^{13}C_{12}$-2,2',3,3',5,5',6,6'-OctaCB	178L	20-130%
Alternate Recovery Standard		
$^{13}C_{12}$-2,3',4',5-TetraCB	70L	20-130%
$^{13}C_{12}$-2,3,4,4'-TetraCB	60L	20-130%
$^{13}C_{12}$-3,3',4,5,5'-PentaCB	127L	20-130%

Table 5-4. SVOC Surrogate and Isotopically-Labeled Spike Compounds

Method 0010 Semi-volatile Surrogate Compound Spike Recoveries		
Compound	**Aqueous Target Recovery**	**Solid, XAD-2 Resin, and Filter Target Recovery**
Nitrobenzene-d_5	35-114%	23-120%
2-Fluorobiphenyl	43-116%	30-115%
Terphenyl-d_{14}	33-141%	18-137%
Phenol-d_6	10-110%	24-113%
2-Fluorophenol	21-110%	25-121%
2,4,6-Tribromophenol	10-123%	19-122%

Method 0010 Semi-volatile Sampling Surrogate Compound Recovery	
Compound	**Target Recovery**
$^{13}C_3$-labeled Naphthalene	50 – 150%

Method 0010 Selected Ion Monitoring Standard Compound Recovery	
Compound	**Target Recovery**
1,2-Dichlorobenzene-d_4	30 – 120%
Naphthalene-d_8	30 – 120%

Table 5-5. VOC Surrogate and Isotopically-Labeled Spike Compounds

Volatile Surrogate Compound Spike Recoveries		
Compound	**Aqueous Target Recovery**	**Solid and SMVOC Target Recovery**
Dibromofluoromethane	80 – 120%	50 – 150%
1,2-Dichloroethane-d_4	77 – 128%	50 – 150%
Toluene-d_8	80 – 120%	50 – 150%
Bromofluorobenzene	72 – 129%	50 – 150%

Table 5-6. PCB Waste Feed Surrogate Spike Compounds

PCB Surrogate Compound Spike Recoveries	
Compound	**Target Recovery**
Tetrachloro-m-xylene	57 – 159%
DCB Decachlorobiphenyl	60 – 138%

6.0 SAMPLING AND MONITORING PROCEDURES

6.1 GENERAL

The objective of this test program is the collection of representative stack gas samples to demonstrate compliance of Train I with the TSCA performance and emissions standards. To meet this objective requires minimizing the potential sources of sample contamination or bias imparted to the samples by the sampling equipment, ambient conditions, handling, and preservation. The test program samples will be collected using the methods summarized in Table 6-1. The total numbers of field samples expected to be generated during Train I testing are also summarized Table 6-1.

Guidelines followed to determine sampling equipment to be used, sampling points, and the frequency at which samples are to be taken are presented in the TBP and are incorporated here by reference. The reference sources for the standard sampling method references include:

- Appendix A to 40 CFR 60, Test Methods and Procedures, New Source Performance Standards, 40 CFR 60 (EPA)
- Test Methods for Evaluating Solid Waste, SW-846, Third Edition, 1986 and updates (SW-846)
- American Society for Testing and Materials (ASTM) Annual Book of ASTM Standards.

Reference sampling and analytical methods are identified in the TBP and this QAPP. The specifics of the sampling and analytical methodologies followed during the course of test execution by the selected sampling and analytical contractors include the referenced nationally recognized methods (ASTM, SW-846, 40 CFR 60 Appendix A, etc.) and/or the contractor-specific standard operating procedures (SOPs) as recognized by NELAP.

During the course of sampling and analysis, situations may still arise that require modifying the specific sampling or analytical procedures included or referenced in the TBP or this QAPP. For the stack gas samples, there are few alternatives to the analysis methods prescribed in SW-846 or 40 CFR 60. For the samples from the single sampling train (e.g., Method 23 for PCB and PCDD/PCDF), the proposed procedures for the sample extractions and splitting of extracts for the respective analyses are discussed in this QAPP. The NELAP-approved laboratory SOPs, which include a number of procedures for special circumstances, will be followed. In cases where the laboratory finds it necessary to make adjustments to the analytical methods, the changes will be documented following the corrective action procedures noted in Section 14.0 of this QAPP. Any such changes must be approved by the CPT Manager. Regulatory observer approval (if present on-site during testing) will be requested if significant deviations from planned sampling procedures are encountered during the testing.

All stack sampling equipment and glassware will be prepared prior to the test according to the method specifications. Following each test run, the samples will be recovered from the sampling trains. The sample recovery procedures include prescribed rinses of the trains, which serve a dual purpose of sample recovery and decontamination of the train in preparation for the next run. Rinses that are not included in the sample recovery will be placed into a waste solvent container.

During the test program, Train I will be operated and tested at the conditions specified in the TBP. The following emissions samples will be collected during the test:

- EPA Method 23 for PCB and PCDD/PCDF
- SW-846 Method 0010 for ODCB and SVOC RCl
- SW-846 Method 0031 SMVOC for VOC RCl
- EPA Method 5/26A for filterable particulate HCl and Cl_2
- EPA Method 5/202 for total particulate
- Temporary CEMS for NO_X (EPA Method 7E)
- Installed CEMS for CO, CO_2, and O_2.

Refer to Section 7.0 of this QAPP. Sample tracking is documented using unique alphanumeric sample numbering applied to every sample, completed sample collection forms, completed request for analysis (RFAs) forms, completed chain of custody (COC) forms and sample collection checklists.

6.2 STACK GAS SAMPLING METHODS

6.2.1 General

During the test program, the Stack Sampling Team Leader and the CPT Manager are responsible for monitoring the sampling team's adherence to the standard stack sampling procedures, especially sampling train preparation; leak checks and recoveries (including blank trains); and reagent, field, and trip blanks. The Stack Sampling Team Leader is responsible for the operation and recovery of the stack sampling equipment and stack gas samples. The CPT Manager and Sample Custodian are responsible for preparing the stack gas and process samples for shipment to the laboratory. Sampling train calibration procedures are discussed in Section 8.0.

Figure 6-1 is a schematic of the Train I stack. EPA Methods 1 and 2 will be used to determine the number and location of sampling traverse of isokinetic sampling locations and check for cyclonic flow. Documentation of Method 1 (including cyclonic flow check) and Method 2 (pitot tube measurements) will be included in the stack sampling report. At EPA’s request, a cyclonic flow check will be performed prior to testing each day during the 2-WESP mode demonstration. Pitot tube traverses will also be performed at

16.7%, 50%, and 83.3% of the stack diameter at the temporary CEMS sampling port to check for stratification.

During each test run, the stack gas carbon dioxide and oxygen concentrations will be measured using EPA Method 3A. The stack gas carbon dioxide and oxygen concentrations are used to determine the stack gas molecular weight. Certified calibration gases containing at least 5 percent volume carbon dioxide and/or at least 5 percent volume oxygen may be used as reference standards analyzer.

Stack gas moisture content will be determined for each isokinetic sampling train via EPA Method 4 (sampling train moisture gain). Isokinetic sampling train silica gel impingers will be filled with fresh, dry indicating silica gel at the beginning of the test program. During the sampling train recovery process, and subsequent test runs, each indicating silica gel impinger will be inspected prior to reuse to verify that sufficient capacity remains for moisture absorption during the next test run. Silica gel more than 50% utilized will be discarded and the impinger recharged with fresh dry indicating silica gel.

6.2.2 EPA Method 23 for PCB & PCDD/PCDF

An EPA Method 23 sampling train will be used to concurrently sample stack gas for PCB and PCDD/PCDF. Figure 6-2 is a schematic of the Method 23 or Method 0010 sampling train. The Method 23 sampling train will be operated for 180 minutes (3 hours) to sample a target volume of 2.5 dry standard cubic meters of stack gas during each sampling run. Prior to each test run, the Method 23 sampling train will be assembled and leak checked. During sampling, the sampling rate will be adjusted to maintain an isokinetic sampling rate. The sorbent traps will be kept below 68ºF during sampling to ensure that the XAD resin stays efficient during the testing.

At the completion of the test run, a final leak test will be performed on the sampling system. The Method 23 sampling train will be recovered as follows:

1. Container No. 1 - The filter will be removed from its holder, placed in a glass Petri dish, and sealed with Teflon tape.
2. Container No. 2 - The probe and nozzle will be brushed and rinsed three times (3X) with acetone and then 3X with toluene. The front half of the filter holder will be rinsed 3X with acetone and then 3X with toluene. The back half of the filter holder, coil condenser, and connecting glassware will be rinsed 3X with acetone and then 3X toluene. All acetone and toluene rinses will be combined in a single sample bottle.
3. The sorbent trap will be removed, sealed with Teflon tape, weighed for moisture gain, and the weight recorded. The trap will be sealed in a Ziplock bag and refrigerated or stored on ice.
4. Container No. 3 - Each water impinger will be individually weighed for moisture gain and the weight recorded. The contents of the water impingers will then be placed in Container No. 3.
5. Each water impinger will be individually rinsed 3X with acetone and then 3X toluene. These solvent rinses will then be placed in Container No. 4.

6. The silica gel impinger will be weighed or moisture gain and the weight recorded. The silica gel will be inspected for possible reuse or replacement. If more than 50% used, the silica gel will be replaced with fresh silica gel.

The Method 23 sampling train analysis includes a spiking program that will allow for complete assessment of the sampling and analytical effort regarding the overall method accuracy. Spiked compounds will be placed on the components of the train at different stages of the sampling and analytical program so that the efficiency of the method's performance can be measured quantitatively. By assuming that these compounds have chemical characteristics that are identical to the PCDD/PCDF target compounds, the overall method efficiency can be assessed. These types are defined as follows:

- Sampling Spikes – These compounds are spiked directly onto the XAD-2 resin at the laboratory during resin tube preparation and prior to any field handling or sampling. The final recovery of these compounds gives the most comprehensive indication that the determination of native compounds using the PCDD/PCDF and PCB methodology is accurate. For the PCDD/PCDF and PCB analyses the Isotope Dilution Internal Standards are used to quantitate target analyte concentrations present in the samples.
- Isotope Dilution Internal Standard Spikes – These compounds are placed directly onto the sample just prior to the preparation and extraction steps. The final recovery efficiency of these compounds reflects the overall accuracy of the sample's laboratory handling and analysis. For PCDD/PCDF and PCB analysis the Recovery Standards are used to calculate the recovery of the Isotope Dilution Internal Standards that were added prior to the sample preparation.
- PCDD/PCDF and PCB Recovery Standards – These compounds are applied to the sample extracts just before the extracts are introduced onto the GC/MS instrument injection ports. These compounds are precisely applied at this step in the analytical scheme and provide the actual relative response factors that are used to calculate analyte concentrations.

Tables 5-2 and 5-3 list the isotopically labeled surrogates used as required by Method 23. Spiking levels may be adjusted in accordance with the laboratory QA requirements and SOPs.

Once during the trial burn, a Method 23 blank train will be assembled and charged with all required reagents in a fashion that is identical to that of the actual sample train. This blank train will be heated and leak-checked in the same manner as the actual train, placed near the base of the stack, and sealed for the duration of one sampling run. Upon completion, the blank train samples will be recovered applying the same procedures used to collect actual trial burn train samples. These blank train samples will be analyzed for the PCDD/PCDF and PCB using the same handling and analysis procedures performed on the actual sampling trains. The results of the blank train samples will indicate any possible contamination introduced to the samples by contaminated reagents, improper preparation or handling techniques, or contamination problems due to impure reagents. As well, field and trip blank XAD-2 resin tube samples will be collected to assess fugitive contamination reaching the samples during various sample handling stages.

In accordance with 40 CFR 63.1208(b)(1)(iii), any 2,3,7,8-chlorinated dioxin/furan congener that is non-detect may be counted as zero in determining toxicity equivalent (TEQ) compliance. To qualify for counting non-detects as zero, 40 CFR 63.1208(b)(1)(ii) requires the Method 0010 sampling train to be operated a

minimum of 180 minutes (3 hours) to sample a minimum of 2.5 dry standard cubic meters (dscm) of stack gas during each sampling run. The Method 23 sampling train will be operated a minimum of 180 minutes (3 hours) to sample a minimum of 2.50 dscm of stack gas during each sampling run to comply with the requirements of 40 CFR 63.1208(b)(1)(ii).

6.2.3 SW-846 Method 0010 for SVOC RCl and ODCB

A Method 0010 sampling train will be used to sample stack gas the DRE POHC ortho-dichlorobenzene (ODCB) and SVOC RCls. Figure 6-2 is a schematic of the Method 23 or Method 0010 sampling train. During each test run, the Method 0010 sampling train will be assembled and leak checked. The Method 0010 sampling train will be operated for 180 minutes (3 hours) to sample a target volume of 3.0 dry standard cubic meters of stack gas during each sampling run. Prior to each test run, the Method 0010 sampling train will be assembled and leak checked. During sampling, the sampling rate will be adjusted to maintain an isokinetic sampling rate. The sorbent trap will be kept below 68ºF during sampling to ensure that the XAD resin stays efficient during the testing. At the completion of the test run, a final leak test will be performed on the sampling system. The Method 0010 sampling train will be recovered as follows:

1. Container No. 1 - The filter will be removed from its holder, placed in a glass Petri dish, and sealed with Teflon tape.

2. Container No. 2 - The probe and nozzle will be brushed and rinsed three times (3X) with methanol/methylene chloride (1:1 v/v). The solvent rinses will be combined in a single sample bottle.

3. Container No. 3 - The sorbent trap will be removed, sealed with Teflon tape, weighed for moisture gain, and the weight recorded. The trap will be sealed in a Ziplock bag and refrigerated or stored on ice.

4. Container No. 4 - Each water impinger will be individually weighed for moisture gain and the weight recorded. The contents of the water impingers will then be placed in sample bottle.

4. Container No. 5 - The back half of the filter holder, coil condenser, and connecting glassware will be rinsed 3X methanol/methylene chloride (1:1 v/v). The solvent rinses will be combined in a single sample bottle. Each water impinger will also be individually rinsed methanol/methylene chloride (1:1 v/v). These solvent rinses will also be placed in Container No. 5.

6. The silica gel impinger will be weighed or moisture gain and the weight recorded. The silica gel will be inspected for possible reuse or replacement. If more than 50% used, the silica gel will be replaced with fresh silica gel.

Method 0010 requires sampling a minimum of 3.0 dscm of stack gas when demonstrating DRE of a semivolatile POHC. The Method 0010 sampling train will be operated a minimum of 180 minutes (3 hours) to sample a minimum of 3.0 dscm of stack gas during each sampling run to comply with the sampled volume requirement of Method 0010.

The Method 0010 sampling train front half, back half, and condensate fractions/components are prepared and analyzed as separate fractions. Surrogates are applied to each fraction per the analysis method (Table 5-4). The Method 0010 sampling train fractions will be prepared and extracts split follows:

- The methanol/methylene chloride probe/front-half filter holder rinses and the particulate filter will be combined, SVOC isotopically labeled surrogates applied, and Soxhlet extracted with methylene chloride. The extract will be split two ways, one-half for SVOC RCl analysis and one-half for ODCB analysis.
- The methanol/methylene chloride back-half filter holder/condenser/connecting glassware/impinger rinses and the XAD-2 resin will be combined, SVOC isotopically labeled surrogates applied, and Soxhlet extracted with methylene chloride. The extract will be split two ways, one-half for SVOC RCl analysis and one-half for ODCB analysis.
- The impinger water sample will have SVOC isotopically labeled surrogates applied and separatory funnel extracted with methylene chloride twice, once at an acid pH and once at a basic pH. The extract will be split two ways, one-half for SVOC RCl analysis and one-half for ODCB analysis.

6.2.4 EPA Method 5/26A for Particulate and HCl/Cl_2

An EPA Method 5/26A sampling train will be used to sample the stack gas for particulate and HCl/Cl_2. Figure 6-3 is a schematic of the Method 5/26A sampling train. Prior to each test run, the Method 5/26A sampling train will be assembled and leak checked. During sampling, the sampling rate will adjusted to maintain an isokinetic sampling rate. At the conclusion of each test run, after the final leak check is performed, the train will be recovered as follows:

1. The particulate filter will be recovered, placed in a glass petri dish, and labeled as Container No. 1.

2. The probe and nozzle will be brushed and rinsed with acetone. The front half of the filter holder will be rinsed with acetone. All acetone rinses will be collected in a single amber glass bottle and labeled as Container No. 2.

3. The contents of Impinger 1 will be weighed for moisture gain and then placed in Container No. 3. The impinger will then be rinsed with deionized water and the contents placed in this container.

2. The contents of Impingers 2 and 3 will be weighed for moisture gain and then placed in Container No. 4. The impingers will then be rinsed with deionized water and the contents placed in this container.

3. The contents of Impingers 4 and 5 will be weighed for moisture gain and then placed in Container No. 5. The impingers will then be rinsed with deionized water and the contents placed in this container.

4. Impinger 6 (indicating silica gel) will be weighed for moisture gain and inspected for possible reuse or replacement. If more than 50% used, the silica gel will be replaced with fresh silica gel.

The chloride concentrations of the deionized water impinger samples, the sulfuric acid impinger samples and the sodium hydroxide impinger samples will be reported separately. Analyses of these samples will be conducted using EPA Method 26A.

The stack gas filterable particulate emissions are determined by analysis of the Method 5/26A sampling train tare weighed filter and front-half acetone probe rinses. The tare weighed particulate filter PM catch is determined by the differential weight of the particulate collected. Filter samples are dried to a constant weight to the nearest 0.1 mg. Constant weight shall mean a difference between two consecutive weighings of no more than 0.5 mg.

The acetone probe rinse fraction is transferred to a tare weighed flask, evaporated and dried to a constant weight to the nearest 0.1 mg. Constant weight shall mean a difference between two consecutive weighings of no more than 0.5 mg.

The corresponding test run filter and probe rinse residue differential weights are added together. The sum is reported as the test run filterable particulate catch.

Precision for the particulate analyses is determined via replicate weighings. Accuracy is determined by using Class-S weight to verify the scale accuracy.

The stack gas HCl/Cl_2 is sampled by sparging the sampled gas through impingers containing 0.1N H_2SO_4 (acid) and 0.1N NaOH (alkaline) solutions in series. In the acid impingers, HCl gas is captured. Any Cl_2 in the sampled stack gas passes through to the acid impingers and is captured in the alkaline impingers. The chloride concentrations of the acid and alkaline impinger samples are analyzed separately for chloride ion and are reported as HCl and Cl_2 catches, respectively. During the sampling train recovery, the pH of the NaOH impingers are checked separately and noted on the sampling train recovery sheet. Precision for these samples is determined through the use of duplicate analyses of the calibration standard, QC, reagent blank and field samples. Accuracy is determined by matrix spike analyses.

In the alkaline impinger, Cl_2 is captured in solution by its dissociation into chloride ion (Cl^-) and hypochlorite ion (OCl^-). Sodium thiosulfate ($Na_2S_2O_3$) is added to the recovered NaOH solution to convert the hypochlorite (OCl^-) in the sample to chloride (Cl^-). The analysis of the alkaline impinger may include additional thiosulfate addition by the laboratory analyst to complete the conversion of the hypochlorite (OCl^-) in the sample to chloride (Cl^-). The sample is then analyzed for chloride ion concentration. In the data reduction, the chloride analysis result for the alkaline impingers is reported as Cl_2.

The analysis of Method 26A includes H_2SO_4, NaOH and deionized water reagent blanks to assess blank contamination. Precision for the chloride analyses is determined through the use of duplicate analyses of all calibration standards, all QC samples and all field samples. Accuracy is determined by matrix spike analyses of field samples and reagent blanks.

6.2.5 EPA Method 5/202 for Total PM

An EPA Method 5/202 sampling train will be used to sample the stack gas stack gas for filterable and condensable (total) particulate emissions. Figure 6-4 is a schematic of the Method 5/202 sampling train. Prior to each test run, the Method 5/26A sampling train will be assembled and leak checked. During sampling, the sampling rate will adjusted to maintain an isokinetic sampling rate.

The stack gas filterable and condensable particulate emissions are determined by separate analysis of the Method 5/202 sampling train tare weighed filter, the front-half acetone probe rinses, condenser rinses and ambient impinger contents, ambient filter, and cold (iced) impinger contents.

The tare weighed particulate filter PM catch is determined by the differential weight of the particulate collected by the Method 5/202 sampling train. Filter samples are dried (desiccated) to a constant weight to the nearest 0.1 mg. Constant weight shall mean a difference between two consecutive weighings of no more than 0.5 mg.

The acetone probe rinse fraction is transferred to a tare weighed flask, evaporated and dried to a constant weight to the nearest 0.1 mg. Constant weight shall mean a difference between two consecutive weighings of no more than 0.5 mg.

The corresponding test run filter and probe rinse residue differential weights are added together. The sum is reported as the test run filterable particulate catch.

The ambient impinger contents, condenser and impinger solvent (acetone and hexane) rinses, ambient filter, and cold (iced) impinger contents are analyzed separately. Each fraction is evaporated or dried (desiccated) to a constant weight to the nearest 0.1 mg. Constant weight shall mean a difference between two consecutive weighings of no more than 0.5 mg. The sum of the respective fraction analyses is reported as the test run condensable particulate catch.

The analysis of the Method 5/202 sampling train includes a field blank train, and particulate, acetone, hexane, and deionized water reagent blanks to assess blank contamination. Precision for the particulate analyses is determined via replicate weighings. Accuracy is determined by using Class-S weight to verify the scale accuracy.

6.2.6 SW-846 Method 0031 SMVOC

A SW-846 Method 0031 SMVOC sampling will be used to sample stack gas for VOC RCI. Figure 6-5 is a schematic of the Method 0031 sampling train. The test program includes a target list of VOC compounds for the SMVOC analyses. The SMVOC sampling equipment will be inspected and leak checked prior to each test run. Four sets of SMVOC tubes will be used during each sampling run to sample a nominal 20 liters of stack gas per tube set. SMVOC sampling will be conducted at a nominal rate of 0.50 liters per minute for 40 minutes per tube set. Three of the four tube sets will be analyzed by Method 5041A/8260D. The fourth tube set will serve as an archive set in the event of sample breakage during shipping and

handling. The condensate will also be analyzed via Method 8260D. Field blank and trip blank tube sets may be analyzed as a single sample or separately.

6.3 FIELD QUALITY CONTROL SAMPLES

Field QC samples will be collected during the test to provide an indication of quality assurance for the test samples. The field QC samples include:

- Spiked XAD-2 resin blanks for Method 23 (PCB & PCDD/PCDF) retained by the laboratory and included with the field samples when they are delivered to the laboratory
- Spiked XAD-2 resin blanks for Method 0010 (SVOC RCl & ODCB) retained by the laboratory and included with the field samples when they are delivered to the laboratory
- Blank train for Method 23 (PCB & PCDD/PCDF)
- Blank train for Method 0010 (SVOC RCl & ODCB)
- Blank train for Method 5/202 (PM)
- Spiked Tenax® and Anasorb™ 747 tube blanks for SMVOC retained by the laboratory and included with the field samples when they are delivered to the laboratory
- Tenax® and Anasorb™ 747 tubes and deionized water field and trip blanks for SMVOC
- Reagent blanks for all sampling trains.

Table 6-1 includes the field QC samples that will be collected.

6.3.1 Spiked Resin Blanks

During the preparation of the Tenax® and Anasorb™ 747 tube sets for the test program, two SMVOC Tenax® and Anasorb™ 747 tube sets will be spiked with standard surrogate spike compounds. The SMVOC tube preparation laboratory, to demonstrate the resin is free of background contamination, and to confirm that efficient surrogate recoveries are, achievable will analyze these samples.

Two XAD-2 resin traps will prepared for both the Method 23 PCB and PCDD/PCDF and Method 0010 SVOC RCl and ODCB sampling trains. These traps will be spiked with a sampling surrogate and matrix spike compounds. These samples will be extracted and analyzed for by the XAD-2 trap preparation laboratory to demonstrate the resin is free of background contamination, and to confirm that efficient surrogate recoveries are achievable.

6.3.2 SMVOC Field Blanks

Field blanks are sampling media that are handled at the sampling location in the same manner as the actual test samples. However, these media are not used to collect stack gas samples. The field blank samples will be collected and analyzed to demonstrate that the sample handling procedures do not expose the samples to contaminants. This test program includes collecting one set of SMVOC tubes as field blanks

once during each test run (three samples total per test condition). Each field blank SMVOC tube set is opened in the field by the SMVOC operator during the sampling run and are allowed to remain open for a period equivalent to the time required for a tube set change-out during testing. The field blank set is then sealed up, labeled and handled in the same manner as other SMVOC samples. The compounds found in field blanks reflect exposure to field fugitives, laboratory contaminants and resin degradation products, and are used to assess any contamination that can impact test results.

6.3.3 SMVOC Trip Blanks

Trip blanks are similar to field blanks in that they are used to assess contamination resulting from sample shipment. With each shipment of SMVOC samples from the test site to the laboratory, a set of SMVOC tubes that have remained sealed as shipped from the laboratory to the field to be used as trip blanks. Additionally, a pair of volatile organic analysis (VOA) vials filled with organic free water is included with the SMVOC samples shipped from the test site back to the laboratory. The trip blank and organic free water analyses demonstrate that the samples are not exposed to contamination during transport from the field to the laboratory.

6.3.4 Blank Trains and Reagent Blanks

Blank train samples are the samples recovered from sampling trains that have been assembled and charged with all the required chemical reagents and collection media in the same manner as the sampling trains used to sample the stack gases. The sampling trains are leak checked and heated to temperature in a location near the stack. The sampling train remains sealed at the stack location for a period equivalent to the length of time the corresponding sampling train is operated during the test run. The blank train is then recovered in the same way that actual stack gas sampling trains are recovered. The recovered blank train components are labeled as blank train samples and submitted for analysis with the actual stack gas train samples. The results of the blank train samples provide an indication of possible contamination introduced to the samples by reagents, glassware, sampling environment, and sampling recovery. The blank train samples for the stack sampling trains used during this test program will be collected as summarized in Table 6-1. For this test program one blank train for Method 23 PCB & PCDD/PCDF, Method 0011 SVOC RCl and ODCB, and one Method 5/202 blank train for total particulate matter will be collected for analysis.

Reagent blanks are samples of the reagent source solvents, solutions, and other media used in stack sampling. Reagent blank samples for all sampling trains as summarized in Table 6-1.

Table 6-1. CHDP Train I TSCA Trial Burn Total Field Samples

Sample Name	Sampling Reference Method	Sample Container	Analysis	General Procedure/Frequency	Test	Field QC	Total Field Samples
Method 23 Particulate Filter	Method 23	Petri Dish	PCB & DF	Collect integrated sample for PCB & DF during each test run. Sample for 180 minutes with a target volume of 2.5 dry standard cubic meters of stack gas.	3	1	4
Method 23 XAD-2 Resin		Resin Trap	PCB & DF		3	1	4
Method 23 FH & BH Acetone & Toluene Rinses		500 mL glass sample bottle	PCB & DF		3	1	4
Method 23 Condensate		2.5-liter glass sample bottle	PCB Only		3	1	4
Method 23 Impinger Acetone & Toluene Rinses		500 mL glass sample bottle	PCB Only		3	1	4
Method 23 Acetone Reagent Blank		250 mL glass sample bottle	PCB & DF	Reagent Blank	--	1	1
Method 23 Toluene Reagent Blank		250 mL glass sample bottle	PCB & DF	Reagent Blank	--	1	1
Method 0010 Particulate Filter	Method 0010	Petri Dish	SVOC RCl & ODCB	Collect integrated sample for SVOC RCl & ODCB during each test run. Sample for 180 minutes with a target volume of 3.0 dry standard cubic meters of stack gas.	3	1	4
Method 0010 XAD-2 Resin		Resin Trap	SVOC RCl & ODCB		3	1	4
Method 0010 FH MeOH/MeCl2 Rinses		500 mL glass sample bottle	SVOC RCl & ODCB		3	1	4
Method 0010 BH MeOH/MeCl2 Rinses		250 mL glass sample bottle	SVOC RCl & ODCB		3	1	4
Method 0010 Condensate		2.5-liter glass sample bottle	SVOC RCl & ODCB		3	1	4
Method 0010 Impinger MeOH/MeCl2 Rinses		500 mL glass sample bottle	SVOC RCl & ODCB		3	1	4
MeOH/MeCl2 Reagent Blank		250 mL glass sample bottle	SVOC RCl & ODCB	Reagent Blank	--	1	1

Table 6-1. CHDP Train I TSCA Trial Burn Total Field Samples (cont'd)

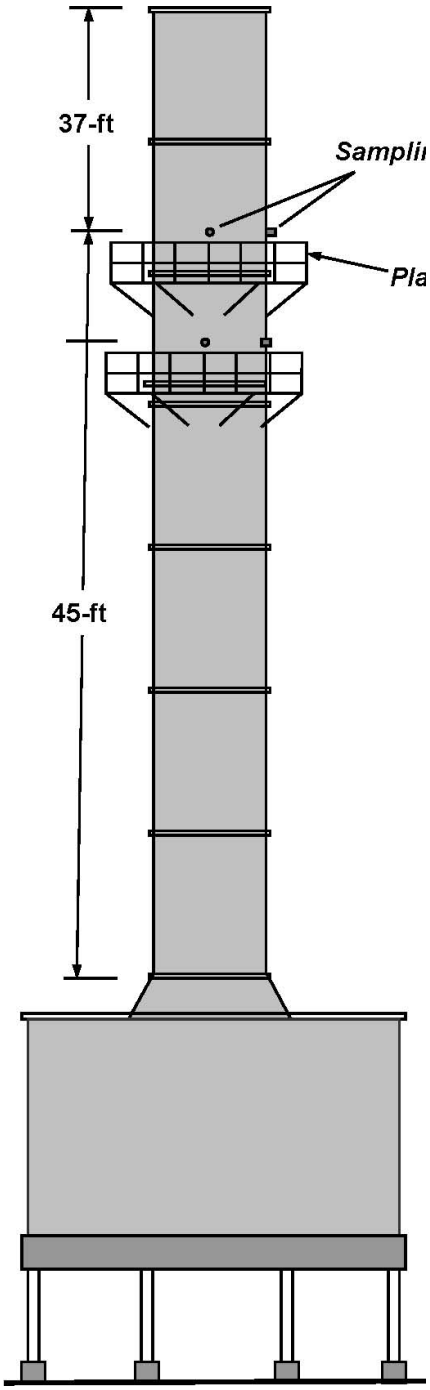
Sample Name	Sampling Reference Method	Sample Container	Analysis	General Procedure/Frequency	Test	Field QC	Total Field Samples
Method 5/202 Particulate Filter	EPA Method 5/202	Petri Dish	Filterable Particulate	Collect integrated sample for particulate for 120 minutes during each test run.	3	1	4
Method 5/202 Front Half Acetone Rinses		250 mL glass sample bottle	Filterable Particulate		3	1	4
Method 5/202 Back-Half-Filter Holder, Condenser, and Ambient Impinger Contents and Deionized Rinses		1-liter glass sample bottle	Condensable Particulate		3	1	4
Method 5/202 Back-Half-Filter Holder, Condenser, and Ambient Impinger Acetone and Hexane Rinses		500 mL glass sample bottle	Condensable Particulate		3	1	4
Method 5/202 Ambient Filter		Petri Dish	Condensable Particulate		3	1	4
Method 5/202 Cold (Iced) Impinger Contents and Deionized Water Rinses		500 mL polyethylene sample bottle	Condensable Particulate		3	1	4
Method 5/202 Particulate Filter Reagent Blank		Petri Dish	Particulate	Reagent Blank	--	1	1
Method 5/202 Acetone Reagent Blank		250 mL glass sample bottle	Particulate	Reagent Blank	--	1	1
Method 5/202 Hexane Reagent Blank		250 mL glass sample bottle	Particulate	Reagent Blank	--	1	1

Table 6-1. CHDP Train I TSCA Trial Burn Total Field Samples (cont'd)

Sample Name	Sampling Reference Method	Sample Container	Analysis	General Procedure/Frequency	Test	Field QC	Total Field Samples
Method 5/202 Particulate Ambient Filter Reagent Blank	EPA Method 5/202 (cont'd)	Petri Dish	Particulate	Reagent Blank	--	1	1
Method 5/202 Deionized Water Reagent Blank		250 mL glass sample bottle	Particulate	Reagent Blank	--	1	1
Method 5/26A Particulate Filter	EPA Method 5/26A	Petri Dish	Filterable Particulate	Collect integrated sample for PM & HCl/Cl_2 during each test run. Sample for a minimum 120 minutes.	3	1	4
Method 5/26A Front Half Acetone Rinses		250 mL glass sample bottle	Filterable Particulate		3	1	4
Method 5/26A Deionized Water Impinger and Rinses		1-liter polyethylene sample bottle	Condensed Particulate & Chloride Ion		3	1	4
Method 5/26A Sulfuric Acid Impingers and Rinses		1-liter polyethylene sample bottle	Chloride Ion		3	1	4
Method 5/26A Sodium Hydroxide Impingers and Rinses		1-liter polyethylene sample bottle	Chloride Ion		3	1	4
Filter Reagent Blank		Petri Dish	Particulate		--	1	1
Acetone Reagent Blank		250 mL glass sample bottle	Particulate		--	1	1
Method 5/26A Deionized Water Reagent Blank		250 mL polyethylene sample bottle	Particulate & Chloride Ion	Reagent Blank	--	1	1
Method 5/26A Sulfuric Acid Reagent Blank		250 mL polyethylene sample bottle	Chloride Ion	Reagent Blank	--	1	1
Method 5/26A Sodium Hydroxide Reagent Blank		250 mL polyethylene sample bottle	Chloride Ion	Reagent Blank	--	1	1

Table 6-1. CHDP Train I TSCA Trial Burn Total Field Samples (cont'd)

Sample Name	Sampling Reference Method	Sample Container	Analysis	General Procedure/Frequency	Test	Field QC	Total Field Samples
SMVOC Resin Tubes	SW846 Method 0031	SMVOC Resin Tube Sets	VOC RCI	Collect four (4) tube sets per test run ~20 liters of stack gas sampled per tube set pair.	12	--	12
SMVOC Condensate		40 mL glass VOA	VOC RCI	Collect one (1) composite stack gas condensate for each test run.	3	--	3
SMVOC Field Blank Resin Tubes		SMVOC Resin Tube Sets	VOC RCI	Collect one (1) tube set per test run.	1	--	1
SMVOC Trip Blank Resin Tubes		SMVOC Resin Tube Sets	VOC RCI	Collect one (1) tube set per test condition.	1	--	1
SMVOC Condensate Trip/Field Blank		40 mL glass VOA	VOC RCI	Collect one (1) glass VOA per test condition.	1	--	1
TOTAL SAMPLES							123



STACK INSIDE DIAMETER: 60 inches

TRAVERSE DISTANCE FROM POINT NO. TO INSIDE WALL, inches (percent):

1. **2.6 (4.4%)**
2. **8.8 (14.6%)**
3. **17.8 (29.6%)**
4. **42.3 (70.4%)**
5. **51.3 (85.4%)**
6. **57.4 (95.6%)**

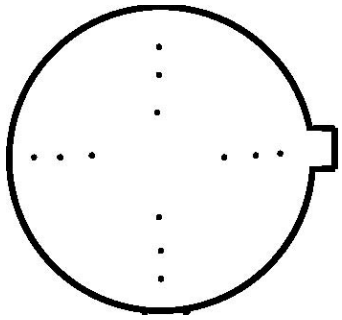


Figure 6-1. Stack Sampling Location Schematic

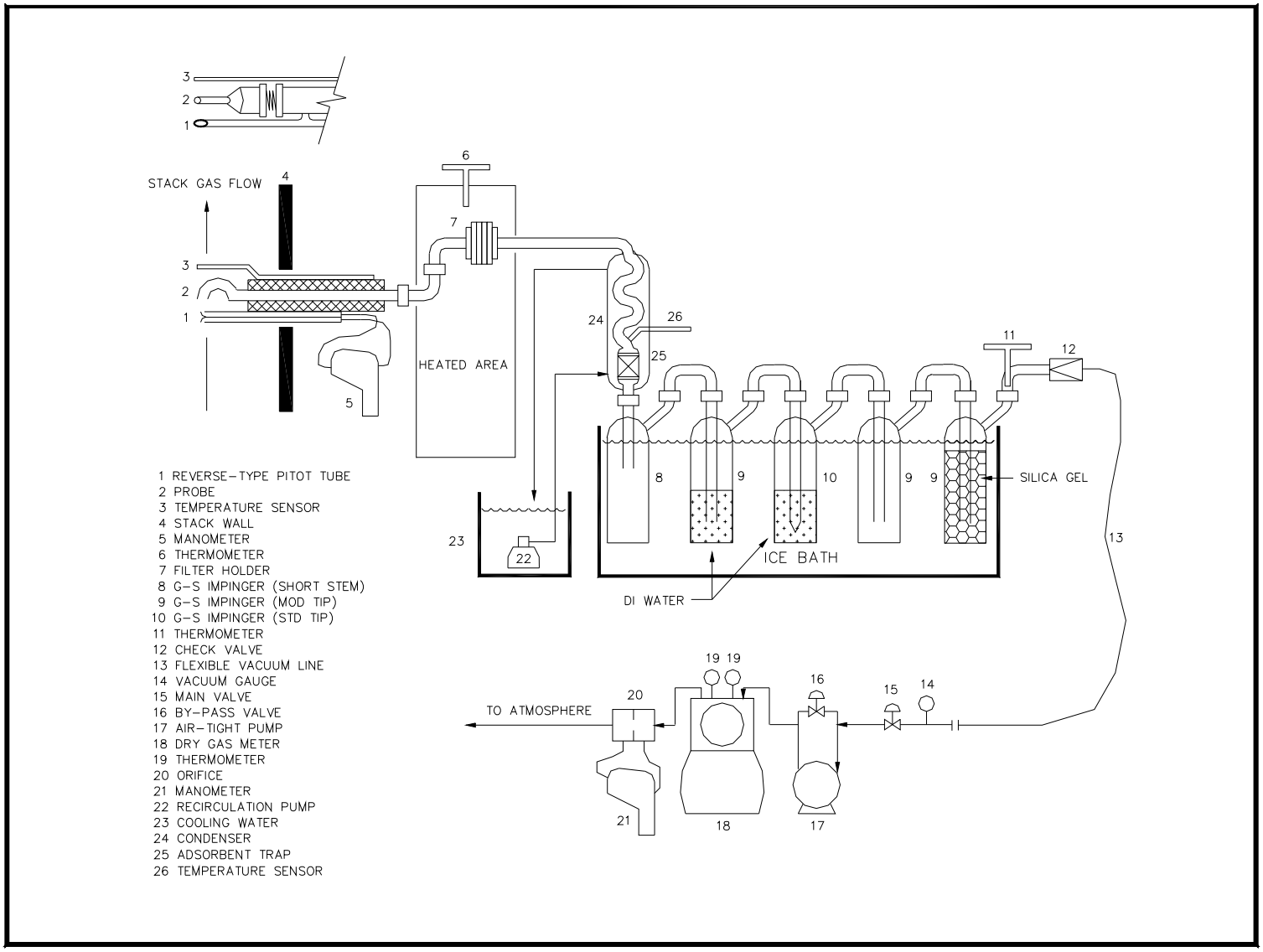


Figure 6-2. Method 23 or Method 0010 Sampling Train Schematic

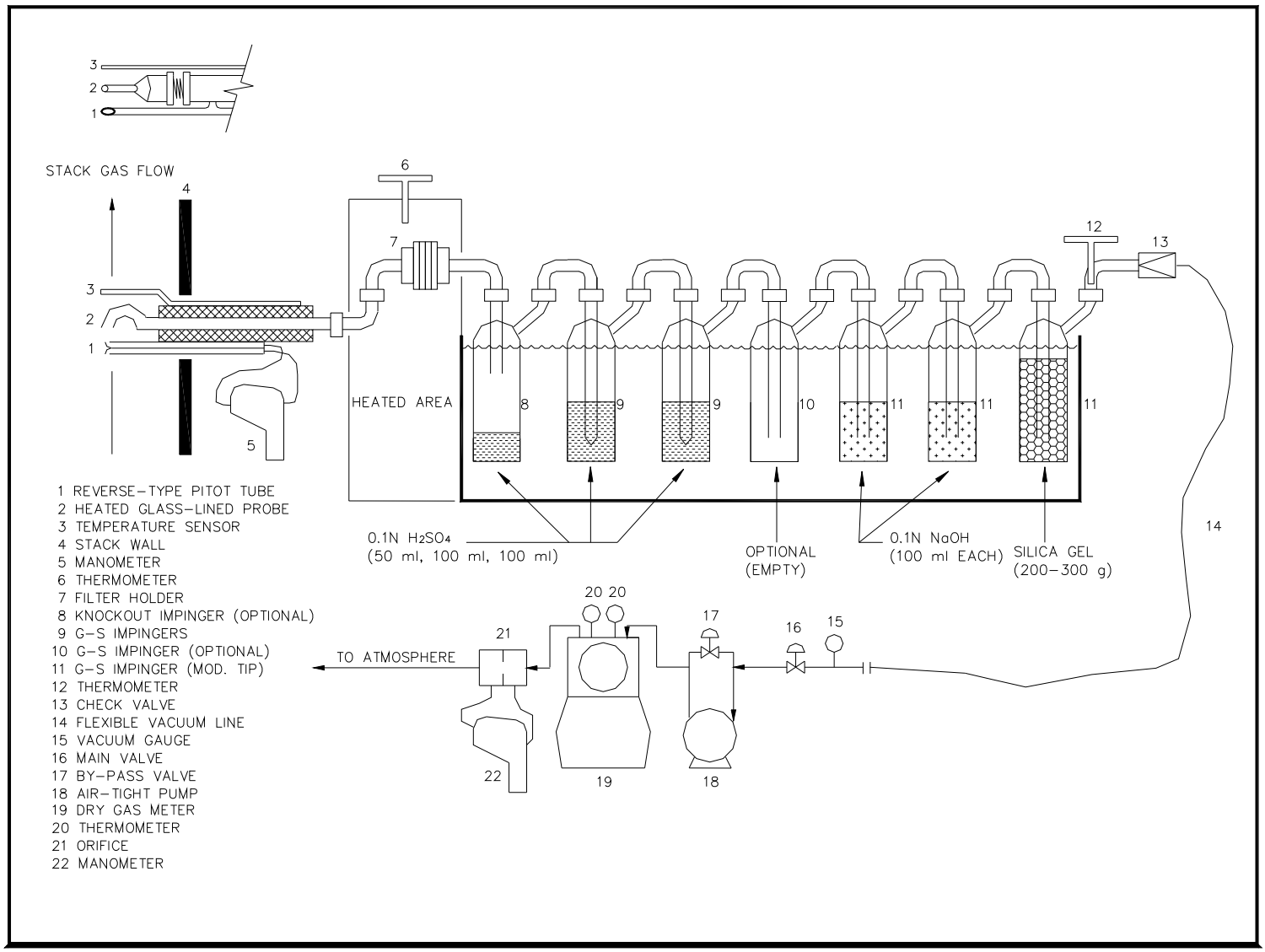


Figure 6-3. Method 5/26A Sampling Train Schematic

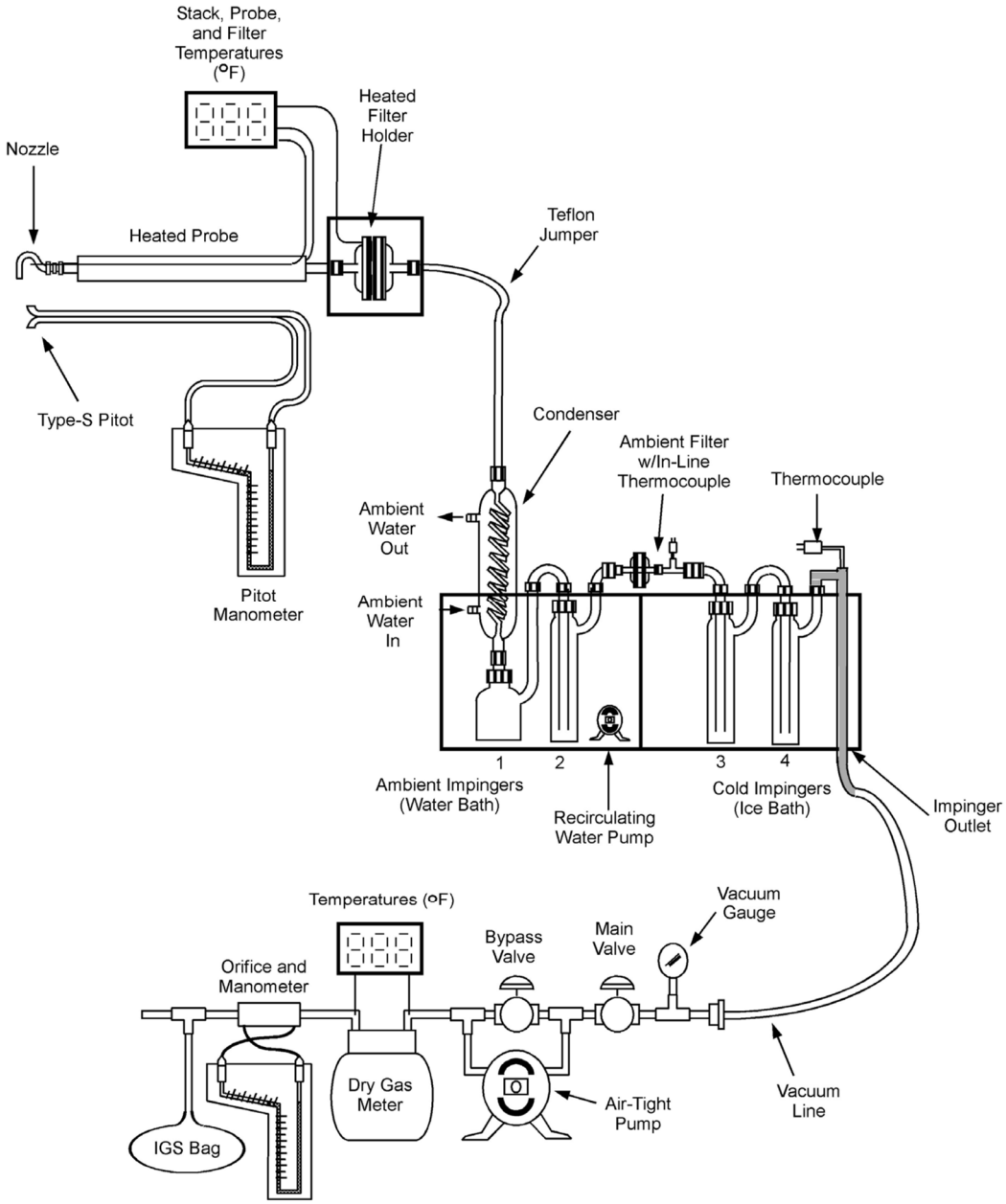


Figure 6-4. Method 5/202 Sampling Train Schematic

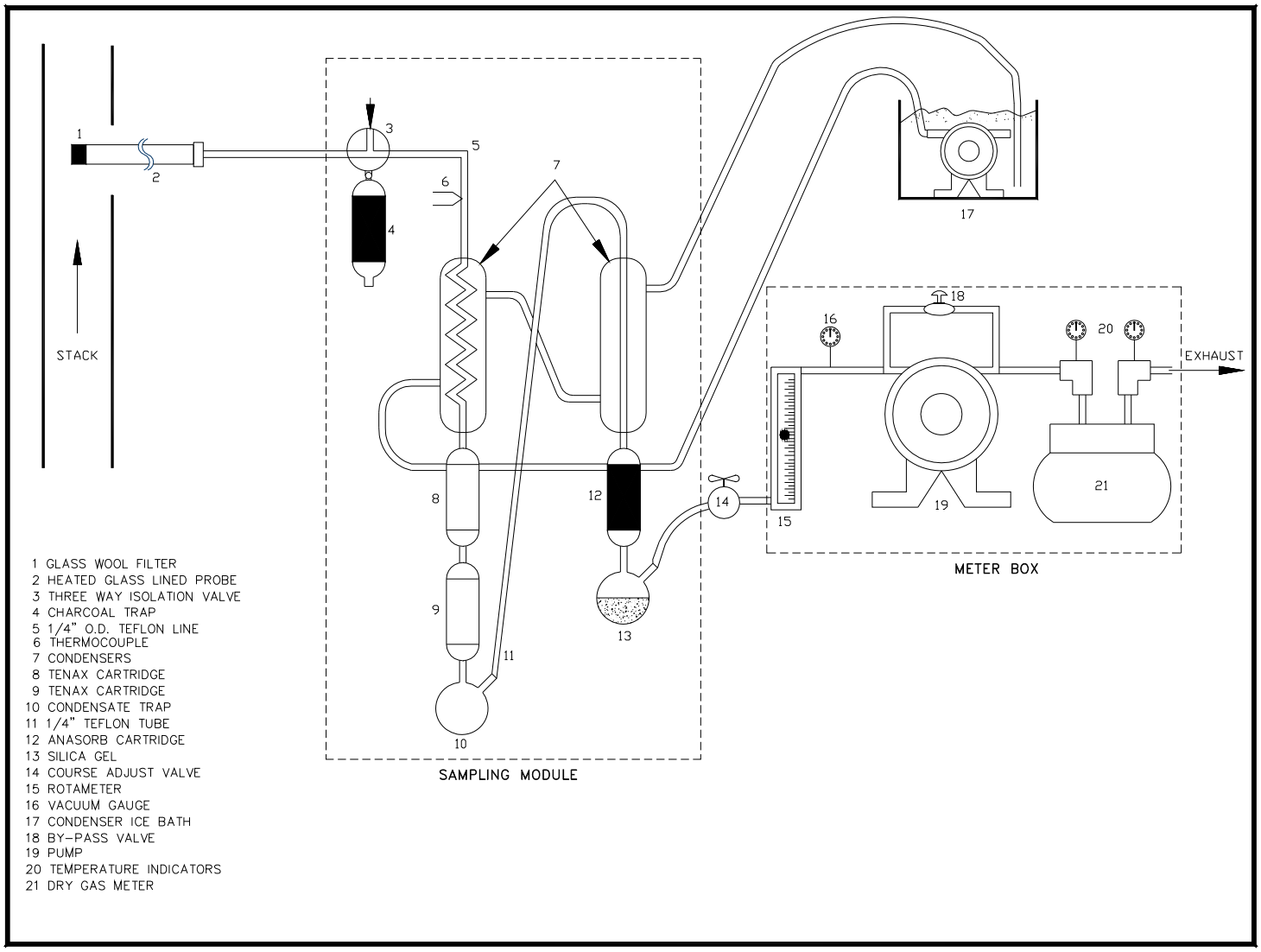


Figure 6-5. Method 0031 Sampling Train Schematic

7.0 SAMPLE HANDLING, TRACEABILITY, AND HOLDING TIMES

7.1 SAMPLE CUSTODY AND SECURITY

A sample will be considered to be in the custody of a person if it is in his or her possession, in his or her sight, or secured by that person in an approved location accessible only to authorized personnel. Evidence tamper seals will be placed on each sample container.

Sample collection will include preparation of a chain of custody (COC). The COC will accompany the samples from the field to the analytical laboratory. If overnight couriers are utilized, the air bill will serve to document the transfer of custody to the courier. The courier's air bill becomes part of the chain of custody (COC) record. Upon transfer of the samples from the courier to the analytical laboratory, sample custody will be maintained by the analytical laboratory performing the analyses.

Samples for organic analysis (SMVOC, Method 23, etc.) will be maintained on ice ($4\pm2^{o}C$) and shipped to the analytical laboratory in insulated shipping containers. All ice used for shipping samples shall be double bagged in Ziplock® bags to prevent leakage of water during shipping. "Blue ice" may also be used to chill samples. Samples not requiring chilling (particulate, chloride, properties, etc.) may be shipped without ice.

7.2 SAMPLE IDENTIFICATION

Refer to Figure 7-1. In consultation with the CPT Manager, the Laboratory Project Manager will prepare the master sample list for the test program. Once the master sample list is set, the alpha-numeric sample numbers will be assigned to every sample. The sample numbers are used to track individual samples from collection through analysis. These items will be shipped to the test site in sealed transport containers. The stack sampling contractor will provide the sampling reagents for field use.

7.3 STACK SAMPLE COLLECTION FORMS

While stack sampling is being performed, the sampling technician will complete a stack sampling record. An example stack field sampling record for iso-kinetic sampling is presented as Figure 7-2. The stack sampling record will be completed in its entirety for every sampling train. This will provide information necessary to perform the emissions calculations. The sampling technician shall provide the completed stack sampling record to the Stack Sampling Coordinator at the completion of each sampling run.

7.4 SAMPLE LABELING

An example sample label format is presented in Figure 7-3. Each sample container will be labeled to show the source of the sample as CHDP; the project identification; sampler's initials; laboratory to which the sample will be shipped; the unique alphanumeric sample number; date and time; sample description; test number; and run number. If a single sample requires multiple containers, the number of the container and the total number of containers will be noted on the label. Project samples will be tracked via the assigned

unique alphanumeric sample numbers. The sample number will appear on the sample label, the request for analysis (RFA), and the chain of custody (COC).

7.5 SAMPLE COLLECTION CHECKLIST

The master sample list identifies every sample by the assigned unique alphanumeric sample numbers (Refer to Figure 7-1), and the corresponding analytical test(s) required. As field samples are acquired and routed through the Sample Custodian, the samples will be checked off against the master list to ensure that all of the appropriate samples have been collected.

7.6 REQUEST FOR ANALYSIS/CHAIN OF CUSTODY

Collected samples will be shipped from the site to the laboratory in sealed containers with COC and RFA forms. Example RFA and COC forms are presented as Figures 7-4 and 7-5, respectively. The Sampling Technician and Sample Custodian will complete the COC and RFA forms for every sample. Some samples may consist of several sub-samples. Each individual component of the sample will be listed separately on the RFA/COC with its own unique alphanumeric sample identification number. The samples will be preserved as needed, and will remain in the possession of the Sample Custodian. The Sample Custodian will secure the samples in a location accessible only to authorized personnel until custody is transferred to a courier for delivery to the laboratory.

7.7 SAMPLE SHIPMENT

Field samples may be transported directly to the analytical laboratory by the test management or sampling contractor. If the samples are shipped via overnight courier, e.g., Federal Express, an individual trained in Federal Department of Transportation (DOT) and International Air Transport Association (IATA) regulations will package the samples to assure compliance with the applicable portions of these regulations.

Prior to shipping any samples, the condition of the samples will be verified: sample temperatures for organic analyses samples, condition of all containers, level of sample within all containers (to be marked on the outside of the container), and type of packing material used. RFA/COCs will be checked to verify there is a RFA and COC for every sample being shipped.

7.8 SAMPLE DELIVERY

Upon receipt of samples at the laboratory, the receiver will accept custody for the shipment by an exchange of signatures with the delivering agent. The shipping containers will be opened by the Laboratory Project Manager or his/her designee and inspected. The container contents will verified against the accompanying RFA/COC. Any damage to the contents of the shipping container or deviations from the original shipment documents will be noted on the COC. A labeled temperature blank (labeled bottle or VOA vial with water) will be shipped in every container with samples for organic analysis expressly for the purpose of determining

sample temperatures. The Laboratory Project Manager or designee will, immediately upon opening the sample packaging, open the temperature blank and measure the temperature of the water inside the temperature blank using a thermometer. This temperature will be recorded on the COCs and any applicable laboratory documentation (sample receipt log).

Individual samples will be sorted and directed to the respective laboratory section responsible for the analyses noted on the RFA. Samples will be secured in a location accessible only to authorized personnel. Samples for organic analysis shall be secured in refrigerated sample storage. The COC forms are used specifically to track the samples. To provide specific instructions to the analysts, the RFAs will accompany the respective COCs.

Transfer of custody to and within the analytical laboratory is addressed in the Laboratory's QA Manual. Upon completion of analysis, samples will be maintained at the laboratory under COC until they are released for proper disposal.

7.9 SAMPLE PRESERVATION

Table 7-1 shows the appropriate containers, preservation, and holding times for all samples to be collected during the test.

Table 7-1. Sample Containers, Preservation, and Holding Times

Parameter	Sample Name/Matrix	Sample Containers	Preservation	Maximum Holding Time[a]
Stack Gas PCDD/PCDF & PCB	Stack Gas Method 23 Filter	Glass petri dish	Chill to 4°C	30 days until extraction 45 days after extraction
	Stack Gas Method 23 Sorbent Tube	Standard cartridge wrapped in aluminum foil and sealed in plastic bag	Chill to 4°C	
	Stack Gas Method 23 Solvents	Amber glass bottles with Teflon-lined caps	Chill to 4°C	
Stack Gas SVOC RCl & ODCB	Stack Gas Method 0010 Filter	Glass petri dish	Chill to 4°C	14 days until extraction 40 days after extraction
	Stack Gas Method 0010 Sorbent Tube	Standard cartridge wrapped in aluminum foil and sealed in plastic bag	Chill to 4°C	
	Stack Gas Method 0010 Solvents	Amber glass bottles with Teflon-lined caps	Chill to 4°C	
Stack Gas Particulate	Method 5/26A Filters	Glass or plastic petri dish	NA	180 days
	Method 5/26A Acetone Probe Rinses	Amber glass bottles with Teflon-lined caps	NA	180 days
	Method 5/26A Knockout Impinger Impingers Contents and Deionized water Rinses	Amber glass bottles with Teflon-lined caps	NA	180 days
Stack Gas Chloride	Method 26A Impinger Liquids	Amber glass bottles with Teflon-lined caps or polyethylene bottles	NA	30 days
Stack VOC RCl	Stack Gas SMVOC Tubes	Glass culture tube in foam cushioned plastic tube	Chill to 4°C	14 days
	Stack gas SMVOC condensate	Glass VOA vials with Teflon-lined lined caps or septum caps	Chill to 4°C	14 days
Liquid Waste	Liquid	Amber glass bottles with Teflon-lined caps	Chill to 4°C	30 days until extraction 45 days after extraction
Solid Waste	Solid/Semi-Solid	Wide mouth glass jars with Teflon-lined caps	Chill to 4°C	30 days until extraction 45 days after extraction

Clean Harbors Deer ParK, LLC
LaPorte, TX
Focus Project No. P-001616

THERMAL DESORBER TRIAL BURN MASTER SAMPLE LIST

Eurofins, Knoxville, TN
17-Mar-26

Field Sample No.		Test No.	Run No.	RFA/COC No.	Sample Source	Sample Description	Sample Container	Analytical Parameters	Analytical Laboratory	QC Analysis
A-	5001	1	1	001	Method 23 Train	Particulate Filter	Petri dish	PCB & DF	Eurofins-Knox	
A-	5002	1	1	001	Method 23 Train	Acetone & Toluene FH&BH Rinses	250 mL amber bottle	PCB & DF	Eurofins-Knox	
A-	5003	1	1	001	Method 23 Train	Acetone Reagent Blank	250 mL amber bottle	PCB & DF	Eurofins-Knox	RB
A-	5004	1	1	001	Method 23 Train	Toluene Reagent Blank	250 mL amber bottle	PCB & DF	Eurofins-Knox	RB
A-	5005	1	1	002	Method 5/26A Train	Particulate Filter	Petri dish	Filterable Particulate	Eurofins-Knox	
A-	5006	1	1	002	Method 5/26A Train	Acetone Probe Rinses	250 mL amber bottle	Filterable Particulate	Eurofins-Knox	
A-	5007	1	1	002	Method 5/26A Train	Knockout Impinger	2-L amber bottle	Cond. PM & Chloride	Eurofins-Knox	
A-	5008	1	1	002	Method 5/26A Train	H2SO4 Impingers	500 mL HPDE bottle	Chloride	Eurofins-Knox	
A-	5009	1	1	002	Method 5/26A Train	NaOH Impingers	500 mL HPDE bottle	Chloride	Eurofins-Knox	
A-	5010	1	1	002	Method 5/26A Train	H2SO4 Reagent Blank	250 mL HDPE bottle	Chloride	Eurofins-Knox	RB
A-	5011	1	1	002	Method 5/26A Train	NaOH Reagent Blank	250 mL HDPE bottle	Chloride	Eurofins-Knox	RB
A-	5012	1	1	002	Method 5/26A Train	DI Water Reagent Blank	250 mL HDPE bottle	Chloride	Eurofins-Knox	RB
A-	5013	1	1	003	Method 0010 Train	Particulate Filter	Petri dish	ODCB & SVOC RCI	Eurofins-Knox	
A-	5014	1	1	003	Method 0010 Train	MeOH MeCl2 FH Rinses	250 mL amber bottle	ODCB & SVOC RCI	Eurofins-Knox	
A-	5015	1	1	003	Method 0010 Train	MeOH MeCl2 BH Rinses	250 mL amber bottle	ODCB & SVOC RCI	Eurofins-Knox	
A-	5016	1	1	003	Method 0010 Train	Condensate	2-L amber bottle	ODCB & SVOC RCI	Eurofins-Knox	
A-	5017	1	1	003	Method 0010 Train	MeOH MeCl2 Imp Rinses	250 mL amber bottle	ODCB & SVOC RCI	Eurofins-Knox	
A-	5018	1	1	003	Method 0010 Train	MeOH MeCl2 Reagent Blank	250 mL amber bottle	ODCB & SVOC RCI	Eurofins-Knox	RB

Figure 7-1. Example Master Sample List

Isokinetic Stack Sample Data Collection Sheet

Contract No.	80201	Method:	Method 5/26A			Page 1 of 1	
Facility	Clean Harbors Deer ParK, LLC	Initial Leak Rate (ft^3 @ in.Hg)	<0.010 @ 10"			Operator	MJK
Source	Train I Stack	Final Leak Rate (ft^3 @ in.Hg)	<0.010 @ 10"			Pitot No.	K-004
Date	14-Apr-26	Start Time	0800	Meter No.	1442	PTCF	0.84
Condition No.	NA	End Time	0926	DGMCF	1.004	Init. Pitot Leak Check	0.0
Run No.	1	Duration (min)	120	ΔH @	1.645	Final Pitot Leak Check	0.0
Stat. Press. (in. H_2O)	-0.94	Bar. Press. (in.Hg)	29.73	Nozzle Dia.(")	0.251	Kf	2.3

Point	Time	Volume	ΔP	ΔH	Temperatures (°F)							Vacuum
No.	(24 Hr)	(ft^3)	(in. H_2O)	(in. H_2O)	Flue Gas	Probe	Filter	Impingers	Meter in	Meter Out	Cond. Exit	(in. Hg)
A-1	0800	352.13	0.78	1.79	294	225	258	68	103	105	NA	6.0
A-1	0805	353.94	0.78	1.79	294	260	257	67	105	104		6.0
A-2	0810	355.75	0.74	1.70	294	257	261	66	106	104		6.0
A-2	0815	357.48	0.74	1.70	294	261	258	66	107	104		6.0
A-3	0820	359.05	0.68	1.56	292	258	257	64	108	104		6.0
A-3	0825	360.75	0.68	1.56	292	257	258	63	109	104		6.0
A-4	0830	362.68	0.77	1.77	292	258	258	67	104	104		6.0
A-4	0835	364.68	0.77	1.77	292	258	256	67	109	103		6.0
A-5	0840	366.60	0.77	1.70	293	258	259	61	110	104		6.0
A-5	0845	368.55	0.77	1.70	289	256	258	61	108	104		6.0
A-6	0850	370.34	0.74	1.43	285	259	255	62	106	105		6.0
A-6	0855	372.06	0.74	1.43	290	258	255	62	105	103		6.0
STOP	0900	373.61										
B-1	0920	373.71	0.62	1.77	292	255	259	66	96	95		7.0
B-1	0925	375.47	0.62	1.77	292	259	257	65	96	95		7.0
B-2	0930	377.38	0.77	1.43	293	257	257	62	99	95		7.0
B-2	0935	379.11	0.77	1.29	289	257	258	62	102	95		6.0
B-3	0940	380.76	0.62	1.04	285	258	257	62	104	97		6.0
B-3	0945	382.26	0.56	1.10	290	257	253	61	106	99		7.0
B-4	0950	383.90	0.45	1.50	296	257	257	63	109	100		6.0
B-4	0955	383.96	0.56	1.50	296	253	258	64	111	101		6.0
B-5	1000	387.26	0.45	0.99	296	257	259	61	112	103		6.0
B-5	1005	388.76	0.44	0.94	297	258	258	60	112	104		5.5
B-6	1010	390.24	0.65	0.85	297	259	258	61	113	105		5.5
B-6	1015	391.59	0.65	0.85	294	258	257	61	112	105		5.5
END	1020	392.97										
Comments:												

Figure 7-2. Example Stack Sampling Record

Clean Harbors Deer ParK, LLC
LaPorte, TX
Focus Project No. P-001616

Sample Type:	Method 5/26A PM Filter	**Sample No.:**	**A-5005**
Test No. 1	**Run No.** 1	**Container(s):**	1 of 1
Analysis Required:	Particulate Method 5 (Gravimetric)		
Analysis Laboratory:	Eurofins, Knoxville, TN		
Date:	14-Apr-26	**Initials:**	MJK
Time:	1215	**Preservation:**	NA

Figure 7-3 Example Sample Label Format

Request for Analysis/Chain of Custody No. 002
Clean Harbors Deer ParK, LLC
LaPorte, TX
Focus Project No. P-001616

Eurofins-Knoxville Lot No. _H-XXXXXXXX_____
Eurofins-Knoxville Project No. ___XXXXXXX_____

Project Description:	CHDP TSCA Trial Burn
Client Project No.:	Focus Project No. P-001616
Test America Project No:	XXXXXXX
Client Project Mgr:	Chris McBride
	865-692-8662
Test America Contact:	Courtney Adkins
	865-291-3019

Laboratory Deliverable Requirements

Analytical Due Date: 21 days from lab receipt

Data Package Due Date: 30 days from lab receipt
Holding Time: 180 to analysis
Data Package Due Date: 30 days from lab receipt

Analytical Testing QC Requirements:
MS - Matrix Spike
MSD - Matrix spike duplicate
PDS - Post-digestion spike
DUP - Duplicate
BT- Blank train

Laboratory Destination:

Eurofins-Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
(865)-291-3000

Courier: Hand deliver

Project Deliverables:
Report analytical results on R-02 Reports and in data packages. Include "Field Number", "Sample Type", "test Number", and "Run Number" on all R-02 Reports.

Holding Time Requirements:	
Particulate	180 days to analysis

Field Sample No.	Test No.	Run No.	Sample Collection Date	Sample Container	Sample Description	Analysis Specifications	Project QC Requirements
A- 5005	1	1	14-Apr-26	Petri dish	Particulate Filter	Desiccate to constant mass; determine differential from logbook recorded original tare weight (EPA Method 5)	Replicate weighings
A- 5006	1	1	14-Apr-26	250 mL amber bottle	Acetone Probe Rinses	Transfer sample to tare weighed beaker; evaporate/desiccate to constant mass; determine differential mass (EPA Method	Replicate weighings
A- 5007	1	1	14-Apr-26	250 mL amber bottle	Knockout Impinger	Transfer sample to tare weighed beaker; evaporate/desiccate to constant mass; determine differential mass (EPA Method	Replicate weighings

Figure 7-4. Example Request for Analysis

Request for Analysis/Chain of Custody No. 002
Clean Harbors Deer ParK, LLC
LaPorte, TX
Focus Project No. P-001616

Sample Receipt Log and Condition of the Samples Upon Receipt

Please fill in the following information:		Comments
		(Please write "NONE" if no comment is applicable.)
(1)	Record the identities of any samples that were listed on the Request for Analysis form but were not found in the sample shipment	
(2)	Record the sample shipping cooler temperature of all coolers transporting samples listed on the Request for Analysis form.	
(3)	Record any apparent sample loss or breakage.	
(4)	Record any unidentified samples transported with this shipment of samples.	
(5)	Indicate if all samples were received according to the project's required specifications (i.e, no non-conformances).	

Custody Transfer

	Name	Company	Date/Time
Relinquished by:			
Accepted by:			
Relinquished by:			
Accepted by:			
Relinquished by:			
Accepted by:			

Figure 7-5. Example Chain of Custody

8.0 SPECIFIC CALIBRATION PROCEDURES AND FREQUENCY

The objective of this section is to assure that gas sampling equipment and analytical instruments are performing properly before conducting the test and analyzing samples. Equipment and instruments used to generate data for determining compliance with performance requirements or to establish quantitative allowable operating limits will be calibrated according to the manufacturer's instructions, prior to and/or during the test as necessary.

The calibration procedures are separated into groups according to the personnel who will perform them. Stack sampling equipment will be calibrated by the stack sampling contractor and analytical instruments will be calibrated by the contracted laboratory personnel. The calibration procedures for stack gas sampling and laboratory analytical instruments are described in the following subsections.

8.1 STACK SAMPLING EQUIPMENT

Sampling equipment is calibrated according to the criteria specified in the reference method being employed. In addition, the guidelines set forth in the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods (EPA-600/4-77-027b) will be followed. Dry gas meters, orifices, nozzles, pitot tubes, etc. are calibrated in accordance with this document. The range of the calibration is specified for all environmental measurements to encompass the range of probable experimental values. This approach ensures that all results are based upon interpolative analyses rather than extrapolative analyses.

Calibrations are designed to include, where practical, at least three measurement points evenly spaced over the range. This practice minimizes the probability that false assumptions of calibration linearity will be made. In addition, it is common practice to select, when practical, at least one calibration value approximating the levels anticipated in the actual measurement. Typically, calibration frequency is dictated by the need to demonstrate the stability of the calibration value over the course of measurements. Calibrations are made both pre- and post-test to accomplish the demonstration of stability.

Following the test program, calibrations are checked on all relevant items of sampling equipment to ensure the validity of data collected in the field. New items for which calibration is required are calibrated before initial field use. Equipment whose calibration status may change with use or time is inspected in the field before testing begins and again upon return from each field use. When an item of equipment is found to be out of calibration, it is repaired and recalibrated or retired from service. All equipment is periodically recalibrated in full, regardless of the outcome of these regular inspections.

Data obtained during calibrations are recorded on standardized forms, which are checked for completeness and accuracy by management personnel. Data reduction and subsequent calculations are performed using standard procedures, and are computerized where appropriate. Calculations are checked at least twice for accuracy. Copies of calibration forms are included in the test or project reports.

Emissions sampling equipment requiring calibration include pitot tubes, pressure gauges, thermometers, dry gas meters, and barometers. The following sections elaborate on the calibration procedures for these specific equipment items.

8.1.1 Pitot Tubes

All Type S pitot tubes, whether separate or attached to a sampling probe, are inspected in accordance with the geometry standards contained in EPA Method 2.

For Type S pitot tubes with a D_t between 3/16 and 3/8 inches, the pitot tube may be calibrated according to the procedure outlined in Sections 10.1.2 through 10.1.5 of Method 2 before and after the test, or a baseline (isolated tube) coefficient value of 0.84 may be assigned.

All Type S pitot tubes >3/8 inches are calibrated over an eight-point range with a wind tunnel and a calibration coefficient is calculated for each pitot tube. The acceptance limits are listed in Table 8-1.

8.1.2 Differential Pressure Gauges

Some meter consoles are equipped with 10-inch water column (W.C.) inclined-vertical manometers. Fluid manometers do not require calibration other than leak-checks. Manometers are leak-checked in the field prior to each test series.

8.1.3 Digital Temperature Indicator

One digital temperature indicator is used to determine the flue gas temperature, probe temperature, oven temperature, "train temperature" and dry gas meter temperature. The digital temperature indicator is calibrated over a seven-point range (32°F-450°F) using an ASTM mercury-in-glass thermometer as a reference. The calibration is acceptable if the agreement is within ±2% or 2°F from 50°F-180°F.

8.1.4 Dry Gas Meter and Orifice

A calibrated wet test meter is used to calibrate the dry gas meter and orifice. The full calibration procedure is used to obtain the calibration factor of the dry gas meter. Full calibrations are performed using a calibrated wet test meter as a reference standard.

8.1.4.1 Dry Gas Meter

Each metering system receives a full calibration at the time of purchase and quarterly. Upon request, a post-test calibration can be performed after each field use. If the calibration factor deviates by less than five percent from the initial value, the test data are acceptable. If it deviates by more than 5%, the meter is recalibrated and the meter coefficient (initial or recalibrated) that yields the lowest sample volume for the test runs is used.

EPA Method 5 requires another full calibration anytime the post-test calibration check indicates that the calibration factor has changed by more than 5%. Standard practice is to recalibrate the dry gas meter quarterly and check the orifice calibration during and after each field use.

8.1.4.2 Orifice

An orifice calibration factor is calculated for each of the eighteen flow settings during a full calibration. The arithmetic average of the values obtained during the calibration is used.

8.1.5 Barometer

Each field barometer is adjusted before each test series to agree within ±0.1 inches of a reference aneroid barometer. The reference barometer is checked against the weather station pressure value (corrected for elevation difference) reported by the National Weather Service or mercury barometer. This information is obtained via a call to the weather line or the nearest airport

8.2 LABORATORY ANALYTICAL EQUIPMENT

The laboratory instruments will be calibrated as specified by the appropriate method before analyzing the test samples. The laboratory instrument calibration procedures are based on instructions in the referenced analytical methods and are summarized, along with other routine quality control checks, in Table 8-2. The calibrations performed and the results will be reported as appropriate to assure the quality of data in the laboratory sample analysis report.

Table 8-1. Sampling Equipment Calibration Requirements

Stack Sampling Equipment	Acceptance Criteria	Measurement Frequency	Action If Criteria Are Not Met
Volumetric Flow Measurements			
Type S pitot tube inspection	All dimension specifications met	Calibrate prior to test and visually inspect after each field test	Use pitot tubes that meet face opening specifications; repair or replace as required
Type S pitot tube calibration	± 3% for volumetric flows >1,000 fpm ± 5-6% for volumetric flows >600 and <1,000 fpm	Refer to Section 10.0 of Method 2: If D_t is between 0.48 and 0.95 cm (3/16 and 3/8 in.), and if P_A and P_B are equal and between 1.05 and 1.50 D_t, there are two possible options: (1) the pitot tube may be calibrated according to the procedure outlined in Sections 10.1.2 through 10.1.5 of Method 2 before and after the test, or (2) a baseline (isolated tube) coefficient value of 0.84 may be assigned to the pitot tube with pitot tube inspection before and after the test.	Check for blockage. If blockage is significant, recalculate calibration coefficient.
Barometers	±0.1 inches Hg (± 2.5mm Hg) of mercury-in-glass barometer	Calibrate initially versus mercury-in-glass barometer; check before and after field test	Adjust to agree with a certified barometer
Stack gas temperature measurement system	Capable of measuring within ± 2°F (± 1°C) of mercury-in-glass thermometer	Calibrate prior to test and after each field use	Adjust to agree with Hg bulb thermometer; construct calibration curve, correct readings
Pressure sensors (excludes inclined manometer)	Agree within ± 5 percent of inclined manometers	Prior to and after field use	Adjust to agree with Hg bulb thermometer; construct calibration curve, correct readings
Wet test meter	$Y_{mi} = Y_m \pm 0.030$ Y (before test) Y_{mf}/Y_{mi} is 0.95 to 1.05 (after test)	Calibration prior to test Check calibration after test	Before test: Adjust until specifications are met. After test: Recalculate calibration coefficient.
Dry gas meters	$Y_i = Y \pm 0.02$ Y (before test) Y_{mf}/Y_{mi} is 0.95 to 1.05 (after test)	Calibration versus wet test meter initially, and when post-check exceeds $\Delta Y \pm 0.05$	Before test: Repair or replace and then calibrate After test: Recalculate calibration coefficient.

Table 8-1. Sampling Equipment Calibration Requirements

Stack Sampling Equipment	Acceptance Criteria	Measurement Frequency	Action If Criteria Are Not Met
Assembled isokinetic sampling train leakage	0.02 cfm (0.00057 m^3/min) at vacuum of $\geq$ 10 inches Hg (250 mm Hg) before the start of stack sampling, and $\geq$ maximum vacuum value recorded during sampling run for post sampling leak checks	Just prior to start of first sampling traverse (required); after first sampling traverse (recommended); after moving sampling train from first traverse port to second traverse port (recommended); end of second sampling traverse (required).	Before stack sampling or at post port change: Isolate and repair leak point(s); repeat leak check. End of first traverse or end of second traverse: Determine leak rate; If <4% of sampling rate, correct sample volume per procedures in Section 6.3 of Method 5. If >4% of sampling rate, invalid test sample; discard sample and repeat sampling run for invalid train.
Oxygen and carbon dioxide analyzers used for Method 3A analyses	3-point Calibration Error Test: $\pm$ 0.5 vol% 2-point Calibration Drift Check: $\pm$ 0.5 vol% 2-point System Bias Check: $\leq$ 0.5 vol%)	Calibration Error: Beginning of each test day Calibration Drift: Before and after each test run System Bias: Before and after each test run	Calibration Error: Repair or replace Monitor Calibration Drift: Void test run; re-calibrate or repair/replace monitor System Bias: Void test run; re-calibrate or repair/replace monitor
Analytical balance (for moisture)	± 1 mg of Class-S weights	Check with Class-S weights upon receipt and daily	Adjust or repair
Sampling Train Heating Systems and Thermocouples			
Probe heating system (isokinetic sampling trains)	Capable of maintaining 248° ± 25°F (120°C ± 14°C) at a flow of 0.75 cfm (21.2 L/min)	Calibrate initially by APTD-0576(11) or use published calibration curves	Repair, or replace, and then verify the calibration
Probe nozzle (isokinetic sampling trains)	Average of three ID measurements of nozzle within 0.001 inches (0.0025 mm); difference between high and low 0.002 inches (0.0050 mm)	Use a micrometer to measure to nearest 0.025 mm (0.001 in.); check before and after field test	Recalibrate, reshape, and sharpen when nozzle becomes nicked, dented, or corroded

Table 8-1. Sampling Equipment Calibration Requirements

Stack Sampling Equipment	Acceptance Criteria	Measurement Frequency	Action If Criteria Are Not Met
Probe heating system (SMVOC)	Maintained at a temperature >130°C (>266°F)	Periodic check during sampling	Immediately increase the SMVOC system to the proper temperature
Thermocouples (stack gas meters and final impinger)	Impinger thermocouple ± 1°C (2°F) [Method 5]; dry gas thermocouple ± 3°C (5.4°F) [Method 0010]; stack thermocouple within ± 1°C(± 2°F) of absolute temperature.	Calibrate prior to test against a mercury thermometer	Adjust; determine a correction factor or reject

Sources:
Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, EPA-600/R-94/038c, September 1994.
Maintenance, Calibration, and Operation of Isokinetic Source Sampling Equipment, APTD-0576, U.S. EPA, Office of Air Programs, March 1972.
Construction of Isokinetic Source Sampling Equipment, APTD-0581, U.S. EPA, Office of Air Programs, April 1971.
Method 0031, Volatile Organics Sampling Train and Method 0010, Modified Method 5 Sampling Train, Test Method for Evaluating Solid Waste Physical/Chemical Methods (SW-846), U.S. EP A Office of Solid Waste, Update III, December 1997.
Determination of Particulate Emissions from Stationary Sources, U.S. EPA, Test Methods and Procedures, New Source Performance Standards, 40 CFR 60, Appendix A.

Table 8-2. Laboratory Quality Control Checks, Frequencies, Acceptance Criteria, and Corrective Actions

Parameter/Method	Quality Control Check	Method of Determination	Frequency	Acceptance Criteria	Corrective Action
Volatile organics by GC/MS (SW-846 8260D KNOX-MS-0011)	Initial calibration	3 - 5 standards bracketing expected concentrations	Prior to sample analysis	Variability of average RRF less than or equal to 20% RSD for POHCs and CCCs SPCCs (chlorobenzene and 1,1,2,2-tetrachloroethane) will be μ 0.3, and SPCCs (chloromethane, 1,1-dichloroethane, and bromoform) will be μ 0.1	Recalibrate
	Continuing calibration	Midlevel standard	Prior to sample analysis, then every 12 hours or after sample set	RRF for POHCs and CCCs within 25% difference of the initial calibration average RRF. SPCCs (chlorobenzene and 1,1,2,2-tetrachloroethane) will be μ 0.3, and SPCCs (chloromethane, 1,1-dichloroethane, and bromoform) will be μ 0.1	Reanalyze standard. If second analysis does not meet criteria, recalibrate and reanalyze samples or justify acceptance of sample results since the last successful check.
	Consistency in chromatography	For MS methods, monitor internal standard retention time and area. For non-MS methods, monitor retention time windows for compounds of interest.	Every sample, standard, and blank	Retention time within 30 seconds of last calibration check. Area within -50 to +100% of last calibration check	Perform calibration standard check. Reanalyze sample if possible, or flag data.
	Calibration check or LCS	Analysis of independent calibration check standard	In association with each initial calibration	Within 3 std. deviations of historical mean (laboratory specific)	Recalibrate and recheck.
	Method Blank	Analysis of blank	Analyze one with each analytical batch	Result less than method detection limit	Flag data and discuss in case narrative.
Semi-volatile organics GC/MS (SW-846 8270E) KNOX-MS-0028	Initial calibration	5 standards bracketing expected concentrations. Critical level should be at least 10 times higher than lowest standard	Prior to sample analysis	Variability of average RRF less than or equal to 30% RSD for CCCs. SPCCs greater than or equal to 0.05.	Recalibrate

Table 8-2. Laboratory Quality Control Checks, Frequencies, Acceptance Criteria, and Corrective Actions

Parameter/Method	Quality Control Check	Method of Determination	Frequency	Acceptance Criteria	Corrective Action
Semi-volatile organics GC/MS (SW-846 8270E) (continued)	Continuing calibration	Midlevel standard	Prior to sample analysis, then every 12 hours or after sample set	RRF for CCCs within 20% of initial calibration average RRF. SPCCs greater than or equal to 0.05.	Reanalyze standard. If second analysis does not meet criteria, recalibrate and reanalyze samples or justify acceptance of sample results since the last successful check.
	Consistency in chromatography	For MS methods, monitor internal standard retention time and area. For non-MS methods, monitor retention time window for compounds of interest.	Every sample, standard, and blank	Retention time within 30 seconds of last calibration check. Area within -50 to +100% of last calibration check	Perform calibration standard check. Reanalyze sample if possible, or flag data.
	Calibration check	Analysis of independent calibration check standard	In association with each initial calibration	Within 3 std. deviations of historical mean (laboratory specific)	Recalibrate and recheck.
	Method Blank	Analysis of blank	Analyze one with each analytical batch	Results less than method detection limit	Flag data and discuss in the case narrative.
PCB and PCDD/PCDF by High Resolution GC/High Resolution MS (EPA Method 1668C and SW-846 8290A KNOX-ID 0004 KNOX-ID-0013)	Initial Calibration	All five high resolution concentration calibration solutions must be used for the initial calibration	Prior to sample analysis	PCDD/PCDF: The %RSD for the mean RRF from the each of the unlabeled standards must not exceed $\pm$ 20%, and those for the labeled reference compounds must not exceed $\pm$ 30%. PCB: Mean RRF %RSD must be no greater than 30% for both unlabeled analytes and internal standards	Recalibrate

Table 8-2. Laboratory Quality Control Checks, Frequencies, Acceptance Criteria, and Corrective Actions

Parameter/Method	Quality Control Check	Method of Determination	Frequency	Acceptance Criteria	Corrective Action
PCB and PCDD/PCDF by High Resolution GC/High Resolution MS (EPA Method 1668C and SW-846 8290A) (cont'd)	Continuing Calibration	Midlevel standard	At the beginning and end of each 12 hour shift	PCDD/PCDF: RFs must be within ± 20% of the initial calibration mean RRF for unlabeled standards and ± 30% for labeled standards PCB: RRFs must be within ±30% of the initial calibration mean RRF for all analytes (both labeled and unlabeled)	Reanalyze standard. If second analysis does not meet criteria, recalibrate and reanalyze samples or justify acceptance of sample results since the last successful check.
	Retention time window verification and GC column performance	Monitor retention times	Start of each 12 hour shift	PCDD/PCDF: Compliance with Section 8.2.1 of Method 8290A PCB: The internal standard RT must be within ± 10 seconds of the continuing calibration.	Correct according to method
	Method Blank	Analysis of blanks	Analyze one with each analytical batch	Results less than method detection limit	Flag data as discussed in case narrative
Particulate and Gravimetric (EPA Method 5/202, EPA Method 5 & KNOX-WC-0006)	Calibration check	Calibration of balance with standardized weights	Prior to analysis, between each group of sample weighings, and at the end of each day.	99 – 101% of theoretical value	Recalibrate and recheck sample weights.
Chloride by Ion Chromatography (SW846 Methods 505/9056A; Method 26A; KNOX-WC-0005 & KNOX-WC-0016)	Initial Calibration	4 standards bracketing expected concentrations Note: Separate calibrations are required for the acid and alkaline samples	Prior to sample analysis	Linear correlation coefficient >0.995	Recalibrate

Table 8-2. Laboratory Quality Control Checks, Frequencies, Acceptance Criteria, and Corrective Actions

Parameter/Method	Quality Control Check	Method of Determination	Frequency	Acceptance Criteria	Corrective Action
Chloride by Ion Chromatography (continued)	Retention time check for ion identification	Determine average retention time for ions of interest or relative retention time of several ions for every calibration curve	Prior to sample analysis	Average Retention Time - Sample identification is positive if results are within retention time window of standards Relative Retention Time – Sample identification is positive if results are within 3 SD of average RRT	Ions of interest are not present if criteria are not met.
	Control check sample	Midlevel independent standard analyzed in duplicate	Beginning and end of each analysis period and after every 10 samples	90 – 110% of theoretical value	Repeat calibration check. If second check fails criteria, regenerate analytical system and reanalyze all samples since last acceptable calibration check.
	Reagent blank (ICB and CCBs)	Analysis of blanks	Immediately following the ICV and following each CCV.	Less than 1 mg/L	Contamination source must be found and corrected. All samples analyzed since the last acceptable CCB must be reanalyzed.
	Reagent blank (ICB and CCBs)	Analysis of blanks	Immediately following the ICV and following each CCV.	Less than 1 mg/L	Contamination source must be found and corrected. All samples analyzed since the last acceptable CCB must be reanalyzed.
PCB by GC/ECD	Initial calibration	Minimum of 3 standards	Prior to sample analysis	Correlation coefficient $\leq$ 0.97	Recalibrate
	Daily Calibration check	Midlevel standard	At least one per day	$\pm$ 15% of true value	Reanalyze standard and if necessary recalibrate system
	Method Blank	Analysis of blanks	One with each batch	< 20% of sample results	Evaluate for possible contamination

Table 8-2 Reference Method Sources:

"ASTM" refers to American Society for Testing Materials, Annual Book of ASTM Standards, Annual Series

"SW846" refers to Test Methods for Evaluating Solid Waste, Third Edition, November 1986, and Updates.

"EPA Method" refers to New Source Performance Standards, Test Methods and Procedures, Appendix A, 40 CFR 60.

"KNOX" refers to Eurofins Environment Testing, Knoxville, TN (Eurofins) standard operating procedure (SOP) and are based on the reference method(s) noted as accredited by TCEQ.

Eurofins SOP No.	Title
KNOX-ID-0004	Analysis of Polychlorinated Dioxins/Furans by High Resolution Gas Chromatography/High Resolution Mass Spectrometry (HRGS/HRMS) Based on Methods 8290, 8290A, 1613B, 23, 0023A, and TO-9A
KNOX-ID-0013	Analysis of Polychlorinated Biphenyl (PCB) Isomers by Isotope Dilution HRGC/HRMS
KNOX-MS-0011	VOST Analysis
KNOX-MS-0028	GC/MS Analysis Based on Method 8270E
KNOX-OP-0010	Method 0023A and Method 0010 Sampling Train Pre-Sampling Preparation and Sample Extraction Procedure (Includes TO-09A Sampling Components)
KNOX-WC-0005	Anion Analysis by Ion Chromatography
KNOX-WC-0006	Sampling Train Particulate Determination
KNOX-GC-0015	Analysis of PCBs Based on Method 8082 and TO-4A

9.0 ANALYTICAL PROCEDURES

Analytical procedures and methods are summarized in Tables 3-1.

The target PCB and PCDD/PCDF compounds and expected detection limits are noted in Tables 9-1 and 9-2.
The target SVOC RCI compounds and expected detection limits are noted in Table 9-3.

The expected ODCB detection limits are noted in Table 9-4.

Table 9-5 presents expected detection limits for stack gas particulate for Method 5/202.

Table 9-6 presents expected detection limits for stack gas HCl and Cl_2 for the Method 26A. .

Table 9-7 presents the stack gas target volatile organic analytes for the SMVOC samples and expected detection limits.

Table 9-8 presents expected detection limits for PCB in waste matrices.

Table 9-1. Stack Gas PCB Target Analytes

PCB No. [1]	BZ/IU PAC No. [2]	PCB Chemical Structure Name [3]	PCB CAS No. [4]	Estimated Detection Limit (ng) [5]	Train Detection Limit @ EDL (ng/m^3) [5,6]	Method Detection Limit (ng) [5]	Train Detection Limit @ MDL (ng/m^3) [5,6]	Reporting Limit (ng) [5]	Train Detection Limit @ RL (ng/m^3) [5,6]
1	1	2-monochlorobiphenyl	2051-60-7	0.0153	0.00613	0.0960	0.0384	0.200	0.0800
2	2	3-monochlorobiphenyl	2051-61-8	0.0163	0.00651	0.0800	0.0320	0.200	0.0800
3	3	4-monochlorobiphenyl	2051-62-9	0.0161	0.00643	0.0860	0.0344	0.200	0.0800
4	4	2,2'-dichlorobiphenyl	13029-08-8	0.0151	0.00605	0.120	0.0480	0.400	0.160
5	5	2,3-dichlorobiphenyl	16605-91-7	0.0123	0.00491	0.0920	0.0368	0.200	0.0800
6	6	2,3'-dichlorobiphenyl	25569-80-6	0.0107	0.00427	0.0720	0.0288	0.200	0.0800
7	7	2,4-dichlorobiphenyl	33284-50-3	0.0117	0.00467	0.100	0.0400	0.200	0.0800
8	8	2,4'-dichlorobiphenyl	34883-43-7	0.0103	0.00413	0.0880	0.0352	0.400	0.160
9	9	2,5-dichlorobiphenyl	34883-39-1	0.0115	0.00461	0.0640	0.0256	0.200	0.0800
10	10	2,6-dichlorobiphenyl	33146-45-1	0.0125	0.00501	0.0840	0.0336	0.200	0.0800
11	11	3,3'-dichlorobiphenyl	2050-67-1	0.0127	0.00507	0.126	0.0504	0.400	0.160
12	12	3,4-dichlorobiphenyl	2974-92-7	0.0123	0.00493	0.112	0.0448	0.400	0.160
13	13	3,4'-dichlorobiphenyl	2974-90-5	0.0123	0.00493	0.112	0.0448	0.400	0.160
14	14	3,5-dichlorobiphenyl	34883-41-5	0.0117	0.00469	0.072	0.0288	0.200	0.0800
15	15	4,4'-dichlorobiphenyl	2050-68-2	0.0111	0.00443	0.100	0.0400	0.200	0.0800
16	16	2,2',3-trichlorobiphenyl	38444-78-9	0.0301	0.0120	0.118	0.0472	0.200	0.0800
17	17	2,2',4-trichlorobiphenyl	37680-66-3	0.0273	0.0109	0.130	0.0520	0.200	0.0800
18	18	2,2',5-trichlorobiphenyl	37680-65-2	0.0192	0.00768	0.190	0.0760	0.400	0.160
19	19	2,2',6-trichlorobiphenyl	38444-73-4	0.0265	0.0106	0.100	0.0400	0.200	0.0800
20	20	2,3,3'-trichlorobiphenyl	38444-84-7	0.00880	0.00352	0.168	0.0672	0.400	0.160
21	21	2,3,4-trichlorobiphenyl	55702-46-0	0.00960	0.00384	0.182	0.0728	0.400	0.160
22	22	2,3,4'-trichlorobiphenyl	38444-85-8	0.00867	0.00347	0.084	0.0336	0.200	0.0800
23	23	2,3,5-trichlorobiphenyl	55720-44-0	0.00953	0.00381	0.108	0.0432	0.200	0.0800
24	24	2,3,6-trichlorobiphenyl	55702-45-9	0.0202	0.0081	0.148	0.0592	0.200	0.0800
25	25	2,3',4-trichlorobiphenyl	55712-37-3	0.00813	0.00325	0.082	0.0328	0.200	0.0800
26	26	2,3',5-trichlorobiphenyl	38444-81-4	0.00920	0.00368	0.154	0.0616	0.400	0.160
27	27	2,3',6-trichlorobiphenyl	38444-76-7	0.0185	0.00741	0.090	0.0360	0.200	0.0800
28	28	2,4,4'-trichlorobiphenyl	7012-37-5	0.00880	0.00352	0.168	0.0672	0.400	0.160
29	29	2,4,5-trichlorobiphenyl	15862-07-4	0.00920	0.00368	0.154	0.0616	0.400	0.160
30	30	2,4,6-trichlorobiphenyl	35693-92-6	0.0192	0.00768	0.190	0.0760	0.400	0.160
31	31	2,4',5-trichlorobiphenyl	16606-02-3		0.00000	0.0940	0.0376	0.400	0.160

Table 9-1. Stack Gas PCB Target Analytes

PCB No. [1]	BZ/IU PAC No. [2]	PCB Chemical Structure Name [3]	PCB CAS No. [4]	Estimated Detection Limit (ng) [5]	Train Detection Limit @ EDL (ng/m^3) [5,6]	Method Detection Limit (ng) [5]	Train Detection Limit @ MDL (ng/m^3) [5,6]	Reporting Limit (ng) [5]	Train Detection Limit @ RL (ng/m^3) [5,6]
32	32	2,4',6-trichlorobiphenyl	38444-77-8	0.0185	0.00741	0.0860	0.0344	0.200	0.0800
33	33	2',3,4-trichlorobiphenyl (2,3',4'-trichlorobiphenyl)	38444-86-9	0.00960	0.00384	0.182	0.0728	0.400	0.160
34	34	2',3,5-trichlorobiphenyl (2,3',5'-trichlorobiphenyl)	37680-68-5	0.00920	0.00368	0.110	0.0440	0.200	0.0800
35	35	3,3',4-trichlorobiphenyl	37680-69-6	0.00913	0.00365	0.114	0.0456	0.200	0.0800
36	36	3,3',5-trichlorobiphenyl	38444-87-0	0.00933	0.00373	0.082	0.0328	0.200	0.0800
37	37	3,4,4'-trichlorobiphenyl	38444-90-5	0.00907	0.00363	0.0780	0.0312	0.200	0.0800
38	38	3,4,5-trichlorobiphenyl	53555-66-1	0.00953	0.00381	0.0860	0.0344	0.200	0.0800
39	39	3,4',5-trichlorobiphenyl	38444-88-1	0.00893	0.00357	0.0600	0.0240	0.200	0.0800
40	40	2,2',3,3'-tetrachlorobiphenyl	38444-93-8	0.0124	0.00496	0.280	0.112	0.600	0.240
41	41	2,2',3,4-tetrachlorobiphenyl	52663-59-9	0.0124	0.00496	0.280	0.112	0.600	0.240
42	42	2,2',3,4'-tetrachlorobiphenyl	36559-22-5	0.0135	0.00541	0.112	0.0448	0.200	0.080
43	43	2,2',3,5-tetrachlorobiphenyl	70362-46-8	0.0106	0.00424	0.162	0.0648	0.400	0.160
44	44	2,2',3,5'-tetrachlorobiphenyl	41464-39-5	0.0113	0.00451	0.260	0.104	0.600	0.240
45	45	2,2',3,6-tetrachlorobiphenyl	70362-45-7	0.0133	0.00531	0.178	0.0712	0.400	0.160
46	46	2,2',3,6'-tetrachlorobiphenyl	41464-47-5	0.0155	0.00619	0.092	0.0368	0.200	0.0800
47	47	2,2',4,4'-tetrachlorobiphenyl	2437-79-8	0.0113	0.00451	0.260	0.1040	0.600	0.240
48	48	2,2',4,5-tetrachlorobiphenyl	70362-47-9	0.0131	0.00523	0.110	0.0440	0.200	0.0800
49	49	2,2',4,5'-tetrachlorobiphenyl	41464-40-8	0.0103	0.00411	0.180	0.0720	0.400	0.160
50	50	2,2',4,6-tetrachlorobiphenyl	62796-65-0	0.0128	0.00512	0.204	0.0816	0.400	0.160
51	51	2,2',4,6'-tetrachlorobiphenyl	68194-04-7	0.0133	0.00531	0.178	0.0712	0.400	0.160
52	52	2,2',5,5'-tetrachlorobiphenyl	35693-99-3	0.0119	0.00477	0.088	0.0352	0.200	0.0800
53	53	2,2',5,6'-tetrachlorobiphenyl	41464-41-9	0.0128	0.00512	0.204	0.0816	0.400	0.160
54	54	2,2',6,6'-tetrachlorobiphenyl	15968-05-5	0.00201	0.000803	0.090	0.0360	0.200	0.0800
55	55	2,3,3',4-tetrachlorobiphenyl	74338-24-2	0.00827	0.00331	0.060	0.0240	0.200	0.0800
56	56	2,3,3',4'-tetrachlorobiphenyl	41464-43-1	0.00893	0.00357	0.068	0.0272	0.200	0.0800
57	57	2,3,3',5-tetrachlorobiphenyl	70424-67-8	0.0101	0.00405	0.074	0.0296	0.200	0.0800
58	58	2,3,3',5'-tetrachlorobiphenyl	41464-49-7	0.00827	0.00331	0.082	0.0328	0.200	0.0800
59	59	2,3,3',6-tetrachlorobiphenyl	74472-33-6	0.00927	0.00371	0.280	0.112	0.600	0.240
60	60	2,3,4,4'-tetrachlorobiphenyl	33025-41-1	0.00980	0.00392	0.0680	0.0272	0.200	0.0800

Table 9-1. Stack Gas PCB Target Analytes

PCB No. [1]	BZ/IU PAC No. [2]	PCB Chemical Structure Name [3]	PCB CAS No. [4]	Estimated Detection Limit (ng) [5]	Train Detection Limit @ EDL (ng/m^3) [5,6]	Method Detection Limit (ng) [5]	Train Detection Limit @ MDL (ng/m^3) [5,6]	Reporting Limit (ng) [5]	Train Detection Limit @ RL (ng/m^3) [5,6]
61	61	2,3,4,5-tetrachlorobiphenyl	33284-53-6	0.00873	0.00349	0.320	0.128	0.800	0.320
62	62	2,3,4,6-tetrachlorobiphenyl	54230-22-7	0.00927	0.00371	0.280	0.112	0.600	0.240
63	63	2,3,4',5-tetrachlorobiphenyl	74472-34-7	0.00973	0.00389	0.104	0.0416	0.200	0.0800
64	64	2,3,4',6-tetrachlorobiphenyl	52663-58-8	0.00933	0.00373	0.130	0.0520	0.200	0.0800
65	65	2,3,5,6-tetrachlorobiphenyl	33284-54-7	0.0113	0.00451	0.260	0.1040	0.600	0.240
66	66	2,3',4,4'-tetrachlorobiphenyl	32598-10-0	0.00873	0.00349	0.080	0.0320	0.200	0.0800
67	67	2,3',4,5-tetrachlorobiphenyl	73575-53-8	0.00773	0.00309	0.080	0.0320	0.200	0.0800
68	68	2,3',4,5'-tetrachlorobiphenyl	73575-52-7	0.00873	0.00349	0.104	0.0416	0.200	0.0800
69	69	2,3',4,6-tetrachlorobiphenyl	60233-24-1	0.0103	0.00411	0.180	0.0720	0.400	0.160
70	70	2,3',4',5-tetrachlorobiphenyl	32598-11-1	0.00873	0.00349	0.320	0.128	0.800	0.320
71	71	2,3',4',6-tetrachlorobiphenyl	41464-46-4	0.0124	0.00496	0.280	0.112	0.600	0.240
72	72	2,3',5,5'-tetrachlorobiphenyl	41464-42-0	0.0100	0.00400	0.086	0.0344	0.200	0.0800
73	73	2,3',5',6-tetrachlorobiphenyl	74338-23-1	0.0106	0.00424	0.162	0.0648	0.400	0.160
74	74	2,4,4',5-tetrachlorobiphenyl	32690-93-0	0.00873	0.00349	0.320	0.128	0.800	0.320
75	75	2,4,4',6-tetrachlorobiphenyl	32598-12-2	0.00927	0.00371	0.280	0.112	0.600	0.240
76	76	2',3,4,5-tetrachlorobiphenyl (2,3',4',5'-tetrachlorobiphenyl)	70362-48-0	0.00873	0.00349	0.320	0.128	0.800	0.320
77	77	3,3',4,4'-tetrachlorobiphenyl	32598-13-3	0.00980	0.00392	0.0840	0.0336	0.200	0.0800
78	78	3,3',4,5-tetrachlorobiphenyl	70362-49-1	0.00947	0.00379	0.0700	0.0280	0.200	0.0800
79	79	3,3',4,5'-tetrachlorobiphenyl	41464-48-6	0.00767	0.00307	0.0660	0.0264	0.200	0.0800
80	80	3,3',5,5'-tetrachlorobiphenyl	33284-52-5	0.00827	0.00331	0.0800	0.0320	0.200	0.0800
81	81	3,4,4',5-tetrachlorobiphenyl	70362-50-4	0.0105	0.00421	0.0640	0.0256	0.200	0.0800
82	82	2,2',3,3',4-pentachlorobiphenyl	52663-62-4	0.00840	0.00336	0.112	0.0448	0.200	0.0800
83	83	2,2',3,3',5-pentachlorobiphenyl	60145-20-2	0.00827	0.00331	0.164	0.0656	0.400	0.160
84	84	2,2',3,3',6-pentachlorobiphenyl	52663-60-2	0.00953	0.00381	0.114	0.0456	0.200	0.0800
85	85	2,2',3,4,4'-pentachlorobiphenyl	65510-45-4	0.00667	0.00267	0.182	0.0728	0.600	0.240
86	86	2,2',3,4,5-pentachlorobiphenyl	55312-69-1	0.00664	0.00266	0.400	0.160	1.20	0.480
87	87	2,2',3,4,5'-pentachlorobiphenyl	38380-02-8	0.00664	0.00266	0.400	0.160	1.20	0.480
88	88	2,2',3,4,6-pentachlorobiphenyl	55215-17-3	0.00867	0.00347	0.140	0.0560	0.400	0.160
89	89	2,2',3,4,6'-pentachlorobiphenyl	73575-57-2	0.00893	0.00357	0.130	0.0520	0.200	0.0800
90	90	2,2',3,4',5-pentachlorobiphenyl	68194-07-0	0.00727	0.00291	0.260	0.1040	0.600	0.240

Table 9-1. Stack Gas PCB Target Analytes

PCB No. [1]	BZ/IUPAC No. [2]	PCB Chemical Structure Name [3]	PCB CAS No. [4]	Estimated Detection Limit (ng) [5]	Train Detection Limit @ EDL (ng/m^3) [5,6]	Method Detection Limit (ng) [5]	Train Detection Limit @ MDL (ng/m^3) [5,6]	Reporting Limit (ng) [5]	Train Detection Limit @ RL (ng/m^3) [5,6]
91	91	2,2',3,4',6-pentachlorobiphenyl	68194-05-8	0.00867	0.00347	0.140	0.0560	0.400	0.160
92	92	2,2',3,5,5'-pentachlorobiphenyl	52663-61-3	0.00813	0.00325	0.084	0.0336	0.200	0.0800
93	93	2,2',3,5,6-pentachlorobiphenyl	73575-56-1	0.00827	0.00331	0.210	0.0840	0.400	0.160
94	94	2,2',3,5,6'-pentachlorobiphenyl	73575-55-0	0.00913	0.00365	0.110	0.0440	0.200	0.0800
95	95	2,2',3,5',6-pentachlorobiphenyl	38379-99-6	0.00867	0.00347	0.0980	0.0392	0.200	0.0800
96	96	2,2',3,6,6'-pentachlorobiphenyl	73575-54-9	0.00636	0.00254	0.0700	0.0280	0.200	0.0800
97	97	2,2',3',4,5-pentachlorobiphenyl (2,2',3,4',5'-pentachlorobiphenyl)	41464-51-1	0.00664	0.00266	0.400	0.160	1.20	0.480
98	98	2,2',3',4,6-pentachlorobiphenyl (2,2',3,4',6'-pentachlorobiphenyl)	60233-25-2	0.00840	0.00336	0.164	0.066	0.400	0.160
99	99	2,2',4,4',5-pentachlorobiphenyl	38380-01-7	0.00827	0.00331	0.164	0.0656	0.400	0.160
100	100	2,2',4,4',6-pentachlorobiphenyl	39485-83-1	0.00827	0.00331	0.210	0.0840	0.400	0.160
101	101	2,2',4,5,5'-pentachlorobiphenyl	37680-73-2	0.00727	0.00291	0.260	0.104	0.600	0.240
102	102	2,2',4,5,6''-pentachlorobiphenyl	68194-06-9	0.00840	0.00336	0.164	0.0656	0.400	0.160
103	103	2,2',4,5',6-pentachlorobiphenyl	60145-21-3	0.00793	0.00317	0.102	0.0408	0.200	0.080
104	104	2,2',4,6,6'-pentachlorobiphenyl	56558-16-8	0.00687	0.00275	0.130	0.0520	0.200	0.0800
105	105	2,3,3',4,4'-pentachlorobiphenyl	32598-14-4	0.00827	0.00331	0.0680	0.0272	0.200	0.0800
106	106	2,3,3',4,5-pentachlorobiphenyl	70424-69-0	0.00940	0.00376	0.102	0.0408	0.200	0.0800
107	107/109	2,3,3',4',5-pentachlorobiphenyl	70424-68-9	0.00840	0.00336	0.100	0.0400	0.200	0.0800
108	108/107	2,3,3',4,5'-pentachlorobiphenyl	70362-41-3	0.00893	0.00357	0.128	0.0512	0.400	0.160
109	109/108	2,3,3',4,6-pentachlorobiphenyl	74472-35-8	0.00664	0.00266	0.400	0.160	1.20	0.480
110	110	2,3,3',4',6-pentachlorobiphenyl	38380-03-9	0.00583	0.00233	0.200	0.0800	0.400	0.160
111	111	2,3,3',5,5'-pentachlorobiphenyl	39635-32-0	0.00573	0.00229	0.0820		0.200	0.0800
112	112	2,3,3',5,6-pentachlorobiphenyl	74472-36-9	0.00493	0.00197	0.0820	0.0328	0.200	0.0800
113	113	2,3,3',5',6-pentachlorobiphenyl	68194-10-5	0.00727	0.00291	0.260	0.104	0.600	0.240
114	114	2,3,4,4',5-pentachlorobiphenyl	74472-37-0	0.00947	0.00379	0.110	0.0440	0.200	0.0800
115	115	2,3,4,4',6-pentachlorobiphenyl	74472-38-1	0.00583	0.00233	0.200	0.0800	0.400	0.160
116	116	2,3,4,5,6-pentachlorobiphenyl	18259-05-7	0.00667	0.00267	0.182	0.0728	0.600	0.240

Table 9-1. Stack Gas PCB Target Analytes

PCB No. [1]	BZ/IU PAC No. [2]	PCB Chemical Structure Name [3]	PCB CAS No. [4]	Estimated Detection Limit (ng) [5]	Train Detection Limit @ EDL (ng/m^3) [5,6]	Method Detection Limit (ng) [5]	Train Detection Limit @ MDL (ng/m^3) [5,6]	Reporting Limit (ng) [5]	Train Detection Limit @ RL (ng/m^3) [5,6]
117	117	2,3,4',5,6-pentachlorobiphenyl	68194-11-6	0.00667	0.00267	0.182	0.0728	0.600	0.240
118	118	2,3',4,4',5-pentachlorobiphenyl	31508-00-6	0.00847	0.00339	0.122	0.0488	0.200	0.0800
119	119	2,3',4,4',6-pentachlorobiphenyl	56558-17-9	0.00664	0.00266	0.400	0.160	1.20	0.480
120	120	2,3',4,5,5'-pentachlorobiphenyl	68194-12-7	0.00471	0.00189	0.0740	0.0296	0.200	0.0800
121	121	2,3',4,5',6-pentachlorobiphenyl	56558-18-0	0.00537	0.00215	0.0500	0.0200	0.200	0.0800
122	122	2',3,3',4,5-pentachlorobiphenyl	76842-07-4	0.0107	0.00427	0.0920	0.0368	0.200	0.0800
		(2,3,3',4',5'-pentachlorobiphenyl)							
123	123	2',3,4,4',5-pentachlorobiphenyl	65510-44-3	0.00953	0.00381	0.114	0.0456	0.200	0.0800
		(2,3',4,4',5'-pentachlorobiphenyl)							
124	124	2',3,4,5,5'-pentachlorobiphenyl	70424-70-3	0.00893	0.00357	0.128	0.0512	0.400	0.160
		(2,3',4',5',5-pentachlorobiphenyl)							
125	125	2',3,4,5,6'-pentachlorobiphenyl	74472-39-2	0.00666	0.00267	0.4000	0.160	1.20	0.480
		(2,3',4',5',6-pentachlorobiphenyl)							
126	126	3,3',4,4',5-pentachlorobiphenyl	57465-28-8	0.00960	0.00384	0.0820	0.0328	0.200	0.0800
127	127	3,3',4,5,5'-pentachlorobiphenyl	39635-33-1	0.00893	0.00357	0.0840	0.0336	0.200	0.0800
128	128	2,2',3,3',4,4'-hexachlorobiphenyl	38380-07-3	0.000687	0.000275	0.136	0.0544	0.400	0.160
129	129	2,2',3,3',4,5-hexachlorobiphenyl	55215-18-4	0.000713	0.000285	0.340	0.136	0.800	0.320
130	130	2,2',3,3',4,5'-hexachlorobiphenyl	52663-66-8	0.000960	0.000384	0.102	0.0408	0.200	0.0800
131	131	2,2',3,3',4,6-hexachlorobiphenyl	61798-70-7	0.000900	0.000360	0.116	0.0464	0.200	0.0800
132	132	2,2',3,3',4,6'-hexachlorobiphenyl	38380-05-1	0.000900	0.000360	0.118	0.0472	0.200	0.0800
133	133	2,2',3,3',5,5'-hexachlorobiphenyl	35694-04-3	0.000833	0.000333	0.120	0.0480	0.200	0.0800
134	134	2,2',3,3',5,6-hexachlorobiphenyl	52704-70-8	0.000847	0.000339	0.260	0.104	0.400	0.160
135	135	2,2',3,3',5,6'-hexachlorobiphenyl	52744-13-5	0.00130	0.000520	0.180	0.0720	0.400	0.160

Table 9-1. Stack Gas PCB Target Analytes

PCB No. [1]	BZ/IU PAC No. [2]	PCB Chemical Structure Name [3]	PCB CAS No. [4]	Estimated Detection Limit (ng) [5]	Train Detection Limit @ EDL (ng/m^3) [5,6]	Method Detection Limit (ng) [5]	Train Detection Limit @ MDL (ng/m^3) [5,6]	Reporting Limit (ng) [5]	Train Detection Limit @ RL (ng/m^3) [5,6]
136	136	2,2',3,3',6,6'-hexachlorobiphenyl	38411-22-2	0.000933	0.000373	0.096	0.0384	0.200	0.0800
137	137	2,2',3,4,4',5-hexachlorobiphenyl	35694-06-5	0.000873	0.000349	0.064	0.0256	0.200	0.0800
138	138	2,2',3,4,4',5'-hexachlorobiphenyl	35065-28-2	0.000713	0.000285	0.340	0.136	0.800	0.320
139	139	2,2',3,4,4',6-hexachlorobiphenyl	56030-56-9	0.000773	0.000309	0.182	0.0728	0.400	0.160
140	140	2,2',3,4,4',6'-hexachlorobiphenyl	59291-64-4	0.000773	0.000309	0.182	0.0728	0.400	0.160
141	141	2,2',3,4,5,5'-hexachlorobiphenyl	52712-04-6	0.000773	0.000309	0.118	0.0472	0.200	0.0800
142	142	2,2',3,4,5,6-hexachlorobiphenyl	41411-61-4	0.000900	0.000360	0.100	0.0400	0.200	0.0800
143	143	2,2',3,4,5,6'-hexachlorobiphenyl	68194-15-0	0.000847	0.000339	0.260	0.104	0.400	0.160
144	144	2,2',3,4,5',6-hexachlorobiphenyl	68194-14-9	0.00120	0.000480	0.088	0.0352	0.200	0.0800
145	145	2,2',3,4,6,6'-hexachlorobiphenyl	74472-40-5	0.000973	0.000389	0.082	0.0328	0.200	0.0800
146	146	2,2',3,4',5,5'-hexachlorobiphenyl	51908-16-8	0.000700	0.000280	0.090	0.0360	0.200	0.0800
147	147	2,2',3,4',5,6-hexachlorobiphenyl	68194-13-8	0.000753	0.000301	0.240	0.096	0.400	0.160
148	148	2,2',3,4',5,6'-hexachlorobiphenyl	74472-41-6	0.00124	0.000496	0.110	0.0440	0.200	0.0800
149	149	2,2',3,4',5',6-hexachlorobiphenyl	38380-04-0	0.000753	0.000301	0.240	0.096	0.400	0.160
150	150	2,2',3,4',6,6'-hexachlorobiphenyl	68194-08-1	0.000927	0.000371	0.096	0.0384	0.200	0.080
151	151	2,2',3,5,5',6-hexachlorobiphenyl	52663-63-5	0.00130	0.000520	0.180	0.0720	0.400	0.160
152	152	2,2',3,5,6,6'-hexachlorobiphenyl	68194-09-2	0.00095	0.000381	0.106	0.0424	0.200	0.0800
153	153	2,2',4,4',5,5'-hexachlorobiphenyl	35065-27-1	0.000619	0.000247	0.166	0.0664	0.400	0.160
154	154	2,2',4,4',5,6'-hexachlorobiphenyl	60145-22-4	0.00116	0.000464	0.120	0.0480	0.200	0.080
155	155	2,2',4,4',6,6'-hexachlorobiphenyl	33979-03-2	0.00100	0.000400	0.104	0.0416	0.200	0.080
156	156	2,3,3',4,4',5-hexachlorobiphenyl	38380-08-4	0.000767	0.000307	0.170	0.0680	0.400	0.160

Table 9-1. Stack Gas PCB Target Analytes

PCB No. [1]	BZ/IU PAC No. [2]	PCB Chemical Structure Name [3]	PCB CAS No. [4]	Estimated Detection Limit (ng) [5]	Train Detection Limit @ EDL (ng/m^3) [5,6]	Method Detection Limit (ng) [5]	Train Detection Limit @ MDL (ng/m^3) [5,6]	Reporting Limit (ng) [5]	Train Detection Limit @ RL (ng/m^3) [5,6]
157	157	2,3,3',4,4',5'-hexachlorobiphenyl	69782-90-7	0.000767	0.000307	0.170	0.0680	0.400	0.160
158	158	2,3,3',4,4',6-hexachlorobiphenyl	74472-42-7	0.000516	0.000206	0.104	0.0416	0.200	0.0800
159	159	2,3,3',4,5,5'-hexachlorobiphenyl	39635-35-3	0.000488	0.000195	0.078	0.0312	0.200	0.0800
160	160	2,3,3',4,5,6-hexachlorobiphenyl	41411-62-5	0.000713	0.000285	0.340	0.136	0.800	0.320
161	161	2,3,3',4,5',6-hexachlorobiphenyl	74472-43-8	0.000599	0.000240	0.074	0.0296	0.200	0.0800
162	162	2,3,3',4',5,5'-hexachlorobiphenyl	39635-34-2	0.000538	0.000215	0.100	0.0400	0.200	0.0800
163	163	2,3,3',4',5,6-hexachlorobiphenyl	74472-44-9	0.000713	0.000285	0.340	0.136	0.80	0.320
164	164	2,3,3',4',5',6-hexachlorobiphenyl	74472-45-0	0.000651	0.000261	0.050	0.0200	0.200	0.080
165	165	2,3,3',5,5',6-hexachlorobiphenyl	74472-46-1	0.000660	0.000264	0.100	0.0400	0.200	0.080
166	166	2,3,4,4',5,6-hexachlorobiphenyl	41411-63-6	0.000687	0.000275	0.136	0.0544	0.400	0.160
167	167	2,3',4,4',5,5'-hexachlorobiphenyl	52663-72-6	0.000491	0.000196	0.120	0.0480	0.200	0.080
168	168	2,3',4,4',5',6-hexachlorobiphenyl	59291-65-5	0.000619	0.000247	0.166	0.0664	0.400	0.160
169	169	3,3',4,4',5,5'-hexachlorobiphenyl	32774-16-6	0.000497	0.000199	0.0820	0.0328	0.200	0.080
170	170	2,2',3,3',4,4',5-heptachlorobiphenyl	35065-30-6	0.000713	0.000285	0.0880	0.0352	0.200	0.080
171	171	2,2',3,3',4,4',6-heptachlorobiphenyl	52663-71-5	0.000673	0.000269	0.186	0.0744	0.400	0.160
172	172	2,2',3,3',4,5,5'-heptachlorobiphenyl	52663-74-8	0.000740	0.000296	0.100	0.0400	0.200	0.080
173	173	2,2',3,3',4,5,6-heptachlorobiphenyl	68194-16-1	0.000673	0.000269	0.186	0.0744	0.400	0.160
174	174	2,2',3,3',4,5,6'-heptachlorobiphenyl	38411-25-5	0.000653	0.000261	0.050	0.0200	0.200	0.080
175	175	2,2',3,3',4,5',6-heptachlorobiphenyl	40186-70-7	0.000661	0.000265	0.092	0.0368	0.200	0.080

Table 9-1. Stack Gas PCB Target Analytes

PCB No. [1]	BZ/IU PAC No. [2]	PCB Chemical Structure Name [3]	PCB CAS No. [4]	Estimated Detection Limit (ng) [5]	Train Detection Limit @ EDL (ng/m^3) [5,6]	Method Detection Limit (ng) [5]	Train Detection Limit @ MDL (ng/m^3) [5,6]	Reporting Limit (ng) [5]	Train Detection Limit @ RL (ng/m^3) [5,6]
176	176	2,2',3,3',4,6,6'-heptachlorobiphenyl	52663-65-7	0.000511	0.000204	0.124	0.0496	0.200	0.080
177	177	2,2',3,3',4',5,6-heptachlorobiphenyl (2,2',3,3',4,5',6'-heptachlorobiphenyl)	52663-70-4	0.000645	0.000258	0.0640	0.0256	0.200	0.080
178	178	2,2',3,3',5,5',6-heptachlorobiphenyl	52663-67-9	0.000707	0.000283	0.0400	0.0160	0.200	0.080
179	179	2,2',3,3',5,6,6'-heptachlorobiphenyl	52663-64-6	0.000441	0.000177	0.0840	0.0336	0.200	0.080
180	180	2,2',3,4,4',5,5'-heptachlorobiphenyl	35065-29-3	0.000539	0.000216	0.136	0.0544	0.400	0.160
181	181	2,2',3,4,4',5,6-heptachlorobiphenyl	74472-47-2	0.000663	0.000265	0.100	0.0400	0.200	0.080
182	182	2,2',3,4,4',5,6'-heptachlorobiphenyl	60145-23-5	0.000680	0.000272	0.104	0.0416	0.200	0.080
183	183	2,2',3,4,4',5',6-heptachlorobiphenyl	52663-69-1	0.000641	0.000257	0.154	0.0616	0.400	0.160
184	184	2,2',3,4,4',6,6'-heptachlorobiphenyl	74472-48-3	0.000461	0.000184	0.0900	0.0360	0.200	0.080
185	185	2,2',3,4,5,5',6-heptachlorobiphenyl	52712-05-7	0.000641	0.000257	0.154	0.0616	0.400	0.160
186	186	2,2',3,4,5,6,6'-heptachlorobiphenyl	74472-49-4	0.000427	0.000171	0.0960	0.0384	0.200	0.080
187	187	2,2',3,4',5,5',6-heptachlorobiphenyl	52663-68-0	0.000571	0.000229	0.0840	0.0336	0.200	0.080
188	188	2,2',3,4',5,6,6'-heptachlorobiphenyl	74487-85-7	0.000441	0.000177	0.0840	0.0336	0.200	0.080
189	189	2,3,3',4,4',5,5'-heptachlorobiphenyl	39635-31-9	0.00449	0.001797	0.0980	0.0392	0.200	0.080
190	190	2,3,3',4,4',5,6-heptachlorobiphenyl	41411-64-7	0.000473	0.000189	0.100	0.0400	0.200	0.080

Table 9-1. Stack Gas PCB Target Analytes

PCB No. [1]	BZ/IUPAC No. [2]	PCB Chemical Structure Name [3]	PCB CAS No. [4]	Estimated Detection Limit (ng) [5]	Train Detection Limit @ EDL (ng/m^3) [5,6]	Method Detection Limit (ng) [5]	Train Detection Limit @ MDL (ng/m^3) [5,6]	Reporting Limit (ng) [5]	Train Detection Limit @ RL (ng/m^3) [5,6]
191	191	2,3,3',4,4',5',6-heptachlorobiphenyl	74472-50-7	0.000489	0.000195	0.102	0.0408	0.200	0.080
192	192	2,3,3',4,5,5',6-heptachlorobiphenyl	74472-51-8	0.000468	0.000187	0.080	0.0320	0.200	0.080
193	193	2,3,3',4',5,5',6-heptachlorobiphenyl	69782-91-8	0.000539	0.000216	0.136	0.0544	0.400	0.160
194	194	2,2',3,3',4,4',5,5'-octachlorobiphenyl	35694-08-7	0.00185	0.000741	0.0960	0.0384	0.200	0.080
195	195	2,2',3,3',4,4',5,6-octachlorobiphenyl	52663-78-2	0.00218	0.00087	0.106	0.0424	0.200	0.080
196	196	2,2',3,3',4,4',5,6'-octachlorobiphenyl	42740-50-1	0.000880	0.000352	0.120	0.0480	0.200	0.080
197	197	2,2',3,3',4,4',6,6'-octachlorobiphenyl	33091-17-7	0.000597	0.000239	0.094	0.0376	0.200	0.080
198	198	2,2',3,3',4,5,5',6-octachlorobiphenyl	68194-17-2	0.000787	0.000315	0.164	0.0656	0.400	0.160
199	201/199	2,2',3,3',4,5,5',6'-octachlorobiphenyl	52663-75-9	0.000787	0.000315	0.164	0.0656	0.400	0.160
200	199/200	2,2',3,3',4,5,6,6'-octachlorobiphenyl	52663-73-7	0.000680	0.000272	0.068	0.0272	0.200	0.0800
201	200/201	2,2',3,3',4,5',6,6'-octachlorobiphenyl	40186-71-8	0.000700	0.000280	0.106	0.0424	0.200	0.0800
202	202	2,2',3,3',5,5',6,6'-octachlorobiphenyl	2136-99-4	0.000661	0.000264	0.102	0.0408	0.200	0.0800
203	203	2,2',3,4,4',5,5',6-octachlorobiphenyl	52663-76-0	0.000740	0.000296	0.136	0.0544	0.200	0.0800
204	204	2,2',3,4,4',5,6,6'-octachlorobiphenyl	74472-52-9	0.000653	0.000261	0.096	0.0384	0.200	0.0800
205	205	2,3,3',4,4',5,5',6-octachlorobiphenyl	74472-53-0	0.00165	0.000661	0.110	0.0440	0.200	0.0800
206	206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	40186-72-9	0.0346	0.0138	0.114	0.0456	0.200	0.0800

Table 9-1. Stack Gas PCB Target Analytes

PCB No. [1]	BZ/IUPAC No. [2]	PCB Chemical Structure Name [3]	PCB CAS No. [4]	Estimated Detection Limit (ng) [5]	Train Detection Limit @ EDL (ng/m^3) [5,6]	Method Detection Limit (ng) [5]	Train Detection Limit @ MDL (ng/m^3) [5,6]	Reporting Limit (ng) [5]	Train Detection Limit @ RL (ng/m^3) [5,6]
207	207	2,2',3,3',4,4',5,6,6'-nonachlorobiphenyl	52663-79-3	0.0274	0.0110	0.076	0.0304	0.200	0.0800
208	208	2,2',3,3',4,5,5',6,6'-nonachlorobiphenyl	52663-77-1	0.0279	0.0112	0.102	0.0408	0.200	0.0800
209	209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	2051-24-3	0.000411	0.000165	0.0920	0.0368	0.200	0.0800
Total		All Congeners		1.45	0.579	29.8	11.9	69.8	27.9

Notes:

1. The PCB congener number is from Method 1668C and Chemical Abstract Services.

2. The BZ number is from Ballschmiter and Zell (1980). The IUPAC number, when different from the BZ, follows the recommended changes to the BZ number per Schulte and Malisch (1983) and Guitart et al. (1993).

3. The chemical structure names are from Ballschmiter and Zell (1980). IUPAC nomenclature structure names are listed in parenthesis when different from the BZ name (source CAS Registry).

4. Chemical Abstract Service Registry number (source CAS Registry and Method 1668C Table 1).

5. Detection limits based on analysis of extracts split two ways: one-half for PCB and one-half for DF. The PCB detection limits values represent approximate, relative limits using isotope dilution and HRGC/SIMS analysis which can result in detection limit variations.

6. Based on 2.5 dry standard cubic meters of stack gas sampled.

Table 9-2. Stack Gas Dioxin/Furan Target Analytes

Compound	CAS No.	Per Analysis EDL (pg) [1]	Per Analysis RL (pg) [1]	Train Detection Limit @ EDL (ng/m^3) [1,2,3]	Train Detection Limit @ RL (ng/m^3) [1,2,3]	2,3,7,8-TCDD TEQ Factor	2,3,7,8-TCDD TEQ @ EDL (ng/m^3) [1,2]	2,3,7,8-TCDD TEQ @ RL (ng/m^3) [1,2]
2,3,7,8 - TCDD	1746-01-6	1.37	20.0	0.000548	0.00800	1	0.00800	0.000548
Total TCDD	41903-57-5	1.37	20.0	0.000548	0.00800	NA	NA	NA
2,3,7,8 - TCDF (DB225)	51207-31-9	2.82	20.0	0.001128	0.00800	0.1	0.000800	0.000113
Total TCDF	55722-27-5	1.59	20.0	0.000637	0.00800	NA	NA	NA
1,2,3,7,8 - PeCDD	40321-76-4	1.33	100.0	0.000530	0.0400	0.5	0.0200	0.000265
Total PeCDD	36088-22-9	1.33	100.0	0.000530	0.0400	NA	NA	NA
1,2,3,7,8 - PeCDF	57117-41-6	0.644	100.0	0.000258	0.0400	0.05	0.00200	0.00001288
2,3,4,7,8 - PeCDF	57117-31-4	0.632	100.0	0.000253	0.0400	0.5	0.0200	0.0001264
Total PeCDF	30402-15-4	0.638	100.0	0.000255	0.0400	NA	NA	NA
1,2,3,6,7,8 - HxCDD	57653-85-7	0.796	100.0	0.000318	0.0400	0.1	0.00400	0.0000318
1,2,3,4,7,8 - HxCDD	39227-28-6	0.754	100.0	0.000302	0.0400	0.1	0.00400	0.0000302
1,2,3,7,8,9 - HxCDD	19408-74-3	0.738	100.0	0.000295	0.0400	0.1	0.00400	0.0000295
Total HxCDD	34465-46-8	0.762	100.0	0.000305	0.0400	NA	NA	NA
1,2,3,6,7,8 - HxCDF	57117-44-9	0.938	100.0	0.000375	0.0400	0.1	0.00400	0.0000375
1,2,3,4,7,8 - HxCDF	70648-26-9	0.860	100.0	0.000344	0.0400	0.1	0.00400	0.0000344
1,2,3,7,8,9 - HxCDF	72918-21-9	0.928	100.0	0.000371	0.0400	0.1	0.00400	0.0000371
2,3,4,6,7,8 - HxCDF	60851-34-5	1.01	100.0	0.000404	0.0400	0.1	0.00400	0.0000404
Total HxCDF	55684-94-1	0.934	100.0	0.000374	0.0400	NA	NA	NA
1,2,3,4,6,7,8 - HpCDD	35822-39-4	4.36	100.0	0.00174	0.0400	0.01	0.00040	0.00001744
Total HpCDD	37871-00-4	4.36	100.0	0.00174	0.0400	NA	NA	NA
1,2,3,4,6,7,8 - HpCDF	67562-394	0.692	100.0	0.000277	0.0400	0.01	0.00040	0.00000277
1,2,3,4,7,8,9 - HpCDF	55673-89-7	0.832	100.0	0.000333	0.0400	0.01	0.00040	0.00000333
Total HpCDF	38998-75-3	0.762	100.0	0.000305	0.0400	NA	NA	NA
Total OCDD	3268-87-9	0.864	200	0.000346	0.0800	0.001	0.0000800	0.000000346
Total OCDF	39001-02-0	0.656	200	0.000262	0.0800	0.001	0.0000800	0.000000262
TOTALS				0.00531	0.416		0.0802	0.001330

Notes:
[1] Detection limits based on combined analysis of the Method 23 extract split two ways for PCDD/PCDF and PCB analyses. PCDD/PCDF detection limits using isotope dilution and HRGS/HRMS analysis method can vary. The detection values represent approximate, relative limits of detection.
[2] Based on 2.5 dry standard cubic meters (dscm) of stack gas sampled.
[3] Based on sum of the individual congener group "Total" detection limits.

Table 9-3 Stack Gas Semivolatile Organic Target Analytes

Compound [1]	CAS No.	Combined Fractions @ Method Detection Limit (ug) [2]	Train Detection Limit @ MDL (ug/m^3) [2,3]	Combined Fractions @ Reporting Limit (ug) [2]	Train Detection Limit @ RL (ug/m^3) [2,3]
bis(2-Chloroethoxy)methane	111-91-1	2.00	0.667	20.0	6.67
bis(2-Chloroethyl) ether	111-44-4	2.20	0.733	20.0	6.67
4-Chloroaniline	106-47-8	24.0	8.00	40.0	13.3
4-Chloro-3-methylphenol	59-50-7	2.50	0.833	20.0	6.67
2-Chloronaphthalene	91-58-7	2.00	0.667	20.0	6.67
2-Chlorophenol	95-57-8	2.00	0.667	20.0	6.67
4-Chlorophenyl phenyl ether	7005-72-3	2.00	0.667	20.0	6.67
1,2-Dichlorobenzene	95-50-1	2.00	0.667	20.0	6.67
1,3-Dichlorobenzene	541-73-1	2.40	0.800	20.0	6.67
1,4-Dichlorobenzene	106-46-7	2.20	0.733	20.0	6.67
3,3'-Dichlorobenzidine	91-94-1	30.0	10.0	100	33.3
2,4-Dichlorophenol	120-83-2	3.00	1.00	20.0	6.67
Hexachlorobenzene	118-74-1	2.00	0.667	20.0	6.67
Hexachlorobutadiene	87-68-3	3.00	1.00	20.0	6.67
Hexachlorocyclopentadiene	77-47-4	40.0	13.3	100	33.3
Hexachloroethane	67-72-1	5.00	1.67	20.0	6.67
Pentachlorobenzene	608-93-5	2.00	0.667	20.0	6.67
Pentachloronitrobenzene	82-68-8	2.00	0.667	20.0	6.67
Pentachlorophenol	87-86-5	100	33.3	100	33.3
1,2,4-Trichlorobenzene	120-82-1	2.40	0.800	20.0	6.67
2,4,5-Trichlorophenol	95-95-4	5.20	1.73	20.0	6.67
2,4,6-Trichlorophenol	88-06-2	3.00	1.00	20.0	6.67

Notes:

[1] In addition to the target SVOC compounds listed above, all non-target chlorinated SVOC compound peaks greater than 10% of the nearest internal standard will be tentatively identified with 85% or better match via GC/MS library search of the mass spectral data, with quantity estimated based on the nearest internal standard.

[2] Detection limits are based on previous similar sampling and Method 8270E analysis. Detection limits based on combined analysis of the front-half and back-half extracts split two (2) ways for ODCB & SVOC RCIs.

[3] Based on three (3) dry standard cubic meters (dscm) of stack gas sampled.

Table 9-4. Ortho-dichlorobenzene Principal Organic Hazardous Constituent Quantity

Parameter	Units	Value
Sampling method	---	SW-846 Method 0010 w/Selected Ion Monitoring Analysis by Method 8270
Reporting limit	ng	40 (for Filter & Probe Rinse) + 40 (for XAD Condenser Rinse) + 40 (condensate) = 120 ng Total
Sampled volume	dscm	3.00
Reporting limit	ng/dscm	40
	ng/dscf	1.13E+00
Estimated stack flow rate	dscfm	50,000
	dscm/min	1,416
Target destruction and removal efficiency	%	99.9999
Minimum emission rate required for detection	lb/hr	7.49E-06
Minimum required POHC feed rate at DRE target	lb/hr	7.49
Maximum potential POHC feed rate	lb/hr	3,000 (Possible feed rate necessary to preserve current nominal TSCA authorization PCB feed rate limit)

Note: ODCB detection levels are based on gas chromatograph/mass spectrometry (GC/MS) analysis by SW-846 Method 8270, with selected ion monitoring (SIM). Refer to Section 7.5.5 of Method 8270C, Section 11.5.5 of Method 8270D, or Section 11.3.1 of Method 8270E. The SIM analysis approach is comparable to isotope dilution high resolution GC/MS (HRGC/HRMS) approach normally used for dioxin/furan analysis. The SIM approach provides for detection limits 1-2 orders of magnitude lower than the normal GC/MS analysis. The SIM approach significantly reduces the ODCB spiking rate necessary to effectively demonstrate DRE.

Table 9-5. Stack Gas Particulate

Parameter	Probe Rinse (mg)	Filter (mg)	Conden-sate (mg)	Filterable Train Detection Limit (mg/m^3) [1]	Filterable Train Detection Limit (gr/dscf) [1]	Filterable & Condensable Train Detection Limit (mg/m^3) [1]	Filterable & Condensable Train Detection Limit (gr/dscf) [1]
Particulate Matter	0.5	0.5	0.5	0.50	0.00022	0.75	0.00033

Notes:

[1] For particulate, the measurement is of differential weight. The detection limit accuracy for gravimetric is $\pm$0.5 mg for each of the two fractions, the filter and the probe rinse. The stack gas concentration limit is based on 2.0 dry standard cubic meters (dscm) of stack gas sampled.

Table 9-6. Stack Gas HCl/Cl_2

Parameters	H_2SO_4 Impinger Method Detection Limit (ug)	NaOH Impinger Method Detection Limit (ug)	Train Method Detection Limit (ug/m^3) [1]	H_2SO_4 Impinger Reporting Limit (ug)	NaOH Impinger Reporting Limit (ug)	Train Reporting Limit (ug/m^3) [1]
HCl/Cl_2						
Hydrogen Chloride	150	NA	75.0	300	NA	150
		ug/m^3 as HCl:	77.1		ug/m^3 as HCl:	154
		ppm as HCl:	0.0508		ppm as HCl:	0.102
Chlorine	NA	150	75.0	NA	300	150
		ug/m^3 as Cl_2:	75.0		ug/m^3 as Cl_2:	150
		ppm as Cl_2:	0.025		ppm as Cl_2:	0.0508
Total as Cl^-	150	150	150	300	300	300
		ug/m^3 as Cl^-:	150		ug/m^3 as Cl^-:	300
		ppm as Cl^-:	0.102		ppm as Cl^-:	0.203

Notes:
[1] Detection limits are for chloride ion via Ion Chromatography (IC) analysis, SW-846 Method 9056/9057. The stack gas concentration limit is based on 2.0 cubic meters of stack gas sampled using a Method 26A sampling train. MDL and RL limit are based on previous similar testing.

Table 9-7. Stack Gas Volatile Organic Target Analytes

Compound [1]	CAS No.	Method Detection Limit per Tube (ug)	Tube Total @ MDL (ug)[1]	Condensate @ MDL (ug)[c]	Train Total @ MDL (ug/m^3) [4]	Reporting Limit per Tube (ug)	Tube Total @ RL (ug) [2]	Condensate @ RL (ug) [3]	Train Total @ RL (ug/m^3) [4]
Bromochloromethane	74-97-5	0.00560	0.0504	0.00960	1.00	0.0250	0.150	0.0400	3.17
Bromodichloromethane	75-27-4	0.00420	0.0378	0.00400	0.697	0.0250	0.150	0.0400	3.17
Carbon tetrachloride	56-23-5	0.00690	0.0621	0.00480	1.12	0.0250	0.150	0.0400	3.17
Chlorobenzene	108-90-7	0.00320	0.0288	0.00400	0.547	0.0250	0.150	0.0400	3.17
Chlorodibromomethane	124-48-1	0.00560	0.0504	0.00800	0.973	0.0250	0.150	0.0400	3.17
Chloroethane	75-00-3	0.00680	0.0612	0.00960	1.18	0.0500	0.300	0.0800	6.33
Chloroform	67-66-3	0.00700	0.0630	0.00400	1.12	0.0250	0.150	0.0400	3.17
Chloromethane	74-87-3	0.00480	0.0432	0.00480	0.800	0.0500	0.300	0.0800	6.33
2-Chlorotoluene	95-49-8	0.00180	0.0162	0.00960	0.430	0.0250	0.150	0.0400	3.17
4-Chlorotoluene	106-43-4	0.00180	0.0162	0.00840	0.410	0.0250	0.150	0.0400	3.17
1,2-Dibromo-3-chloro-propane	96-12-8	0.0110	0.0990	0.0180	1.95	0.0500	0.300	0.0800	6.33
1,2-Dichlorobenzene	95-50-1	0.00770	0.0693	0.00400	1.22	0.0250	0.150	0.0400	3.17
1,3-Dichlorobenzene	541-73-1	0.00380	0.0342	0.00400	0.637	0.0250	0.150	0.0400	3.17
1,4-Dichlorobenzene	106-46-7	0.00550	0.0495	0.00480	0.905	0.0250	0.150	0.0400	3.17
Dichlorodifluoromethane	75-71-8	0.00510	0.0459	0.00600	0.865	0.0250	0.150	0.0800	3.83
1,1-Dichloroethane	75-34-3	0.00640	0.0576	0.00400	1.03	0.0250	0.150	0.0400	3.17
1,2-Dichloroethane	107-06-2	0.00660	0.0594	0.00400	1.06	0.0250	0.150	0.0400	3.17
cis-1,2-Dichloroethene	156-59-2	0.00620	0.0558	0.00480	1.01	0.0250	0.150	0.0400	3.17
trans-1,2-Dichloroethene	156-60-5	0.00740	0.0666	0.00400	1.18	0.0250	0.150	0.0400	3.17
1,1-Dichloroethene	75-35-4	0.00670	0.0603	0.00400	1.07	0.0250	0.150	0.0400	3.17
1,2-Dichloropropane	78-87-5	0.00490	0.0441	0.00400	0.802	0.0250	0.150	0.0400	3.17
1,3-Dichloropropane	142-28-9	0.00730	0.0657	0.00680	1.21	0.0250	0.150	0.0400	3.17
2,2-Dichloropropane	594-20-7	0.00700	0.0630	0.00440	1.12	0.0250	0.150	0.0400	3.17
cis-1,3-Dichloropropene	10061-01-5	0.00460	0.0414	0.00400	0.757	0.0250	0.150	0.0400	3.17
trans-1,3-Dichloropropene	10061-02-6	0.00590	0.0531	0.00440	0.958	0.0250	0.150	0.0400	3.17
1,1-Dichloropropene	563-58-6	0.00770	0.0693	0.00400	1.22	0.0250	0.150	0.0400	3.17
Hexachlorobutadiene	87-68-3	0.0120	0.108	0.00480	1.88	0.0250	0.150	0.0800	3.83
Methylene chloride	75-09-2	0.0160	0.144	0.00920	2.55	0.0250	0.150	0.0800	3.83
1,1,1,2-Tetrachloroethane	630-20-6	0.00370	0.0333	0.00480	0.635	0.0250	0.150	0.0400	3.17
1,1,2,2-Tetrachloroethane	79-34-5	0.00970	0.0873	0.00600	1.56	0.0250	0.150	0.0400	3.17
Tetrachloroethene	127-18-4	0.00620	0.0558	0.00400	0.997	0.0250	0.150	0.0400	3.17

Table 9-7. Stack Gas Volatile Organic Target Analytes

Compound [1]	CAS No.	Method Detection Limit per Tube (ug)	Tube Total @ MDL (ug)[1]	Condensate @ MDL (ug)[c]	Train Total @ MDL (ug/m^3) [4]	Reporting Limit per Tube (ug)	Tube Total @ RL (ug) [2]	Condensate @ RL (ug) [3]	Train Total @ RL (ug/m^3) [4]
1,2,3-Trichlorobenzene	87-61-6	0.0140	0.126	0.00920	2.25	0.0250	0.150	0.0400	3.17
1,2,4-Trichlorobenzene	120-82-1	0.0130	0.117	0.00600	2.05	0.0250	0.150	0.0400	3.17
1,1,1-Trichloroethane	71-55-6	0.00820	0.0738	0.00400	1.30	0.0250	0.150	0.0400	3.17
1,1,2-Trichloroethane	79-00-5	0.00700	0.0630	0.0100	1.22	0.0250	0.150	0.0400	3.17
Trichloroethene	79-01-6	0.00650	0.0585	0.00400	1.04	0.0250	0.150	0.0400	3.17
Trichlorofluoromethane	75-69-4	0.00680	0.0612	0.00480	1.10	0.0500	0.300	0.0800	6.33
1,2,3-Trichloropropane	96-18-4	0.0100	0.0900	0.0144	1.74	0.0250	0.150	0.0400	3.17
Vinyl chloride	75-01-4	0.0250	0.225	0.00960	3.91	0.0250	0.150	0.0400	3.17

Notes:
[1] In addition to the target compounds listed above, all non-target chlorinated compound peaks greater than 10% of the nearest internal standard will be tentatively identified with 85% or better match via GC/MS library search of the mass spectral data, with quantity estimated based on the nearest internal standard.
[2] Based on summation of analysis of three tube sets at the method detection limit (MDL) presented. MDLs are based on previous similar VOST sampling and analysis.
[3] Based on 40 mL of Condensate (one 40-mL VOA).
[4] Based on 60 liters (0.060 cubic meters)of stack gas sampled using three tube sets and 40 mL of VOST Condensate.

Table 9-8. Waste Feed PCB Target Analytes

PCB Aroclor	CAS No.	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)
Aroclor 1016	12674-11-2	1.00	0.16
Aroclor 1221	11104-28-2	1.00	0.16
Aroclor 1232	11141-16-5	1.00	0.16
Aroclor 1242	53469-21-9	1.00	0.16
Aroclor 1248	12672-29-6	1.00	0.13
Aroclor 1254	11097-69-1	1.00	0.13
Aroclor 1260	11096-82-5	1.00	0.13
Aroclor 1262	37324-23-5	1.00	0.23
Aroclor 1268	11100-14-4	1.00	0.13

10.0 SPECIFIC INTERNAL QUALITY CONTROL CHECKS

10.1 DEFINITIONS

The various types of QA/QC checks that may be performed as part of the test, both for sampling and analysis, are defined below. One or more of these QA/QC checks are associated with each measurement system in order to assess the compliance of the data to the DQOs established in Section 5.0. Table 10-1 is a summary of all the sample analyses and their associated internal quality control checks associated with this test program.

Audit Sample An audit sample is a field or alternate laboratory prepared blank spike submitted to the test laboratory to assess accuracy or potential sample degradation.

Blank, Field A field blank is a sampling train or sampling component that is set-up in the field but is not used for test sampling. The field blank is used to assess background contamination that may affect the representativeness of the field samples.

Blank, Media A sample of unused sampling media analyzed to ensure the media are uncontaminated. This type of sample may also be referred to as a “reagent blank” (see below).

Blank, Method A method blank is a sample of unused media that is prepared and analyzed in the test laboratory to assess background contamination that may exist in the laboratory, on glassware, or in the analytical system.

Blank, Reagent A sample of unused reagent(s) used to demonstrate the absence of contamination in the reagents.

Blank, Spike A blank spike is a laboratory prepared sample of blank media that is spiked with a known amount of target analyte(s) used to assess the accuracy of the analytical method.

Blank, System An aliquot of uncontaminated reagent used to clean out the analytical system after high level samples have been analyzed or before analysis begins.

Blank, Trip A trip blank is an unused sample component that is shipped to the field along with the sampling equipment/media and/or returned to the laboratory without having been exposed to field conditions. If contamination is encountered in the field blank(s), the trip blank is analyzed to assess whether or not the contamination originates in the field, is inherent in the equipment/media, or results from exposure during shipping and handling.

Breakthrough Check The result of the analysis of a secondary component (i.e., sorbent tube) in a sampling train is compared to the result of the primary component to assess whether or not the primary component has successfully captured the target analytes. If the result of the secondary component analysis is high compared to the primary component analysis, the possibility exists that the analytical results may be artificially low.

Calibration Check A standard solution from a source other than the calibration standards used to verify the integrity of an instrument's calibration.

Calibration Standards High purity compounds or mixtures of compounds used to adjust the response of an analytical instrument. The laboratory will use traceable standards and submit standard preparation logs as part of the deliverables package.

Contingency Sample An archived portion of a field sample from the same location as other field samples that is collected and held in case of breakage or QA/QC failure during

the handling or analysis of the primary sample. This type of sample is sometimes referred to as an "archive sample."

Continuing Calibration Verification A mid-point standard, from the same Calibration source as the initial calibration solution analyzed periodically to verify that calibration conditions have not drifted from the initial calibration.

Duplicate Analysis A duplicate is a sample that is split in the laboratory and prepared and analyzed twice. The results of the two analyses are compared as a measure of precision.

Duplicate Injection A second analysis of a single sample preparation. This QC test may be used to assess analytical QC failures, matrix interferences, or as a measure of analytical system precision.

Initial Calibration A series of analyses of solutions, that have known concentrations, used to establish the correspondence between the amount of an analyte present in the solution and the instrument's response across the expected analytical range of the samples. Initial calibrations also establish retention time windows for identification purposes in chromatographic methods.

Internal Standard Recovery Internal standards are non-target spikes added to samples for quantitation purposes. The percent recovery of the internal standards is checked to assess whether or not significant matrix interferences may affect the accuracy and precision of analytical results.

Performance Evaluation (PE) Sample See Audit Sample.

Proficiency Test A series of blank spikes analyzed in the test laboratory to demonstrate an analyst's ability to successfully perform the method with acceptable precision and accuracy.

Replicate One of a series of identical samples or splits of a single sample used to assess precision.

Serial Dilution The result of the analysis of a highly contaminated sample, run undiluted, is compared to the results for the same sample after serial dilution. The two results are expected to match to within method specified criteria. This test is a measure of the linearity of ICP calibration and the analysis technique.

Spike, Field See Audit Sample.

Spike, Matrix Spike of the known or controlled amount of an actual target analyte to an actual sample matrix that is then analyzed for that analyte. The percent recovery of the spiked analyte provides a measure of the matrix bias.

Surrogates Non-target or isotopically labeled analytes spiked into field samples as a measure of method efficiency and accuracy.

10.2 SPECIFIC QUALITY CONTROL CHECKS AND ACCEPTANCE CRITERIA

A variety of QC checks are required both in the field and in the laboratory to ensure the collection of samples that accurately represent the field conditions under study, to assess compliance with the Data Quality Objectives (DQOs), and to assess biases in the measurement system.

10.2.1 Field Activities

In order to ensure the representativeness of samples collected during the test, and to ensure integrity of field measurements, a variety of QC checks and controls will be implemented throughout the sampling program. These checks and controls will include:

- Standard forms and/or standard field notebooks will be used to document field activities and for data collection. The data collection forms and field notebooks will be reviewed routinely by senior staff for accuracy, completeness, and internal consistency.
- The strict adherence to detailed operating procedures as documented in the various project controlling documents and related SOPs will be enforced by experienced senior technical staff.
- Project personnel will be selected based on appropriate levels of training and experience and will receive site-specific training prior to working on-site. The site-specific training will include health and safety requirements; security requirements; briefings on overall project goals, objectives, and schedules; and, specific technical training related to their assigned tasks.
- Routine calibration will be performed on measurement systems and sampling equipment including metering systems, thermocouples, barometers, rotameters, and pitot tubes. Guidance related to equipment calibration is provided in Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods and Quality Assurance/Quality Control Procedures for Hazardous Waste Incinerators, Appendix A. The detailed specifications, acceptance criteria, and corrective action requirements are presented in Section 8.0 of this QAPP. All calibrations will be documented and the documentation maintained in the project files.
- Leak checks will be performed according to method specifications before and after sampling.
- Field QC samples for sampling train are submitted including field blanks, media blanks, reagent blanks, trip blanks, and contingency samples. The frequency of submittal for these field QC samples and other field samples are provided in Table 6-1.
- Field QC samples of process samples, e.g., spiking material, are not routinely collected unless split or duplicate samples are to be provided to a third party to perform their own independent comparative analysis.
- Field audits/surveillance will be performed periodically to assess conformance to specifications. If nonconforming conditions are noted, the corrective action provisions of the QA plan will be invoked.

10.2.2 Laboratory Activities

Standard laboratory QA procedures, required of each laboratory, provide discussions related to QA/QC checks and controls within the laboratory. Specific data quality objectives, calibration requirements, acceptance criteria, and corrective action requirements for this test program are presented in Table 5-1 and Table 8-2 of this plan.

In addition to the requirements referenced above the laboratory will provide for quality control of sampling media and sample collection equipment. Sorbents used in the organic sampling trains will be prepared according to method specifications. Samples of the prepared media will be tested according to the intended method of use. The results of these tests will be retained in the laboratory's files for future reference.

Table 10-1. CHDP Train I TSCA Compliance Test Program Analyses

Analysis	Sample Matrix	Test	Field QC	Reference Preparation Method	Reference Analytical Method	QC Analysis	QC Analysis Frequency	QC Analyses	Total Analyses
PCB & DF by EPA Method 23	Method 23 Filter, XAD-2, & Solvent Rinses (Combined Extraction)	3	1	Soxhlet Extraction	HRGC/HRMS for PCB and GC/MS Analysis for SVOC RCl	PCB isotope dilution internal standard spike	Every analysis	4	4
						PCB recovery standard spike	Every analysis	4	
					HRGC/HRMS for DF	DF isotope dilution internal standard spike	Every analysis	4	4
						DF recovery standard spike	Every analysis	4	
	Method 23 Impinger Liquid and Rinses	3	1	Separatory Funnel Extraction	HRGC/HRMS for PCB	PCB isotope dilution internal standard spike	Every analysis	Combine w/ Corresponding FH & BH Extract for Single Analysis	NA
						PCB recovery standard spike	Every analysis		
	Method 23 Acetone Reagent Blank	--	1	NA	HRGC/HRMS for PCB & DF, GC/MS Analysis for SVOC RCl	PCB isotope dilution internal standard spike	Every analysis	1	1
						PCB recovery standard spike	Every analysis	1	
						DF isotope dilution internal standard spike	Every analysis	1	1
						DF recovery standard spike	Every analysis	1	
	Method 23 Toluene Reagent Blank	--	1	NA	HRGC/HRMS for PCB & DF, GC/MS Analysis for SVOC RCl	PCB isotope dilution internal standard spike	Every analysis	1	1
						PCB recovery standard spike	Every analysis	1	
						DF isotope dilution internal standard spike	Every analysis	1	1
						DF recovery standard spike	Every analysis	1	

Table 10-1. CHDP Train I TSCA Compliance Test Program Analyses

Analysis	Sample Matrix	Test	Field QC	Reference Preparation Method	Reference Analytical Method	QC Analysis	QC Analysis Frequency	QC Analyses	Total Analyses
PCB & DF by EPA Method 23 (cont'd)	Method 23 Spiked XAD-2 Resin Blank	--	--	Soxhlet Extraction	HRGC/HRMS for PCB, DF, & SVOC RCl	PCB isotope dilution internal standard spike	Every analysis	2	2
						PCB recovery standard spike	Every analysis	2	
						DF isotope dilution internal standard spike	Every analysis	2	2
						DF recovery standard spike	Every analysis	2	
SVOC & ODCB by Method 0010	Method 0010 Filter & FH MeOH/MeCl2 Rinses	3	1	Soxhlet Extraction	SVOC RCl by GCMS & ODCB GCMS SIM	SVOC GCMS surrogate spike	Every analysis	4	4
						GCMS SIM Spike	Every analysis	4	4
	Method 0010 Filter & XAD-2 & BH MeOH/MeCl2 Rinses	3	1		SVOC RCl by GCMS & ODCB GCMS SIM	SVOC GCMS surrogate spike	Every analysis	4	4
						GCMS SIM Spike	Every analysis	4	4
	Method 0010 Impinger Liquid and Rinses	3	1	Separatory Funnel Extraction	SVOC RCl by GCMS & ODCB GCMS SIM	SVOC GCMS surrogate spike	Every analysis	4	4
						GCMS SIM Spike	Every analysis	4	4

Table 10-1. CHDP Train I TSCA Compliance Test Program Analyses

Analysis	Sample Matrix	Test	Field QC	Reference Preparation Method	Reference Analytical Method	QC Analysis	QC Analysis Frequency	QC Analyses	Total Analyses
SVOC & ODCB by Method 0010 (cont'd)	Method 23 MeOH/MeCl2 Reagent Blank	--	1	NA	SVOC RCl by GCMS & ODCB GCMS SIM	SVOC surrogate spike	Every analysis	1	1
						GCMS SIM Spike	Every analysis	1	1
	Method 23 Spiked XAD-2 Resin Blank	--	--	Soxhlet Extraction	SVOC RCl by GCMS & ODCB GCMS SIM	SVOC surrogate spike	Every analysis	2	2
						GCMS SIM Spike	Every analysis	2	2
Particulate by Method 5/202	Method 5/202 particulate filter	3	1	Desiccate to constant mass	Method 5	Gravimetric (Method 5)	Replicate weighing to constant weight	Every sample	4
	Method 5/202 probe and filter holder acetone rinses	3	1	Evaporate/Desiccate to constant mass	Method 5	Gravimetric (Method 5)	Replicate weighing to constant weight	Every sample	4
	Method 5/202 impinger water and rinses	3	1	Extract/Evaporate/Desiccate to constant mass	Method 202	Gravimetric (Method 202)	Replicate weighing to constant weight	Every sample	4
	Method 5/202 impinger acetone and hexane rinses	3	1	Extract/Evaporate/Desiccate to constant mass	Method 202	Gravimetric (Method 202)	Replicate weighing to constant weight	Every sample	4

Table 10-1. CHDP Train I TSCA Compliance Test Program Analyses

Analysis	Sample Matrix	Test	Field QC	Reference Preparation Method	Reference Analytical Method	QC Analysis	QC Analysis Frequency	QC Analyses	Total Analyses
Particulate by Method 5/202 (cont'd)	Method 5/202 ambient particulate filter	3	1	Extract/Evaporate/Desiccate to constant mass	Method 202	Gravimetric (Method 202)	Replicate weighing to constant weight	Every sample	4
	Method 5/202 cold impinger water and rinses	3	1	Extract/Evaporate/Desiccate to constant mass	Method 202	Gravimetric (Method 202)	Replicate weighing to constant weight	Every sample	4
	Method 5/202 filter reagent blank	--	1	Desiccate to constant mass	Method 5/202	Gravimetric (Method 5/202)	Replicate weighing to constant weight	Every sample	1
	Method 5/202 acetone reagent blank	--	1	Evaporate/Desiccate to constant mass	Method 5/202	Gravimetric (Method 5/202)	Replicate weighing to constant weight	Every sample	1
	Method 5/202 hexane reagent blank	--	1	Evaporate/Desiccate to constant mass	Method 5/202	Gravimetric (Method 202)	Replicate weighing to constant weight	Every sample	1

Table 10-1. CHDP Train I TSCA Compliance Test Program Analyses

Analysis	Sample Matrix	Test	Field QC	Reference Preparation Method	Reference Analytical Method	QC Analysis	QC Analysis Frequency	QC Analyses	Total Analyses
Particulate by Method 5/202 (cont'd)	Method 5/202 ambient filter reagent blank	--	1	Evaporate/Desiccate to constant mass	Method 5/202	Gravimetric (Method 202)	Replicate weighing to constant weight	Every sample	1
	Method 5/202 water reagent blank	--	1	Evaporate/Desiccate to constant mass	Method 5/202	Gravimetric (Method 5/202)	Replicate weighing to constant weight	Every sample	1
Particulate by Method 5/26A	Filter	3	1	Evaporate/Desiccate to constant mass	Method 5	Gravimetric (Method 5)	Replicate weighing to constant weight	Every sample	4
	Acetone Rinses	3	1	Evaporate/Desiccate to constant mass	Method 5	Gravimetric (Method 5)	Replicate weighing to constant weight	Every sample	4
	Impinger Water	3	1	Evaporate/Desiccate to constant mass	Method 5	Gravimetric (Method 5)	Replicate weighing to constant weight	Every sample	4
	Filter Reagent Blank	--	1	Evaporate/Desiccate to constant mass	Method 5	Gravimetric (Method 5)	Replicate weighing to constant weight	Every sample	1
	Acetone Reagent Blank	--	1	Evaporate/Desiccate to constant mass	Method 5	Gravimetric (Method 5)	Replicate weighing to constant weight	Every sample	1
	DI Water Blank	--	1	Evaporate/Desiccate to constant mass	Method 5	Gravimetric (Method 5)	Replicate weighing to constant weight	Every sample	1

Table 10-1. CHDP Train I TSCA Compliance Test Program Analyses

Analysis	Sample Matrix	Test	Field QC	Reference Preparation Method	Reference Analytical Method	QC Analysis	QC Analysis Frequency	QC Analyses	Total Analyses
HCl & Cl2 by Method 5/26A	Method 5/26A H2SO4 Impingers	3	1	NA	Ion chromatography (EPA Method 5/26A)	Duplicate	Every Sample	4	10
						MS/MSD analyzed	One per batch (all samples in one batch)	2	
	Method 5/26A H2SO4 reagent blank	--	1	NA	Ion chromatography (EPA Method 5/26A)	Reagent Blank	One per test	1	1
	Method 5/26A NaOH impingers	3	1	NA	Ion chromatography (EPA Method 5/26A)	Duplicate	Every Sample	4	10
						MS/MSD analyzed	One per batch (all samples in one batch)	2	
	Method 5/26A NaOH Reagent Blank	--	1	NA	Ion chromatography (EPA Method 5/26A)	Reagent Blank	One per test	1	1
	Method 5/26A Deionized Water Reagent Blank	--	1	NA	Ion chromatography (EPA Method 5/26A)	Reagent Blank	One per test	1	1

Table 10-1. CHDP Train I TSCA Compliance Test Program Analyses

Analysis	Sample Matrix	Test	Field QC	Reference Preparation Method	Reference Analytical Method	QC Analysis	QC Analysis Frequency	QC Analyses	Total Analyses
HCl & Cl2 by Method 5/26A	Analytical System QC	NA	NA	NA	Ion chromatography (EPA Method 5/26A)	LCS/LCSD	One per batch following initial calibration (separate calibration for each matrix)	2	2
						Method Blank	One per batch/ matrix specific - analyzed in duplicate	2	2
Method 0031 SMVOC for Volatile RCl	SMVOC stack sample tube sets	12	--	NA (Note: Only 3 of the 4 tube sets from each test run will be analyzed; the fourth set is a back-up in case of tube breakage.	Purge and trap, GC/MS (SW-846 Methods 5041A, 8260D); Each tube in each tube set is analyzed separately.	Surrogate spikes	Every sample	27	27
	SMVOC Condensate	3	--	NA	Purge and trap, GC/MS (SW-846 Methods 5041A, 8260D)	Surrogate spikes	Every analysis	3	3

Table 10-1. CHDP Train I TSCA Compliance Test Program Analyses

Analysis	Sample Matrix	Test	Field QC	Reference Preparation Method	Reference Analytical Method	QC Analysis	QC Analysis Frequency	QC Analyses	Total Analyses
Method 0031 SMVOC for Volatile RCI (cont'd)	SMVOC field blank tube sets	1	--	NA	Purge and trap, GC/MS (SW-846 Methods 5041A, 8260D); Tube set is analyzed as a single sample.	Surrogate spikes	Every analysis	1	1
	SMVOC trip blank tube sets	1	--	NA	Purge and trap, GC/MS (SW-846 Methods 5041A, 8260D); Tube set is analyzed as a single sample.	Surrogate spikes	Every analysis	1	1
	SMVOC Cond. Trip Blanks	1	--	NA	Purge and trap, GC/MS (SW-846 Methods 5041A, 8260D)	Surrogate spikes	Every analysis	1	1
	Spiked resin blank tube sets	--	--	NA	Purge and trap, GC/MS (SW-846 Methods 5041A, 8260D); Tube set is analyzed as a single sample.	Surrogate spikes	Every analysis	2	2
	Analytical system QC	NA	NA	NA	Purge and trap, GC/MS (SW-846 Method 8260D)	LCS	1 per condensate batch	2 or more	2
						Method blank	1 per analytical run	2 or more	2

Table 10-1. CHDP Train I TSCA Compliance Test Program Analyses

Analysis	Sample Matrix	Test	Field QC	Reference Preparation Method	Reference Analytical Method	QC Analysis	QC Analysis Frequency	QC Analyses	Total Analyses
Waste Feed PCB Samples	Field Samples	TBD	TBD	SW-846 Method 3580A	SW-846 Method 8082A	Duplicate	1 per waste stream	1 per waste stream	TBD +1 per waste stream
						Surrogate spikes	Every analysis	TBD + 1 Duplicate per Waste Stream	
	Analytical system QC	NA	NA	NA	SW-846 Method 8082A	LCS	1 per analysis batch	TBD	TBD
						Method blank	1 per analytical run	TBD	TBD
TOTAL									**160 + TBD**

11.0 DATA REDUCTION, DATA VALIDATION, AND DATA REPORTING

11.1 DATA REDUCTION

This section of the QAPP describes the approach that will be used to report, review, and reduce the field and laboratory data. The raw data include field samples and sampling documentation, sample tracking documentation, laboratory preparation documentation, and raw analytical data. The analytical results from the laboratory are assembled into complete analytical data packages. The analytical data packages include the analytical results and their defensible backup data. The analytical data are evaluated for compliance with the project DQOs. Data determined to meet the analytical requirements will be used to calculate the unit performance and emissions.

11.2 ORGANIC ANALYSES

Organic analyses will be conducted using gas chromatography (GC) techniques. Although the principles of operation and specific methods of calibration differ according to the analyte specific methods, the general data reduction scheme is the same for all of these tests. The individual methods should be consulted for details. A summary of the data reduction scheme is presented below.

Depending on the specific method, analytical instrumentation is calibrated using 3 to 5 points covering the expected analytical range. The gas chromatograph/flame ionization detector (GC/FID) or gas chromatograph/electron capture detector (GC/ECD) methods generally employ an external standard calibration technique while the GC/MS methods employ an internal standard technique. For GC/FID and GC/ECD methods, a calibration factor (CF) is calculated using the following formula:

$$CF = \frac{R}{M}$$

Where: CF = Calibration Factor

R = Response or Area of the GC Peak

M = Mass Injected (in nanograms)

The calibration factors must agree to within method specified criteria for the percent relative standard deviation (%RSD). The formula for %RSD is given below.

$$\%\,\mathrm{RSD} = \frac{\sigma}{\mathrm{avg\,CF}} \times 100$$

Where: $\%RSD$ = Percent Relative Standard Deviation

σ = Standard Deviation of the Calibration Factors

$avg\ CF$ = Average Calibration Factor

For gas chromatograph/mass spectral (GC/MS) calibrations, a response factor (RF) is used rather than the CF. The formula for the RF is:

$$RF = \frac{(A_s \times C_{is})}{(A_{is} \times C_s)}$$

Where: RF = Response Factor

A_s = Response for the Analyte

A_{is} = Response for the Internal Standard

C_s = Concentration of the Analyte

C_{is} = Concentration of the Internal Standard

The RFs must also pass a test of the %RSD in order for the calibration to be considered valid.

When samples are analyzed, the area of the peak produced by a given analyte is compared to the CF or RF to arrive at an analytical result according to the following formula:

$$M_x = A_x \times CF$$

Where: M_x = The Mass of Analyte in the Sample

A_x = The Response of the Analyte in the Sample

CF = The Calibration (or Response) Factor

Samples containing a concentration of an analyte exceeding the concentration the instrument is calibrated for, will have a serial dilution performed, if such a dilution is practical given the sample preparation method, to bring the concentration within the calibrated range of the instrument. Such dilutions will be documented in the analytical data report and preparation logs. In that case M_x is multiplied by the dilution factor to arrive at the final result. If, under the circumstances of the method, a dilution is not possible (sample is completely consumed in original analysis), the original analytical result must be considered estimated.

To arrive at a concentration in the gas sample the mass of any sub-samples must be added together and then compared to the volume of gas sampled according to the following formula:

$$C_x = \frac{(M_1 + M_2 + ...M_n)}{V}$$

Where: C_x = The Concentration of the Analyte in the Gas Sample

M_n = The Result (Mass) for Each Component in the Sampling Train

V = The Volume of Gas Sampled

11.3 ION CHROMATOGRAPHY

Anions, such as chloride, are separated on the ion chromatograph using a system comprising separator columns, guard columns, and eluents. The system is calibrated using a minimum of 3 points and the calibration is verified with a mid-range standard. Samples are quantitated in the same manner as described above.

11.4 DIRECT READING INSTRUMENTS

Gravimetric, temperature, pressure, flow, and CEMS data are directly read from the measurement instrumentation. The instrumentation will be calibration checked prior to the test, and routinely prior to reading measurements, however, no data reduction beyond formatting into tables is expected

11.5 ANALYTICAL DATA PACKAGES

Analytical data packages will be organized in accordance with the laboratory standard operating procedures. The complete analytical data package is a stand-alone deliverable that includes the final analysis results, raw analytical instrument data, initial and continuing calibration data, parameter-specific quality control documentation, sample preparation documentation, and records of sample traceability. These data are sufficient for performing independent verification of the final analytical results. Every analytical data package includes the following:

- Cover Page—Identifies the laboratory-assigned lot number, project identification, laboratory project manager, and issue date.
- Table of Contents—Organization of the data package.
- Sample Summary—Cross reference to project sample identifications and laboratory sample identifications.
- Analytical/Preparation Methods Summary—Identifies the methods used to prepare and analyze the samples.
- Narrative— Summarizes the project-specific information and any pertinent information concerning data quality. The narrative documents sample delivery and condition upon receipt, and any analytical difficulties or anomalies encountered during sample preparation and analysis.

- QC Data Association Summary—Comparison of sample results to the project and laboratory DOQs and association of project samples to laboratory QC.

- Analytical Data Report—Summarized analytical data for all samples and associated quality assurance samples including as appropriate: data flags, duplicate analysis results, surrogate recovery results, method blank results, laboratory control sample results, and matrix spike/matrix spike duplicate/post digestion spike (MS/MSD/PDS) results.

- Chain-of-custody (COC) documentation

Each analytical data package will include the identification and signature or initials of each analyst who handles the test samples. The Laboratory Project Manager will certify via signature the contents of each analytical data package. Analytical data packages will be transmitted in Acrobat® PDF format. Acrobat® PDF files will be transmitted to CHDP and its testing consultants using Eurofins' secure file transfer protocol (FTP) portal website.

11.5.1 Organic Analyses

The organic analytical data packages will include the following:

- Sample Results
- Raw Sample Data
- Standards Data
  - Initial Calibration Summary(s) and Raw Data
  - Continuing Calibration Summary(s) and Raw Data
  - Initial Calibration(s) Tuning Raw Data (GC/MS only)
  - Continuing Calibration(s) Tuning Raw Data (GC/MS only)
- Raw QC Data
  - Method Blank Data
  - MS/MSD Data and Evaluation Reports
  - Laboratory Control Standard Data and Evaluation Reports
- Miscellaneous data
  - Sample Data Review Checklist
  - Calibration Data Review Checklists
  - Run Logs
  - Extraction sheets.
  - Sample Results
- Example Calculations

11.5.2 Non-Metal Inorganic Analyses

The data packages for other inorganic analyses will include the following:

- Sample Results
- QC Summary
  - Method Blank Report
  - Sample Duplicate report

  - MS/MSD Data and Evaluation Report(s)
  - Laboratory Control Sample Data and Evaluation Report
- Raw Data
  - Data Review Checklist
  - Sample, Standards, and Quality Control Data
  - Distillation, Extraction, and Sample Preparation Sheets
  - Standards Preparation Logs
  - Run Logs

11.6 DATA REPORTING

11.6.1 Project Reporting Format

The outline for the final test report is presented in Figure 11-1.

11.6.2 Detection Limit Definitions

The detection limit for each project target analyte will be derived according to the referenced analytical method and the laboratory's standard operating procedures. The laboratory will provide detection limits for each analyte. There are a number of types of detection limits associated non-isotope dilution analytical methods. The U.S. EPA Office of Solid Waste (OSW) in the "Human Health Risk Assessment Protocol" (RA Protocol) published in July 1998 defines the following detection limits:

> *Instrument Detection Limit (IDL)-the smallest signal above background that an instrument can reliably detect, but not quantify. Also, commonly described as a function of the signal-to-noise (S/N) ratio.*

> *Method Detection Limit (MDL)-the minimum concentration of a substance that can be measured (via non-isotope dilution methods) and reported with 99 percent confidence that the analyte concentration is greater than zero, and is determined from analysis of a sample in a specific matrix type containing the analyte. The MDL is considered the lowest level at which a compound can be reliably detected. The MDL is based on statistical analyses of laboratory data. In practice, the MDLs are determined on analytical reagents (e.g., water) and not on the matrix of concern. MDLs for a given method, are laboratory and compound specific. The determine the MDL as specified in 40 CFR Part 136, Appendix A, at least seven replicate samples with a concentration of the compound of interest near the estimated MDL are analyzed. The standard deviation among these analyses is calculated and multiplied by 3.14. The result of the calculation becomes the MDL. The factor of 3.14 is based on a t-test with six degrees of freedom and provides a 99 percent confidence that the analyte can be detected at this concentration.*

> *Reporting Limit (RL)-the laboratory determined detection, normally the lowest calibration standard.*

Isotope dilution methods quantify non-detects using estimated detection limits (EDLs) as defined in SW-846 Method 8290A. The EDL is defined as follows:

EDL (from SW-846 Method 8290A) -*"The sample specific estimated concentration of a given analyte required to produce a signal with a peak height of 2.5 times the background signal level."*

The laboratory will provide the RL and MDL for each non-isotope dilution analyte on the analytical certificate. If matrix interference(s) occurs or serial dilutions are necessary, the sample specific RL and MDL will be reported. The analytical data package shall include the documentation of the serial dilutions or other measures taken to determine the detection limit. Isotope dilution analyses shall include the sample-specific and analyte-specific RL, MDL, and EDL for each sample and each analyte.

11.6.3 Detection Limits and Data Reduction

Analytical results for all analyses that are reported as "not-detect" in compliance demonstration samples will be handled in the following manner. The analytical result will be reported as "non-detect" and the appropriate detection limit as discussed above will be shown. In subsequent calculations, the following rules will apply for data reporting and performance demonstrations:

- For analyses of single component samples (e.g., feed or residue samples) that are reported as non-detect, the values will be accompanied by a "less than" ("<") and/or a data flag that denotes a non-detect result was obtained. .
- For analyses of single component samples (e.g., feed or residue samples) that are reported as non-detect, any subsequent calculations using detection limit values will be accompanied by a "less than" ("<") sign.
- For analyses of multi-component samples (e.g., Method 0010), where multiple analytical results must be combined or summed for use in subsequent calculations and the calculations involve the use of one or more non-detect values in combination with one or more detectable values, the final calculated values shall also include "<".
- For analyses of multi-component samples where all the multiple analytical results are non-detect values, the final calculated values shall include a data flag such as "ND" with the "<" to indicate that the target analyte was non-detect in all of the relevant sample fractions.
- Where destruction and removal efficiency (DRE), system removal efficiency (SRE), or similar performance measurements are calculated using emissions rates reported with "<" or non-detect flagged values, the resulting performance measurement will be accompanied by a "greater than" (">") sign.

In accordance with 40 CFR 63.1208(b)(1)(ii) and (iii), by operating the Method 23 sampling train a minimum of 180 minute (3 hours) to sample a minimum of 2.5 dry standard cubic meters of stack gas during each sampling run, any dioxin/furan congener that is non-detect is allowed to be counted as zero in determining compliance. For this test program, a sampling time of 180 minutes is planned to a sample volume of 2.5 dry standard cubic meters is targeted. For the analyses of the Method 23 samples, if a fraction is non-detect for a specific dioxin/furan congener, the specific congener's EDL will be reported. For calculating

total dioxin/furan emissions, the EDL value will be used for non-detect results. In calculating 2,3,7,8-tetrachlorinated dibenzo-p-dioxin (TCDD) toxicity equivalent (TEQ) emissions, any 2,3,7,8-chlorinated dioxin/furan congener that is non-detect will be counted as zero.

For calculating metals and HC/Cl_2 emissions, the MDL value will be used for non-detect results.

For calculating particulate matter emissions, 0.5 mg will be used for non-detect results.

11.6.4 Other Quality Control Data Reporting

The following quality assurance measures will be discussed in the analytical data validation report prepared by the Quality Assurance Officer:

- Sample holding times
- Sample surrogate recovery results
- Duplicate results
- MS/MSD results
- Blank train results
- Reagent blank results (if analyzed)
- Trip and field blank results
- RPD and RSD evaluations of accuracy or precision

These data will be evaluated against the target DQOs. Any data that fall outside of the DQO limits will be flagged, footnoted, and assessed relative to the performance and emissions testing objectives. The data from the field blanks and trip blanks will be used to assess possible contamination from field handling and transport of the samples to the laboratory. The reagent blank and blank train results will be used to assess contamination resulting from reagents used, sample handling, and sample recovery procedures. Any blank results that may have impacted performance and emissions testing results or evaluations will be flagged, footnoted, and discussed in the test report and analytical data validation report.

11.6.5 Final Case Files

At a minimum, the following documents will be retained as part of the facility operating upon the completion of the project. These files will be maintained at the CHDP facility for a period of at least five (5) years or until the next compliance test is completed, whichever occurs later:

- All legal documents and orders,
- All field documents including those used for preliminary field activities,
- Copies of all analytical data,
- Copies of the final report and background documents, and
- All correspondence relating to the project as well as corrective action requests.

The test report will be maintained on-site in hard copy form and electronically (Acrobat® PDF format on computer hard drive and/or flash drive). Supporting documentation (test report appendices such as the stack sampling report, analytical data packages, etc.) will be maintained on-site electronically (PDF format on computer hard drive and/or flash drive). Final versions of the test report and supporting documentation (stack sampling report, analytical data packages, etc.) will be maintained electronically by CHDP in a files system that is not connected to the internet. Files maintained there can only be accessed by CHDP personnel.

.

Figure 11-1. Example Train I Test Report Outline

TABLE OF CONTENTS
LIST OF FIGURES
LIST OF TABLES
LIST OF APPENDICES
1.0 SUMMARY OF TEST RESULTS
- **1.1** Summary of TSCA Compliance Test Results
- **1.2** Deviations from the Approved TBP and Their Impacts
  - **1.2.1** Actual vs. Planned Operations
  - **1.2.2** Data Quality Objectives
  - **1.2.3** Sampling and Sample Handling

2.0 INTRODUCTION/PROCESS DESCRIPTION
- **2.1** Brief Unit Description
- **2.2** Test Objectives Overview
- **2.3** Test Responsible Parties
- **2.4** Test Chronology

3.0 OPERATING DATA SUMMARY
- **3.1** Trial Burn Operating
- **3.2** ODCB Spiking

4.0 TSCA EMISSIONS AND PERFORMANCE RESULTS
- **4.1** ODCB DRE
- **4.2** PCB Emissions
- **4.3** DF Emissions
- **4.4** SVOC RCl Emissions
- **4.5** VOC RCl Emissions
- **4.6** HCl/Cl_2 Emissions
- **4.7** CO and SO_2 Emissions
- **4.8** Combustion Efficiency
- **4.9** ABC Retention Time

5.0 QUALITY ASSURANCE/QUALITY CONTROL DOCUMENTATION
- **5.1** Project Personnel and Responsibilities
- **5.2** QAPP Deviations and Corrective Actions
- **5.3** Sample Handling, Traceability, and Holding Time Results

APPENDICES
- APPENDIX A PROCESS OPERATING DATA
- APPENDIX B EMISSIONS SAMPLING REPORT
- APPENDIX C PROCESS INSTRUMENT CALIBRATIONS
- APPENDIX D EXAMPLE CALCULATIONS
- APPENDIX E FIELD NOTES AND LIST OF SAMPLES
- APPENDIX F SUMMARY ANALYTICAL DATA REPORT

12.0 ROUTINE MAINTENANCE PROCEDURES AND SCHEDULES

12.1 SAMPLING EQUIPMENT

All equipment used in emission testing measuring systems must be maintained in good operating order. To achieve this objective, a routine preventive maintenance program is necessary. Procedures used in this program follow those outlined in Maintenance Calibration and Operation of Isokinetic Source Sampling Equipment, Publication No. APTD-05-76 and Volume III of the Quality Assurance Handbook for Air Pollution Measurement Systems.

The potential impact of equipment malfunction on data completeness is minimized through two complementary approaches. First, an equipment maintenance program is part of routine operations. The maintenance program's strengths include:

- Trained technicians experienced in the details of equipment maintenance and fabrication,
- Adequate spare parts inventory, and
- The availability of tools and specialized equipment.

The second approach is based upon equipment redundancy. Backup equipment, spare parts and tools are included on the materials transported to the field for each sampling task. This approach allows the sampling team to respond to equipment breakage or malfunction in a timely fashion, minimizing the quantity of lost data.

For field equipment, preventive maintenance schedules are based on the results of routine inspections and on accumulated experience. At a minimum, equipment will be inspected prior to the beginning of and at the conclusion of each test. A record of each inspection (Figure 12-1) will be kept as part of the final case file. Maintenance schedules for continuous emissions monitors follow manufacturer's recommendations.

Each item of field test equipment is assigned a unique, permanent identification number. An effective preventive maintenance program is necessary to ensure data quality. Each item of equipment returning from the field is inspected before it is returned to storage. During the course of these inspections, items are cleaned, repaired, reconditioned and recalibrated where necessary. Each item of equipment transported to the field for this test program is inspected again before being packed to detect equipment problems that may originate during periods of storage. This minimizes lost time on the job site due to equipment failure. Occasional equipment failure in the field is unavoidable despite the most rigorous inspection and maintenance procedures. For this reason, adequate spare parts are kept in a central location so the sampling contractor can quickly respond to the job site with replacement equipment for all critical sampling train components.

12.2 LABORATORY INSTRUMENTS

The laboratories perform regular maintenance on all analytical instruments. An inventory of replacement parts is kept to prevent downtime. Manufacturers' service representatives are also contracted, as required, for major instrument repairs.

Preventive and routine maintenance is covered in each of the laboratories' QA Manuals and SOPs or in accordance with manufacturer's recommendations (i.e., instrument manuals). Daily maintenance (such as replacement of injector septa, etc.) is covered in instrument SOPs. Inoperative equipment is tagged as non-usable until repairs are performed. Logbooks are maintained for each instrument to record usage, maintenance, and repairs.

Equipment Inspection Record

Clean Harbors Deer Park, LLC, Laporte, TX

Date/Time of inspection: _____

Equipment Inspected:

1) _____

Condition: Good See Problems Section Below

2) _____

Condition: Good See Problems Section Below

3) _____

Condition: Good See Problems Section Below

4) _____

Condition: Good See Problems Section Below

5) _____

Condition: Good See Problems Section Below

Problems Noted:

_____

_____

_____

_____

Action Taken

_____

_____

_____

Inspector's Signature_____

Figure 12-1. Example Equipment Inspection Record Form

13.0 ASSESSMENT PROCEDURES FOR ACCURACY, PRECISION, & COMPLETENESS

The QA activities implemented in this study will provide a basis for assessing the accuracy and precision of the analytical measurements. Section 5.0 discusses the QA activities that will generate the accuracy and precision data for each sample type. The generalized forms of the equations that will be used to calculate accuracy and precision are presented below.

13.1 ACCURACY

When a reference standard material is used in the analysis, percent Accuracy (A) will be calculated as follows:

$$A = \frac{\text{Found concentration}}{\text{True concentration}} \times 100$$

Percent analyte Recovery (R) will be calculated as follows:

$$R = \frac{X - N}{S} \times 100$$

Where X is the experimentally determined value, N is the amount of native material in the sample, and S is the amount of spiked material of the species being measured. Recoveries are used to determine accuracy when standards are not available, or are not appropriate for a given matrix.

13.2 PRECISION

When less than three analyses of the same parameter are available, precision will be calculated as a Relative Percent Difference (RPD) from the average of replicate measurements according to:

$$\text{RPD} = \frac{(X_1 - X_2)}{\text{Average } X} \times 100$$

Where X_1 and X_2 are the highest and lowest results of replicate measurements.

Where three or more analyses of the same parameter are available, the precision will be determined as the Relative Standard Deviation (RSD) according to:

$$\text{RSD} = \frac{\text{Standard deviation}}{\text{Average X}} \times 100$$

13.3 COMPLETENESS

Completeness of data generated from a test program is usually calculated as follows:

$$\%\,\text{Completeness} = \frac{\text{Valid data}}{\text{Expected data}} \times 100$$

Data completeness is defined in Section 5.0 of this QAPP as the percentage of valid data collected from the total number of valid tests conducted. Three valid test runs, at each test condition, are required for the test to be completed. If an individual sample from a test run is lost or broken, the data for that individual analytical parameter may not be 100% complete. This, however, may not invalidate the test run. The completeness objective for this test program is to generate sufficient data for the regulatory agencies to judge the performance of the system.

14.0 AUDIT PROCEDURES, CORRECTIVE ACTION, AND QA REPORTING

14.1 PERFORMANCE AND SYSTEM AUDITS

This section presents information related to the procedures used by the QA staff to assess conformance of the project staff to the specifications contained in the relevant project controlling documents. Further, auditing may be employed to assess the ability of subcontractors to successfully perform the work.

14.1.1 Field Surveillance

The CPT Manager assigned to the project will actively evaluate the operations at the site during testing to ensure that work is being performed in accordance with the various project controlling documents and associated standard operating procedures. Checklists appropriate to the activities may be used. The field surveillance will cover, but is not necessarily be limited to, such areas as:

- Conformance to SOPs
- Completeness and accuracy of documentation
- Chain of custody procedures
- Compliance with Health and Safety requirements.

The CPT Manager will be present on-site for the testing. The CPT Manager is there to observe and provide overall direction of testing and sampling activities. Review includes unit operations, sampling train preparation, process and emissions sampling activities, process and emissions sample recovery, and recovered sample management.

14.1.2 Performance Evaluations (Analytical Audits)

Refer to Section 5.6. No audit samples are currently available for Method 26A (HCl/Cl_2) or Method 23 (PCDD/PCDF).

14.1.3 Laboratory Audits

The selected laboratory is audited and accredited annually under the National Environmental Laboratory Accreditation Program (NELAP). However, CHDP or its appointed representative may choose to audit the laboratory at any time during the course of this test project to assess the laboratory's ability to successfully perform the work and to ensure mutual agreement between CHDP and the laboratory with regard to the scope of work, QA/QC requirements, and deliverable requirements. Reasonable notice will be provided prior to any on-site inspection of the laboratory.

14.2 CORRECTIVE ACTION

The following procedures have been established to ensure that nonconforming conditions, such as malfunctions, deficiencies, deviations, and errors are promptly investigated, documented, evaluated and corrected. Every person employed in the test program is expected to function as a QC inspector to ensure the quality of the final product. Quality, as it relates to this project, is defined as "performing the work according to the agreed upon specifications contained in the TBP and relevant SOPs or causing the specification to be changed *in a controlled manner*." Each individual is encouraged to identify any condition adverse to the successful completion of the work or any modification to the specifications that might result in a better end product. These improvements might be framed in terms of higher quality, greater safety, greater efficiency, and/or lower cost.

14.2.1 Field

When a nonconforming condition or an opportunity for improvement is noted at the site or contractor location, the corrective action provisions of this plan will be invoked to identify the condition and recommend corrective action. Condition identification, cause, reference documents and the corrective action planned to be taken will be documented.

“Non-conformances” are identified on a case-by-case basis. Field corrections and adjustments will be made as necessary. Such field corrections or adjustment will be communicated and documented in the test report quality assurance discussion as they may impact compliance determinations or data acceptance. The laboratory report narrative will similarly address any minor variances, e.g., surrogate results outside of DQOs limits due to matrix interference. A formal “non-conformance” report will only be generated and communicated for significant changes or deviations from the test plan or QAPP that could impact compliance determinations or data acceptance.

A Corrective Action Request (CAR), as shown in Figure 14-1, should be used to identify the adverse condition or opportunity for improvement, reference document(s) and recommended corrective action(s). The CAR is directed to the CPT Manager. The CPT Manager affixes his signature and the date to the corrective action block that states the cause of the condition(s) and corrective action(s) to be taken. The CPT Manager is responsible for first notifying the regulatory agency representative of any problems or deviations from the QAPP, or the test plan identified in the CAR.

14.2.2 Laboratory

The laboratories' QA Manuals and the related SOPs, contain detailed discussions of corrective actions to be taken if established criteria fail during laboratory analysis. The laboratory has the responsibility to immediately notify the CPT Manager when any analytical QC nonconformance occurs, so a mutually acceptable course of action can be pursued.

14.3 QA REPORT

The CPT Manager will include in the final test report that addresses the following:

- Overview of activities and significant events related to QA/QC
- Summary of any audit results
- Review of corrective action request status
- Laboratory QA/QC reports
- Data validation results
- Summary of significant changes in procedures or QA/QC programs
- Recommendations.

The CPT Manager will include the information in the final test report. Additionally, the QAO's analytical data validation report is included with the final test report. The analytical data validation report compares the data to the data quality objectives (DQO) delineated in the QAPP and includes assessment of the data usability. The CPT Manager can provide formal written reports daily during testing to CHDP and any regulatory officials present.

Corrective Action Request

Number:
Date:
File Name:
Client: Clean Harbors Deer Park, LLC, LaPorte, TX

REQUEST

To:

You are hereby requested to take corrective actions indicated below and as otherwise determined by you (A) to resolve the noted condition and (B) to prevent it from recurring. Your written response is to be returned to the project CPT Manager or other responsible manager by.

Condition:

Reference Documents:

Recommended Corrective Actions:

_____	_____	_____	_____	_____	_____
Originator	Date	Approval	Date	Approval	Date

RESPONSE

Cause of Condition:

Resolution:

Prevention:

Affected Documents:

CPT Manager	Date
Responsible Party	Date
CPT Manager Follow-up	Date

Figure 14-1. Example Corrective Action Request Form