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The request for confidentiality is a single character request.

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Item of Information	Legal Authority
Table of Contents, 2.6-2.10, 2.12	Protect trade secrets; protect proprietary secrets; protect commercial information
Table of Contents, 4.0-4.13	Protect trade secrets; protect proprietary secrets; protect commercial information
1.2 Thermal Treatment System Overview	Protect trade secrets; protect proprietary secrets; protect commercial information
Table 1-3 Target Operating Parameter Limits Overview	Protect trade secrets; protect proprietary secrets; protect commercial information
Table 2-1 Target Operating Parameter Limits	Protect trade secrets; protect proprietary secrets; protect commercial information
2.1 Maximum Waste Feed Rate	Protect trade secrets; protect proprietary secrets; protect commercial information
2.2 Minimum Afterburner Temperature	Protect trade secrets; protect proprietary secrets; protect commercial information
2.3 Maximum Stack Gas Flow Rate	Protect trade secrets; protect proprietary secrets; protect commercial information
2.4 Minimum Stack Gas Oxygen Content	Protect trade secrets; protect proprietary secrets; protect commercial information
2.5 Selective Non-Catalytic Reduction System Operations	Protect trade secrets; protect proprietary secrets; protect commercial information
2.6 Baghouse Pressure Drop Range	Protect trade secrets; protect proprietary secrets; protect commercial information
2.7 Maximum Baghouse Inlet Temperature	Protect trade secrets; protect proprietary secrets; protect commercial information
2.8 High-Efficiency Particulate Arresting Filter Operations	Protect trade secrets; protect proprietary secrets; protect commercial information
2.9 Selective Catalytic Reduction Temperature Range	Protect trade secrets; protect proprietary secrets; protect commercial information
2.11 Control of Combustion System Leaks	Protect trade secrets; protect proprietary secrets; protect commercial information
4.0 Engineering Description—Entire Section	Protect trade secrets; protect proprietary secrets; protect commercial information
Table 5-1 Continuous Process Monitoring Systems	Protect trade secrets; protect proprietary secrets; protect commercial information
Figure 5-1 Monitor Locations	Protect trade secrets; protect proprietary secrets; protect commercial information

6.1 Condition I	Protect trade secrets; protect proprietary secrets; protect commercial information
Table 6-1 Condition I	Protect trade secrets; protect proprietary secrets; protect commercial information
6.2 Condition II	Protect trade secrets; protect proprietary secrets; protect commercial information
Table 6-2 Condition II	Protect trade secrets; protect proprietary secrets; protect commercial information
6.4 Performance Test Waiver	Protect trade secrets; protect proprietary secrets; protect commercial information

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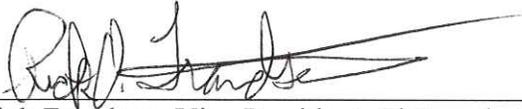
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Concurrent request for Confidential Business Information (CBI) is being made to:

EPA
Louisiana Military Department (LMD)
Louisiana Department of Environmental Quality (DEQ)

7. a certification that all statements are true and correct to the best of the requester's knowledge.

I certify that the statements are true and correct according to the best of my knowledge.

A handwritten signature in black ink, appearing to read "Rick Frandsen", is written over a horizontal line.

Rick Frandsen, Vice President, El Dorado Engineering



EXPLOSIVE SERVICE INTERNATIONAL
BATON ROUGE, LOUISIANA

**COMPREHENSIVE PERFORMANCE
TEST PLAN
FOR
CONTAINED BURNING SYSTEM
OPERATED AT CAMP MINDEN**

**NOVEMBER 2015
REVISION 1: JANUARY 2016
REVISION 2: APRIL 2016**

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5.0	Monitoring	5-1
5.1	Continuous Process Monitoring Systems	5-1
5.2	Continuous Emissions Monitoring Systems.....	5-3
5.3	Control Systems	5-4
5.4	Permissives and Interlocks.....	5-4
5.5	Performance Evaluation Test.....	5-5
	5.5.1 Internal Quality Assurance Program.....	5-5
	5.5.2 External Quality Assurance Program	5-6
	5.5.3 Data Quality Objectives	5-7
	5.5.4 Performance Evaluation Test Schedule	5-7
6.0	Comprehensive Performance Test Operations.....	6-1
6.1	Condition I.....	6-1
6.2	Condition II.....	6-2
6.3	Principal Organic Hazardous Constituent	6-2
6.4	Performance Test Waiver	6-4
6.5	Metals Spiking.....	6-5
6.6	Test Schedule	6-5
7.0	Sampling and Analysis.....	7-1
7.1	Waste Sampling and Analysis	7-1
7.2	Natural Gas Sampling and Analysis.....	7-1
7.3	Stack Gas Sampling and Analysis	7-1

LIST OF TABLES

Table 1-1	Emission Limits.....	1-3
Table 1-2	Emissions Demonstrations Overview	1-4
Table 1-3	Target Operating Parameter Limits Summary	1-5
Table 1-4	Document Revision History	1-6
Table 2-1	Target Operating Parameter Limits	2-1
Table 2-2	Maximum Semivolatile Metals and Low Volatile Metals Feed Rates.....	2-4
Table 3-1	M6 Propellant	3-1
Table 3-2	M6 Propellant Packaging	3-2
Table 3-3	Clean Burning Igniter	3-2
Table 4-1	Batch Process Description	4-6
Table 5-1	Continuous Process Monitoring Systems	5-1
Table 5-2	Continuous Emissions Monitoring Systems.....	5-3
Table 5-3	Performance Specification Requirements	5-4
Table 6-1	Condition I.....	6-1
Table 6-2	Condition II.....	6-2

Table 6-3	Principal Organic Hazardous Constituent Quantity	6-4
Table 6-4	Maximum Theoretical Emission Concentrations	6-5
Table 6-5	Metals Spiking	6-5
Table 6-6	Test Schedule	6-6
Table 7-1	Stack Gas Sampling and Analysis	7-2

LIST OF FIGURES

Figure 4-1	Contained Burning System.....	4-2
Figure 5-1	Monitor Locations.....	5-2

LIST OF APPENDICES

Appendix A:	Quality Assurance Project Plan
Appendix B:	Relevant Military Standard (MIL STD)
Appendix C:	Example Continuous Monitoring Systems Performance Evaluation Test Forms

1.0 INTRODUCTION

This comprehensive performance test (CPT) plan is being submitted by Explosive Service International (ESI) for a thermal treatment system, designated as the Contained Burning System, located at Camp Minden, in Minden, Louisiana. The Contained Burning System is designed to destroy M6 propellant and clean burning igniter (CBI) that has been stored at Camp Minden.

This plan describes the CPT to be conducted for the Contained Burning System. The CPT will demonstrate compliance with the Applicable, Relevant, and Appropriate Requirements (ARARs) provided by United States Environmental Protection Agency (USEPA). This plan is being submitted in accordance with Item 95 of the ARARs.

1.1 FACILITY OVERVIEW

Camp Minden is almost 15,000 acres in size and located in Webster Parish, Louisiana. The facility was formerly known as the Louisiana Military Ammunition Plant, which is a National Priorities List Superfund site primarily because of problems caused by groundwater contamination, and remediation is on-going. Large quantities of explosive and propellant materials are currently stored at Camp Minden. The State of Louisiana entered into a contract with ESI on June 17, 2015, to conduct the destruction of approximately 15,687,247 pounds of M6 propellant and approximately 320,890 pounds of CBI currently stored at Camp Minden.

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1.2 THERMAL TREATMENT SYSTEM OVERVIEW

The Contained Burning System consists of a Contained Burn Chamber (CBC) and a Pollution Abatement System (PAS). The Contained Burning System will provide a maximum throughput rate of approximately 2,640 pounds per hour (lb/hr) or 63,360 pounds per day (lb/day) of propellant waste. This will provide a capability to complete the destruction of the M6 propellant and CBI material workload at Camp Minden in less than one year following start of operations at the maximum throughput rate.

1.3 REGULATORY OVERVIEW

All work to be performed will be subject to all applicable USEPA, Occupational Safety and Health Administration (OSHA), Louisiana Department of Environmental Quality (LDEQ), Department of Public Safety (DPS), Military Department, state and federal laws, regulations, policies, permits, licensing requirements, and guidance. Site-specific ARARs for the Contained Burning System include Title 40 Code of Federal Regulations (CFR) Part 264 Subpart X. USEPA and LDEQ have established the following emission limitations and requirements for the Contained Burning System:

- USEPA's June 8, 2015, cover letter mandates that the thermal treatment system may not emit carbon monoxide (CO) in excess of 20 parts per million by volume on a dry basis (ppmv dry) at stack gas conditions over an hourly rolling average.
- USEPA's June 8, 2015, cover letter mandates that the thermal treatment system may not emit total hydrocarbons (THC) in excess of 10 ppmv dry corrected to seven percent oxygen (if the stack gas oxygen content is less than or equal to 17 percent) or 3 ppmv dry at stack gas conditions (if the stack gas oxygen content is greater than 17 percent) over an hourly rolling average. ESI is requesting that the THC limits be established as uncorrected values due to concerns with calibration limitations and a conflict with the performance specifications of the continuous emissions monitoring systems (CEMS) that is required to demonstrate compliance.
- USEPA's June 8, 2015, cover letter and Item 44 of the ARARs mandate that the thermal treatment system may not emit oxides of nitrogen (NO_x) in excess of 250 ppmv dry at stack gas conditions over an hourly rolling average.
- Item 22 of the ARARs mandates that the thermal treatment system may not emit dioxins and furans (D/F) in excess of 0.11 nanograms toxic equivalence per dry standard cubic meter (ng TEQ/dscm) corrected to seven percent oxygen (the stack gas oxygen content value is capped at 17 percent for all emission calculations).
- Item 24 of the ARARs mandates that the thermal treatment system may not emit particulate matter less than or equal to 10 microns in size (PM10) in excess of 0.0016 grains per dry standard cubic foot (gr/dscf) corrected to seven percent oxygen (the stack gas oxygen content value is capped at 17 percent for all emission calculations).

- USEPA’s June 8, 2015, cover letter and Item 25 of the ARARs require a destruction and removal efficiency (DRE) of 99.99 percent for each designated principal organic hazardous constituent (POHC).
- Item 45 mandates that the thermal treatment system must operate with a stack gas excess oxygen content greater than or equal to two percent oxygen by volume on a dry basis over an hourly rolling average.
- Item 89 mandates that the thermal treatment system may not emit mercury in excess of 8.1 micrograms per dry standard cubic meter ($\mu\text{g}/\text{dscm}$) corrected to seven percent oxygen (the stack gas oxygen content value is capped at 17 percent for all emission calculations).
- Item 90 mandates that the thermal treatment system may not emit lead and cadmium combined, referred to as semivolatile metals (SVM), in excess of 10 $\mu\text{g}/\text{dscm}$ corrected to seven percent oxygen (the stack gas oxygen content value is capped at 17 percent for all emission calculations).
- Item 91 mandates that the thermal treatment system may not emit arsenic, beryllium, and chromium combined, referred to as low volatile metals (LVM), in excess of 23 $\mu\text{g}/\text{dscm}$ corrected to seven percent oxygen (the stack gas oxygen content value is capped at 17 percent for all emission calculations).
- Item 92 mandates that the thermal treatment system may not emit hydrogen chloride and chlorine combined (HCl/Cl_2) in excess of 21 ppmv dry expressed as a chloride equivalent and corrected to seven percent oxygen (the stack gas oxygen content value is capped at 17 percent for all emission calculations).

The emission limitations of the ARARs are summarized in Table 1-1. During the CPT, compliance will be demonstrated with each of these emission limits using the average of three test runs.

**TABLE 1-1
EMISSION LIMITS**

PARAMETER	UNITS	EMISSION LIMITS
Carbon monoxide	ppmv dry ¹	20
Total hydrocarbons	ppmv dry ²	10
Total hydrocarbons	ppmv dry ³	3
Oxides of nitrogen	ppmv dry ¹	250
Dioxins and furans	ng TEQ/dscm ⁴	0.11
Particulate matter less than 10 micron	gr/dscf ⁴	0.0016
Mercury	$\mu\text{g}/\text{dscm}$ ⁴	8.1
Semivolatile metals	$\mu\text{g}/\text{dscm}$ ⁴	10
Low volatile metals	$\mu\text{g}/\text{dscm}$ ⁴	23
Hydrogen chloride and chlorine	ppmv dry ⁴	21
Destruction and removal efficiency	%	99.99

¹ Emission limit at stack gas conditions.

² ESI is requesting that this emission limit be established at stack gas conditions.

³ Emission limit at stack gas conditions (if the stack gas oxygen content is greater than 17 percent).

⁴ Emission limits corrected to seven percent oxygen (the stack gas oxygen content value is capped at 17 percent for all emission calculations).

1.4 COMPREHENSIVE PERFORMANCE TEST OVERVIEW

The CPT is designed to demonstrate compliance with the ARARs and to establish relevant operating parameter limits (OPLs). Two test conditions will be performed for the Contained Burning System during the CPT. Condition I will be performed to demonstrate compliance with the D/F, PM10, CO, THC, and NO_x emission limits and the DRE requirement while feeding neat M6 propellant to the Contained Burning System. Condition II will be performed to demonstrate compliance with the D/F, PM10, SVM, LVM, CO, THC, and NO_x emission limits and the DRE requirement while feeding M6 propellant and packaging materials to the Contained Burning System. In addition, the stack gas will be sampled and analyzed for volatile organics during both conditions.

ESI intends to utilize a performance test waiver to demonstrate compliance with the mercury and HCl/Cl₂ emission limits. No stack testing will be performed for these pollutants.

Table 1-2 provides an overview of the emissions demonstrations planned for each test condition.

**TABLE 1-2
EMISSIONS DEMONSTRATIONS OVERVIEW**

EMISSION DEMONSTRATION	CONDITION I	CONDITION II
Dioxins and furans	✓	✓
Particulate matter less than 10 micron	✓	✓
Semivolatile metals		✓
Low volatile metals		✓
Semivolatile organics (dinitrotoluene, dibutylphthalate, and diphenylamine)	✓	✓
Volatile organics	✓	✓
Carbon monoxide	✓	✓
Oxides of nitrogen	✓	✓
Total hydrocarbons	✓	✓

This CPT is being coordinated by El Dorado Engineering (EDE) under the direction of ESI personnel. TestAmerica Air Emissions Corporation dba METCO Environmental (METCO) will perform all of the stack sampling for the test program. METCO will be responsible for all emission samples collected during the test program, with oversight by EDE. The emission samples will be sent to METCO and TestAmerica Laboratories, Inc., of Knoxville, Tennessee (TestAmerica). Additional information on the project team roles and responsibilities is provided in the quality assurance project plan (QAPP) in Appendix A.

Prior to the CPT, ESI will perform the continuous monitoring systems (CMS) performance evaluation test (PET). The goal of the CMS PET is to demonstrate that the CMS associated with the Contained Burning System are installed so that representative measurements of emissions or process parameters can be obtained. During the CMS PET, ESI will verify that each CMS is correctly installed, calibrated, and operational. The CMS PET plan is included in Section 5.

ESI anticipates conducting the CPT in the first or second quarter of 2016. The testing is expected to take approximately seven days. The CPT report will be submitted within 90 days after completion of all emissions testing, or an extension will be requested.

1.5 OPERATING PARAMETER LIMITS OVERVIEW

ESI intends to demonstrate compliance with the ARARs and to establish OPLs for the Contained Burning System during the CPT. The ARARS list the required OPLs. The target OPLs are summarized in Table 1-3 and are discussed in detail in Section 2. The OPLs will be established as one-minute averages (OMAs) or hourly rolling averages (HRAs), as appropriate.

**TABLE 1-3
TARGET OPERATING PARAMETER LIMITS SUMMARY**

OPERATING PARAMETER	ITEM NO. ¹	AVERAGING PERIOD	TARGETS
Maximum total waste feed rate	20	None ²	880 lb/batch
Minimum afterburner temperature	33	OMA	1,500°F
████████████████████	█	█	██████████
Minimum stack gas oxygen content	---	HRA	2% vol dry
████████████████████	█	█	██████████
████████████████████	█	█	██████
██	█	█	██████████
██	█	█	██████████
Maximum semivolatile metals feed rate	87	None ²	2.9 g/batch
Maximum low volatile metals feed rate	87	None ²	1.1 g/batch

¹ Item number refers to the ARARs.

² The waste is fed on a batch basis. No averaging period will be used.

1.6 REFERENCE DOCUMENTS

Reference documents that have been used in developing this plan include the following:

- USEPA, Applicable, Relevant, and Appropriate Requirements for the Camp Minden Superfund Removal Site, June 5, 2015, and June 8, 2015, update;
- USEPA, New Source Performance Standards, Test Methods and Procedures, Appendix A, 40 CFR Part 60;
- USEPA, New Source Performance Standards, Performance Specifications, Appendix B, 40 CFR Part 60; and
- USEPA, *Test Methods for Evaluating Solid Wastes Physical/Chemical Methods, Third Edition, 1986* and updates (SW-846).

1.7 COMPREHENSIVE PERFORMANCE TEST PLAN ORGANIZATION

The remaining sections of the plan provide the following information:

- Section 2 presents a discussion on the target OPLs for the Contained Burning System;
- Section 3 presents information on the Contained Burning System's feedstreams;
- Section 4 presents a detailed engineering description of the Contained Burning System;
- Section 5 presents a description of the Contained Burning System's CMS;
- Section 6 presents a description of the test operating conditions;
- Section 7 presents a summary of the test sampling and analysis procedures;
- Appendix A includes the QAPP;
- Appendix B includes the relevant military standard (MIL STD) for the waste materials; and
- Appendix C includes example CMS PET forms.

1.8 DOCUMENT REVISION HISTORY

The original version of this plan was submitted in November 2015. The nature and date of any future revisions will be summarized in Table 1-4.

TABLE 1-4
DOCUMENT REVISION HISTORY

REVISION	DATE	DESCRIPTION OF CHANGES
0	November 2015	Original submittal
1	January 2016	Revisions to respond to LDEQ and USEPA comments.
2	April 2016	Revisions to respond to USEPA comments.

2.0 OPERATING PARAMETER LIMITS

The ARARs require ESI to monitor a number of process parameters to demonstrate continued compliance with the emission limits. All of the operating parameters will be monitored continuously. OPLs will be established for each of the operating parameters. The OPLs are summarized in Table 2-1 and discussed in the sections below.

**TABLE 2-1
TARGET OPERATING PARAMETER LIMITS**

OPERATING PARAMETER	AVERAGING PERIOD	TARGETS	METHOD TO CALCULATE LIMIT	CONDITION TO DETERMINE LIMIT
Maximum total waste feed rate	None ¹	880 lb/batch	Average of the maximum batch weights per run	Maximum of Condition I or Condition II
Minimum afterburner temperature	OMA	1,500°F	Average of the minimum OMAs for each test run	Minimum of Condition I or Condition II
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Minimum stack gas oxygen content	HRA	2% vol dry	Design parameters	None
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Maximum semivolatile metals feed rate	None ¹	2.9 g/batch	Average of the test run averages	Condition II
Maximum low volatile metals feed rate	None ¹	1.1 g/batch	Average of the test run averages	Condition II

¹ The waste is fed on a batch basis. No averaging period will be used.

2.1 MAXIMUM WASTE FEED RATE

Item 20 of the ARARs requires that ESI establish a maximum waste feed rate OPL. [REDACTED]

[REDACTED]

The maximum waste feed per batch will be demonstrated during both Conditions I and II. The OPL will be established as the average of the maximum batch weights per run. ESI does not expect there to be significant fluctuation in batch weights during the CPT. The batch weights will be maintained within ± 5 percent during the CPT conditions. The maximum value resulting from the two CPT conditions will be chosen as the OPL.

2.2 MINIMUM AFTERBURNER TEMPERATURE

Item 33 of the ARARs requires a minimum afterburner temperature OPL of 1,500 degrees Fahrenheit ($^{\circ}$ F). During the CPT, ESI will operate the afterburner with an automated temperature control loop to control afterburner temperature

2.3 MAXIMUM STACK GAS FLOW RATE

Item 74 of the ARARs requires that ESI establish a maximum flue gas (stack gas) flow rate OPL with an approximate expected target flow rate of [REDACTED]. This value is based on the system design. During the CPT, there will be fluctuations in the stack gas flow rate during the different stages of each batch cycle.

The maximum stack gas flow rate will be demonstrated during both Conditions I and II. The OPL will be established as the average of the maximum HRAs for each test run. The maximum value resulting from the two CPT conditions will be chosen as the OPL. The OPL will be established on an HRA basis.

2.4 MINIMUM STACK GAS OXYGEN CONTENT

ESI is proposing to establish a minimum stack gas oxygen content OPL based on the system design. The system is designed to operate at a minimum stack gas oxygen content of two percent by volume dry basis (% vol dry). The OPL will be established on an HRA basis.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

2.10 MAXIMUM SEMIVOLATILE METALS AND LOW VOLATILE METALS FEED RATES

Item 87 of the ARARs requires that ESI establish maximum SVM and LVM feed rate OPLs. ESI has identified three operating conditions for the Contained Burning System – processing neat M6 propellant, processing M6 propellant with packaging, and processing CBI material. The maximum SVM and LVM feed rates for each of these conditions were determined. The calculated feed rates are presented in Table 2-2.

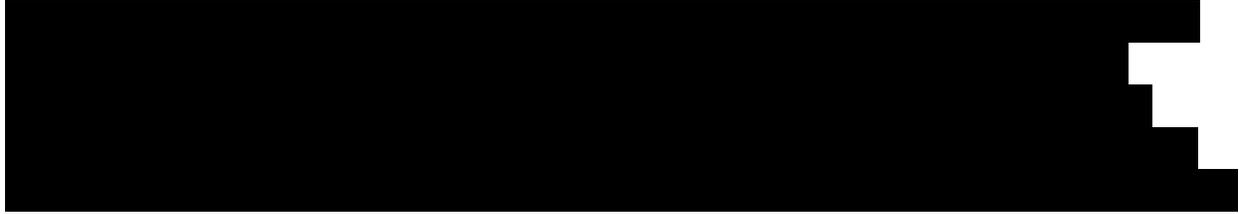
TABLE 2-2
MAXIMUM SEMIVOLATILE METALS AND LOW VOLATILE METALS FEED RATES

FEED MATERIAL	SEMIVOLATILE METALS (G/HR)	SEMIVOLATILE METALS (G/BATCH)	LOW VOLATILE METALS (G/HR)	LOW VOLATILE METALS (G/BATCH)
Neat M6 propellant	1.77	0.59	1.44	0.48
M6 propellant and packaging	1.62	0.54	1.32	0.44
Clean burning igniter	5.01	1.67	1.69	0.56

During Condition II of the CPT, ESI intends to demonstrate compliance with the SVM and LVM emission standards while burning M6 propellant and packaging and also spiking additional chromium and lead. The total SVM and LVM feed rates for Condition II will be set at approximately 150 percent of the maximum values presented in Table 2-2 (*i.e.*, 2.9 g/batch of SVM and 1.1 g/batch of LVM). By increasing the SVM and LVM feed rates during the CPT, ESI will demonstrate the Contained Burning System’s ability to comply with the SVM and LVM emission standards under any batch scenario.

The maximum SVM and LVM feed rates will be demonstrated during Condition II. The OPLs will be established as the averages of the test run averages. The OPLs will be established on a per batch basis.

[REDACTED]



3.0 FEEDSTREAM CHARACTERIZATION

The Contained Burning System is designed to process M6 propellant and CBI. The system design allows for direct thermal treatment of M6 propellant in the existing packaging (anti-static bags) or combined with contaminated packaging if desired. The afterburner is fired on natural gas.

3.1 M6 PROPELLANT

The M6 propellant nominal composition is 86 percent nitrocellulose, 10 percent dinitrotoluene (2,4-dinitrotoluene and 2,6-dinitrotoluene combined), 3 percent dibutylphthalate, and 1 percent diphenylamine. These constituent concentrations are based on the relevant MIL STD for this material and are consistent with manufacturer's data. These values will be used for all CPT calculations, including DRE calculations. A copy of the relevant MIL STD is provided in Appendix B.

The M6 propellant was analyzed for other organics and metals contents. The results of the analyses are presented in Table 3-1. Only detected constituents are listed in the table.

TABLE 3-1
M6 PROPELLANT

PARAMETER	UNITS	M6 PROPELLANT
Detected organics: Toluene	mg/kg	45.1
Detected metals: Lead	mg/kg	1.08
Nickel	mg/kg	9.01

The M6 propellant can be fed with the existing packaging (anti-static bags). The packaging was also analyzed to determine metals and chloride contents. The results of the analyses are presented in Table 3-2. Only detected constituents are listed in the table.

**TABLE 3-2
M6 PROPELLANT PACKAGING**

PARAMETER	UNITS	ANTI-STATIC BAG
Chlorine	mg/kg	5.08
Detected metals:		
Arsenic	mg/kg	---
Chromium	mg/kg	---
Lead	mg/kg	0.883
Manganese	mg/kg	---
Mercury	mg/kg	---
Nickel	mg/kg	---

3.2 CLEAN BURNING IGNITER

The CBI consists of approximately 98 percent nitrocellulose, 1.5 percent diphenylamine, 0.1 percent potassium nitrate, and 0.2 percent added graphite glaze. These constituent concentrations are based on manufacturer's information and will be used for all CPT calculations.

The CBI was analyzed for other organics and metals contents. The results of the analyses are presented in Table 3-3. Only detected constituents are listed in the table.

**TABLE 3-3
CLEAN BURNING IGNITER**

PARAMETER	UNITS	CLEAN BURNING IGNITER
Chlorine	mg/kg	2.74
Detected organics:		
Toluene	mg/kg	113
n-Nitrosodiphenylamine	mg/kg	7,090
Detected metals:		
Chromium	mg/kg	0.626
Lead	mg/kg	3.79

3.3 NATURAL GAS

Natural gas is fed to the afterburner. The natural gas is not expected to contain any regulated constituents in greater than trace quantities.

3.4 WASTE CHOSEN FOR THE COMPREHENSIVE PERFORMANCE TEST

During Condition I, the M6 propellant will be fed to the Contained Burning System, this represents the worst-case emission condition for neat material due to the high percentage of POHC in M6 propellant. As discussed in Section 3.2 and shown in the MIL STD, the CBI does not contain all of the POHCs at levels

necessary to perform the DRE calculations. The CBI only contains diphenylamine, with no dinitrotoluene or dibutylphthalate. Therefore, this material cannot be used during the CPT.

During Condition II, the M6 propellant and packaging, along with metals spiking, will be fed to the Contained Burning System. For each batch during Condition II, the packaging is expected to consist of 25 anti-static bags. The total weight of packing per batch will be approximately seven pounds. This packaging will be fed with approximately 800 pounds of M6 propellant per batch. The M6 propellant will provide the POHC necessary for the DRE determination, and the metals spiking will provide metals feed levels that are greater than those from the M6 propellant or the CBI alone. This is considered to be the worst-case potential operating condition.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]





[Redacted text block]



[Redacted]

[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]

[REDACTED]

5.0 MONITORING

Monitoring equipment for the Contained Burning System includes systems for process control and for stack gas analysis. This equipment enables the operators to maintain safe operation in compliance with the OPLs. This section of the plan provides an overview of the CMS associated with the Contained Burning System. These CMS are comprised of continuous process monitoring systems (CPMS) and CEMS.

5.1 CONTINUOUS PROCESS MONITORING SYSTEMS

The ARARs require that the Contained Burning System use CPMS to document compliance with the applicable OPLs. Table 5-1 provides a description of each CPMS. Due to the use of spare parts or replacement monitors, the actual manufacturer or model number of the CPMS used at the facility may differ from that described in this plan. However, should this occur, the replacement instruments will perform equivocally to those described herein. Numbers in the first column of the table correspond to Figure 5-1, which shows the location of each monitor.

**TABLE 5-1
CONTINUOUS PROCESS MONITORING SYSTEMS**

NO.	MEASURED PARAMETER	INSTRUMENT DESCRIPTION	PROGRAMMED SPAN	CALIBRATION ACCURACY
1	Waste feed rate	Two Rice Lake floor scales with Rice Lake Model 880 indicators	0 – 2,000 lb	± 1.0 lb
2	Afterburner temperature	Type K thermocouples and Endress Hauser TMT128 temperature transmitters	0 – 2,500°F	± 12°F
3	Stack gas flow rate	Yokogawa Electric Corporation EJA110E differential pressure transmitter	0 – 20 in. w.c.	± 1.0% of span
4	Baghouse pressure drop	Dwyer Series 605 Magnehelic® differential pressure transmitter	██████████	± 2.5% of span
5	Baghouse inlet temperature	Type K thermocouples and Endress Hauser TMT128 temperature transmitters	0 – 2,500°F	± 12°F

TABLE 5-1 (CONTINUED)
CONTINUOUS PROCESS MONITORING SYSTEMS

No.	MEASURED PARAMETER	INSTRUMENT DESCRIPTION	PROGRAMMED SPAN	CALIBRATION ACCURACY
1	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
1	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

[REDACTED]

The weight of each batch is determined using two floor scales. For each batch, the empty transfer bin is placed on the floor scale, and a tare weight is recorded. Then, the feed material is introduced to the transfer bin. To insure accuracy and prevent excess weight being introduced to the burn chamber, each scale has “lockout” ability, which will not allow the tray to be filled above the established waste feed rate OPL. Each transfer bin on the scale will create a unique digital record in an access database, as well as a printed weight ticket (in triplicate) to travel with the material to the CBC. The material from the transfer bin is emptied into a burn tray for introduction into the CBC. A copy of the printed weight ticket is taken to the control room once the material on the burn tray is loaded for destruction so that the destruction time can be recorded both on the printed ticket and in the access database.

5.2 CONTINUOUS EMISSIONS MONITORING SYSTEMS

The ARARs require that the Contained Burning System use CEMS to document compliance with the CO, THC, and NO_x emission limits. The facility is also required to use an oxygen CEMS to continuously correct the THC levels to seven percent oxygen.

The ARARs require compliance with Performance Specification 4B of 40 CFR Part 60 Appendix B for CO and oxygen CEMS. This specification requires a dual range CO monitor with span values of zero to 200 ppmv dry and zero to 3,000 ppmv dry and a single range oxygen monitor with a span of zero to 25 percent oxygen by volume on a dry basis.

No Performance Specifications were required for the NO_x and THC CEMS. For the NO_x CEMS, ESI will use Performance Specification 2. For the THC CEMS, ESI will use Performance Specification 8A.

Table 5-2 provides a description of each CEMS.

**TABLE 5-2
CONTINUOUS EMISSIONS MONITORING SYSTEMS**

MEASURED PARAMETER	INSTRUMENT DESCRIPTION	PROGRAMMED SPAN
Carbon monoxide	Thermo Fisher Scientific Inc. Model 48i non-dispersive infrared (NDIR) CO Analyzer	0 – 200 ppmv dry 0 – 3,000 ppmv dry
Oxygen	Thermo Fisher Scientific Inc. Model 48i paramagnetic oxygen analyzer	0 – 25 % vol dry
Oxides of nitrogen	Thermo Fisher Scientific Inc. Model 42i High Level Chemiluminescence NO-NO ₂ -NO _x Analyzer	0 – 100 ppmv dry 0 – 5,000 ppmv dry
Total hydrocarbons	Thermo Fisher Scientific Inc. Model 51i flame ionization detector (FID) THC Analyzer	0 – 100 ppmv dry

These CEMS are designed to meet the applicable Performance Specifications of 40 CFR Part 60 Appendix B. Table 5-3 summarizes the requirements of the applicable Performance Specifications.

**TABLE 5-3
PERFORMANCE SPECIFICATION REQUIREMENTS**

PARAMETER	CARBON MONOXIDE	OXYGEN	OXIDES OF NITROGEN	TOTAL HYDROCARBONS
Performance Specification	4B	4B	2	8A
Calibration drift	≤ 3% of span	< 0.5% vol dry O ₂	≤ 2.5% of span	≤ 3% of span
Relative accuracy	≤ 10% of mean or 5 ppmv dry CO	≤ 1% vol dry O ₂	≤ 20% of mean or ≤ 10% of emission standard	Not applicable
Calibration error	≤ 5% of span	≤ 0.5% of span	Not applicable	≤ 5% of span
Response time	≤ 2 minutes	≤ 2 minutes	Not applicable ¹	≤ 2 minutes

¹ There is no applicable response time requirement in Performance Specification 2. However, USEPA is requiring that the NO_x CEMS have a response time of not greater than two minutes.

The CEMS are maintained using a specified maintenance routine, which includes:

- Routine maintenance;
- Daily auto calibration checks;
- Quarterly absolute calibration audits (ACAs); and
- Annual relative accuracy test audits (RATAs).

Any problems identified by the above tests are remedied through corrective action measures specific to the problem encountered.

5.3 CONTROL SYSTEMS

System operations are monitored with an Allen Bradley CompactLogix programmable logic controller (PLC) and a computer based Human-Machine Interface (HMI). The PLC provides all of the control logic and continuously writes the values of the system parameters and any alarms to the PLC tag database. These values are displayed as necessary on the HMI screen and recorded on the computer hard drive at regular intervals. The computer hard drive is sized to accept the appropriate amount of data and store on remote or other media for archiving.

5.4 PERMISSIVES AND INTERLOCKS

The system is designed with interlocks to prevent the loading of material in the CBC unless all monitored operating parameters are within prescribed design limits. The system is designed to alert the operator if an operating parameter falls outside of these limits so it can be corrected. If a parameter falls outside its limit, feeding of waste material will be stopped until that parameter is brought back within its limit.

5.5 PERFORMANCE EVALUATION TEST

The CMS PET is intended to verify the operational status of the required CMS. This evaluation will include, at a minimum, verification of proper installation, operation, and calibration of the required devices. The CMS PET will be conducted by facility instrumentation staff or qualified contractors prior to the CPT. Each required CMS will be included in the performance evaluation.

This CMS PET plan includes both an internal and external quality assurance (QA) program. The internal QA program specifies the procedures that will be used to verify correct installation, calibration, and operation of each CMS device prior to the CPT. The external QA program provides information on data validation and documentation measures for the CMS PET.

5.5.1 INTERNAL QUALITY ASSURANCE PROGRAM

The performance evaluation test will include an internal QA program that specifies the procedures that will be used to conduct the performance evaluation. The internal QA program consists of three main components:

- Verifying proper installation of the required CMS;
- Verifying proper operation of the required CMS; and
- Checking the calibration of the required CMS.

Installation Checks

During the CMS PET, installation checks will be performed on each of the required CMS to verify that they are installed in accordance with manufacturer recommendations and plant internal standards. The checklists in Appendix C provide the installation checks that will be performed for each CPMS. Examples of the installation checks that will be performed include verifying proper orientation of the CMS, checking the electrical wiring, and looking for evidence of corrosion or excessive buildup.

Operational Checks

Operational checks will also be performed on each of the CMS to verify that they are operating properly. The operational checks specific to each CMS are detailed on the checklists in Appendix B. ESI will observe the CMS display for error indications.

For the CO, NO_x, and oxygen CEMS, RATAs will be conducted following the RATA procedures described in Performance Specifications 2 and 4B. There are no applicable RATA procedures for the THC CEMS. For the THC CEMS, a calibration error (CE) test will be performed in lieu of a RATA.

In addition to the RATAs and CE test, the facility will conduct seven-day drift tests for each CEMS, which are intended to demonstrate the stability of the CEMS calibration over time. A response time test will also be performed for the CO, THC, and oxygen CEMS.

Calibration Checks

In addition to verifying proper installation and operation of each CMS, ESI will also check the calibration of each CMS during the CMS PET. Each CPMS will be factory calibrated. ESI will verify these calibrations during the CMS PET.

For the CEMS, ESI will assess the daily calibration and zero drift of each CEMS. During the daily calibration check, the stack gas sample stream is temporarily turned off, and calibration gases are injected into each analyzer. A zero level calibration gas is used to test the baseline response of each CEMS. A span gas is then used to test the response of the instrument at the high end of its range. This assessment is performed automatically each day by the CEMS and will continue during the CMS PET. Should any adjustments to the CEMS be required, they will be performed manually by following site-specific and manufacturer recommended procedures.

5.5.2 EXTERNAL QUALITY ASSURANCE PROGRAM

The external QA program includes those procedures utilized to validate the data collected during the CMS PET and to document the CMS PET activities. The primary goal of the external QA program is proper collection and organization of test data followed by clear and concise reporting of the test results.

Test Personnel

The CMS PET activities described in this test plan will be performed by trained instrumentation staff or qualified contractors. The personnel involved in each program element will be documented on the CMS PET checklists in Appendix B or will be detailed in the contractor's test logs and report.

Reduction of Test Data

The data collected during the CMS PET will be compiled following test completion and will be included in the CMS PET report. Extreme care will be exercised by test personnel to ensure that all manually recorded data are written accurately and legibly. To help increase the quality and uniformity of the test data, all CMS PET activities will be documented on pre-printed data recording forms. Examples of these checklists are provided in Appendix B.

Validation of Test Results

After the CMS PET is performed, ESI will review the data recorded by the test personnel. When evaluating the data, ESI will make sure that the specified procedures were followed, the necessary forms were completed, and the results of each CMS installation, operation, and calibration check were successful. A preliminary review of the test results will be conducted following test completion prior to the CPT. A final validation of the test results will be performed prior to submittal of the CMS PET report.

Reporting of Test Results

The results of the CMS PET will be compiled and will be summarized in the CMS PET report, which will be prepared by a qualified contractor. The CMS PET report will provide the result of each CMS installation, operation, and calibration check, and will also include, as an appendix, the completed CMS PET

checklists and/or contractor test report. The CMS PET report will be submitted as an appendix to the CPT report for the Contained Burning System.

5.5.3 DATA QUALITY OBJECTIVES

The data quality objectives for the CMS PET include pre-determined specifications for precision, accuracy, and completeness of the evaluation results. Precision and accuracy of the instrument calibration relates to the capabilities of the CMS being evaluated and the methods used to verify the calibration. Tables 4-1 and 4-2 specify the required performance for each CMS.

Completeness is defined as the amount of valid data obtained compared to that which was expected. The objective for completeness of the test results is set at 100 percent, meaning that a complete set of data will be provided to demonstrate the proper installation, operation, and calibration of the required CMS. To help achieve this objective, the CMS performance evaluation will be conducted prior to the CPT.

5.5.4 PERFORMANCE EVALUATION TEST SCHEDULE

The CMS PET must be conducted prior to or in conjunction with the required CPT. Because the procedures specified for the CMS PET are invasive and may require shutdown of the associated process, they must be scheduled carefully with other plant requirements. To allow for this required flexibility in the test schedule, the CMS PET will be conducted in the months prior to the scheduled CPT to allow time for CPMS maintenance, repairs, or replacement should any of the evaluations be unsuccessful. The CEMS RATAs will be performed concurrently with the CPT.

6.0 COMPREHENSIVE PERFORMANCE TEST OPERATIONS

ESI intends to perform two test conditions to demonstrate that the Contained Burning System operate in conformance with the requirements of the ARARs and to establish OPLs. This section of the plan establishes the Contained Burning System operations that will be demonstrated during the testing. In addition, the preparation of materials to be fed during the testing, the amount of waste to be used, and a schedule for the testing are presented here.

6.1 CONDITION I

Condition I is designed to demonstrate operations of the Contained Burning System while feeding neat M6 propellant. During the condition, ESI will demonstrate compliance with the D/F, PM10, CO, THC, and NO_x emission limits and the DRE requirement. Triplicate sampling runs will be performed for the condition. Each run will include a minimum of 12 batch cycles [REDACTED]. All operating conditions presented in this plan are calculated values; the actual conditions observed during the test may vary slightly from these values.

A summary of the approximate expected operating conditions for Condition I is provided in Table 6-1.

**TABLE 6-1
CONDITION I**

OPERATING PARAMETER	UNITS	TARGETS
Waste type	---	Neat M6 propellant
[REDACTED]	[REDACTED]	[REDACTED]
Waste feed per batch	pounds	880
Waste feed rate	lb/hr	2,640
Afterburner temperature	°F	> 1,500
[REDACTED]	[REDACTED]	[REDACTED]

[REDACTED]

6.2 CONDITION II

Condition II is designed to demonstrate operations of the Contained Burning System while feeding M6 propellant and packaging. During the condition, ESI will demonstrate compliance with the D/F, PM10, SVM, LVM, CO, THC, and NO_x emission limits and the DRE requirement. Triplicate sampling runs will be performed for the condition. Each run will include a minimum of 12 batch cycles

All operating conditions presented in this plan are calculated values; the actual conditions observed during the test may vary slightly from these values.

A summary of the approximate expected operating conditions for Condition II is provided in Table 6-2.

**TABLE 6-2
CONDITION II**

OPERATING PARAMETER	UNITS	TARGETS ¹
Waste type	---	M6 propellant and packaging
Waste feed per batch	pounds	807
Waste feed rate	lb/hr	2,421
Semivolatile metals feed rate	g/batch	2.9
Low volatile metals feed rate	g/batch	1.1
Afterburner temperature	°F	> 1,500

6.3 PRINCIPAL ORGANIC HAZARDOUS CONSTITUENT

To demonstrate DRE, POHCs must be specified that are representative of the organic compounds in the waste feedstream. For this CPT, the following three POHCs have been chosen:

- Dinitrotoluene (2,4-dinitrotoluene and 2,6-dinitrotoluene combined);
- Dibutylphthalate; and
- Diphenylamine.

These three compounds are suitable for current stack sampling methods. SW-846 Method 0010 is typically used to sample stack gas for dinitrotoluene, dibutylphthalate, and diphenylamine.

The amount of POHC detected in the stack gases will be used to determine the DRE for the Contained Burning System. DRE is determined for each POHC from the following equation:

$$DRE = \left[1 - \frac{W_{out}}{W_{in}} \right] \times 100$$

where:

W_{out} = Measured mass emission rate of the POHC present in exhaust emissions prior to release to the atmosphere; and

W_{in} = Calculated mass feed rate of the same POHC in the waste feed based on measured batch load weights.

The POHC must be supplied to the unit in sufficient quantity to be detectable in the stack gas. Each stack sampling method has a minimum detection limit. Using the most conservative approach for the test, any compound which is found to be present in the stack gas at quantities below the method minimum detection limit or that is undetected in the stack gases is assumed to be present at the minimum detection limit. Therefore, it is very important to ensure that there is adequate quantity of POHC in the feed to demonstrate the target 99.99 percent DRE.

The required POHC feed rate is determined by back-calculating from the stack sampling method detection limit and the target DRE (99.99 percent) using the following equation, which is derived from the DRE equation above:

$$W_{in} = W_{out} \times \left[\frac{100}{100 - DRE} \right]$$

Table 6-3 provides the quantity of each POHC that will be required for each CPT condition. This value is compared to the expected POHC feed rates for each condition. The expected feed rates are based on the target waste feed rates and the POHC concentrations from the MIL STD and manufacturer's data for the M6 propellant (as provided in Section 3.1).

**TABLE 6-3
PRINCIPAL ORGANIC HAZARDOUS CONSTITUENT QUANTITY**

PARAMETER	UNITS	DINITROTOLUENE	DIBUTYLPHthalate	DIPHENYLAMINE
Method detection limit	ng/dscf	666.7	333.3	333.3
Estimated stack gas flow rate	dscfm	13,000	13,000	13,000
Target destruction and removal efficiency	%	99.99	99.99	99.99
Emission rate required for detection	lb/hr	1.15E-03	5.73E-04	5.73E-04
Minimum required POHC feed rate	lb/hr	11.45	5.73	5.73
Expected POHC feed rate for Condition I	lb/hr	264	79.2	26.4
Expected POHC feed rate for Condition II	lb/hr	240	72.0	24.0

As is shown in the table, the dinitrotoluene, dibutylphthalate, and diphenylamine are present in the M6 propellant in sufficient quantities for the DRE demonstrations. The expected POHC feed rates in Table 5-3 provide an adequate safety factor above the calculated minimum required POHC feed rate. With these POHC feed rates, ESI will be able to demonstrate a DRE of greater than 99.999 percent (five nines) for dinitrotoluene and dibutylphthalate but not diphenylamine. To demonstrate 99.999 percent DRE, approximately 57 lb/hr of diphenylamine would need to be fed during the CPT conditions. The waste feed will only contribute about 25 lb/hr of diphenylamine during each CPT condition. Therefore, the maximum DRE that can be demonstrated for diphenylamine is approximately 99.998 percent.

The DRE will be calculated for each POHC using the equation provided above. The POHC feed rates (W_{in}) will be calculated using the actual waste feed rates from each test run of each condition and the POHC concentrations from the MIL STD and manufacturer's data for the M6 propellant (as provided in Section 3.1). For the dinitrotoluene, the stack gas will be sampled for both 2,4-dinitrotoluene and 2,6-dinitrotoluene, and the resulting emission rates will be summed to determine the DRE for dinitrotoluene.

6.4 PERFORMANCE TEST WAIVER

ESI intends to comply with a performance test waiver for mercury and HCl/Cl₂. To demonstrate compliance with the performance test waiver, the waste feeds were analyzed for metals and chlorine contents. Table 6-4 demonstrates that the calculated maximum theoretical emission concentration (MTEC) for each pollutant can never exceed the emission limit. The MTECs were calculated assuming a maximum waste feed rate of 2,640 lb/hr (2,421 lb/hr for M6 propellant and packaging),

[REDACTED]

The MTEC calculations will be reassessed in the CPT report using the actual test data.

**TABLE 6-4
MAXIMUM THEORETICAL EMISSION CONCENTRATIONS**

FEED MATERIAL	EXPECTED MERCURY CONCENTRATION (MG/KG)	EXPECTED CHLORINE CONCENTRATION (MG/KG)	MERCURY MTEC ¹ (µG/DSCM)	HCL/CL ₂ MTEC ¹ (PPMV DRY)
Neat M6 propellant	0.012	1	2.45	0.138
M6 propellant and packaging	0.012	1.03	2.25	0.131
Clean burning igniter	0.011	2.74	2.25	0.379

¹ Calculated MTECs and emission standards corrected to seven percent oxygen.

6.5 METALS SPIKING

ESI will be required to spike the feed materials with SVM and LVM during Condition II. A lead oxide powder and chromium oxide powder will be used as the spiking materials. Table 6-5 summarizes the spiking planned for the CPT.

**TABLE 6-5
METALS SPIKING**

SPIKING MATERIAL	CONDITION	SPIKING ELEMENT	ELEMENTAL SPIKING RATE (G/HR)	EXPECTED ELEMENTAL CONCENTRATION (%WT)	TOTAL SPIKING RATE (G/HR)	SPIKING MECHANISM
Lead oxide	II	Semivolatile metals	7.0	92.8	7.5	One 2.5 g package per batch
Chromium oxide	II	Low volatile metals	2.0	68.4	3.0	One 1.0 g package per batch

For each feed batch, the contents of the two metals spiking packages will be distributed over the feed trays to provide for distribution, as far as practical, of the metals in the feed.

6.6 TEST SCHEDULE

The sampling effort is estimated to require approximately seven days to complete. During this period, sampling equipment and instruments will be prepared and calibrated, supplies will be brought onsite, and sampling locations will be prepared. Although the onsite activities will dictate the actual timing, a preliminary schedule is presented in Table 6-6.

The table shows that the SW-846 Method 0030 sampling train, for volatile organics, will be performed separately from the other sampling trains. This train requires that the operator change tube sets every 20 minutes. This procedure would be too disruptive to the other sampling because the waste feed

would need to stop whenever METCO approached the stack to change the SW-846 Method 0030 tubes. This would cause numerous breaks in the sampling for the isokinetic trains. The SW-846 Method 0030 sampling will be performed at the end of each run, after all the isokinetic trains have finished.

**TABLE 6-6
TEST SCHEDULE**

DAY	START	STOP	ACTIVITY
1	---	---	Set-up of sampling equipment and pre-test meetings
2	08:00	09:00	Cyclonic flow check and preliminary velocity, moisture and temperature measurements without waste feed
2	09:00	14:00	Condition I Run 1 (isokinetic trains)
2	14:00	16:30	Condition I Run 1 (SW-846 Method 0030 train)
3	09:00	14:00	Condition I Run 2 (isokinetic trains)
3	14:00	16:30	Condition I Run 2 (SW-846 Method 0030 train)
4	09:00	14:00	Condition I Run 3 (isokinetic trains)
4	14:00	16:30	Condition I Run 3 (SW-846 Method 0030 train)
5	08:00	09:00	Cyclonic flow check and preliminary velocity, moisture and temperature measurements without waste feed
5	09:00	14:00	Condition II Run 1 (isokinetic trains)
5	14:00	16:30	Condition II Run 1 (SW-846 Method 0030 train)
6	09:00	14:00	Condition II Run 2 (isokinetic trains)
6	14:00	16:30	Condition II Run 2 (SW-846 Method 0030 train)
7	09:00	14:00	Condition II Run 3 (isokinetic trains)
7	14:00	16:30	Condition II Run 3 (SW-846 Method 0030 train)
7	16:30	---	Break down sampling equipment

7.0 SAMPLING AND ANALYSIS

Sampling and analysis performed during the test conditions described in Section 6 will demonstrate the performance of the Contained Burning System with respect to the ARARs. Each test condition will consist of three replicate test runs for the isokinetic sampling trains and three replicate test runs for the SW-846 Method 0030 sampling train. For each run, samples will be collected using procedures described in the QAPP found in Appendix A. Since most of the proposed methods are standard reference methods, only brief descriptions are presented. Sample holding times will be consistent with the analytical requirements for the methods used.

7.1 WASTE SAMPLING AND ANALYSIS

The M6 propellant and packaging will not be sampled and analyzed for the CPT. Data from MIL STD and manufacturer's information, as described in Section 3, will be used to determine the compositions of the M6 propellant and packaging. This information will be used for all DRE calculations. This information will provide a better representation of the feed composition than random sampling and analyses. Because of the age and condition of the M6 propellant, random sampling during the CPT would be dangerous and also is likely to not provide representative results for the waste materials. The most accurate values for the DRE calculations will be provided by the MIL STD and manufacturer's information.

The MIL STD and manufacturer's data does not include information on metals and chlorine contents of the feed materials. To determine the metals and chlorine contents, each feed material was sampled and analyzed in October 2015 specifically for this purpose. The results of these analyses are shown in Section 3. This data will be used for all metals and chlorine feed rate calculations for the CPT.

7.2 NATURAL GAS SAMPLING AND ANALYSIS

The natural gas will not be sampled and analyzed during the CPT. Analysis of this feedstream is not required for the compliance demonstrations.

7.3 STACK GAS SAMPLING AND ANALYSIS

During the CPT, the stack gas will be sampled for D/F, PM10, SVM, LVM, CO, NO_x, THC, dinitrotoluene, dibutylphthalate, diphenylamine, and volatile organic emissions. The following sampling methods will be used:

- USEPA Methods 1, 2, 3A, and 4 for determination of stack sampling traverse points, gas flow rate, composition, and moisture content;
- SW-846 Method 0023A for measurement of D/F emissions;
- USEPA Methods 5 and 202 for measurement of PM10 emissions;

- USEPA method 29 for measurement of SVM and LVM emissions;
- SW-846 Method 0010 for measurement of dinitrotoluene, dibutylphthalate, and diphenylamine emissions;
- SW-846 Method 0030 for measurement of volatile organic emissions;
- The facility's CEMS to monitor the concentrations of CO, NO_x, THC, and oxygen in the stack gas; and
- A portable CEMS, utilizing USEPA Methods 10, 7E, and 25A, operated by the stack sampling contractor, to monitor the concentrations of CO, NO_x, and THC in the stack gas.

Table 7-1 summarizes the stack gas samples to be taken, the parameters to be measured, and the duration of measurement.

**TABLE 7-1
STACK GAS SAMPLING AND ANALYSIS**

SAMPLING METHOD ^{1,2}	CONDITION	SAMPLING DURATION	ANALYTICAL PARAMETER	ANALYTICAL METHOD ^{1,2}
USEPA Methods 1, 2, 3A, and 4	I and II	Not applicable	Traverse points, stack flow, composition, and moisture	Not applicable
SW-846 Method 0023A	I and II	4 hours (approximate) ³	Dioxins and furans	SW-846 Methods 0023A and 8290A (SOP KNOX-ID-0004)
USEPA Methods 5 and 202	I and II	4 hours (approximate) ³	Particulate matter less than 10 micron	USEPA Methods 5 and 202
USEPA Method 29	II	4 hours (approximate) ³	Arsenic, beryllium, cadmium, chromium, and lead	SW-846 Methods 6010C
SW-846 Method 0010	I and II	4 hours (approximate) ³	Dinitrotoluenedibutyl phthalate, and diphenylamine	SW-846 Method 8270C
SW-846 Method 0030	I and II	4 tube sets, approximately 20 minutes per tube set ⁴	Volatile organics	SW-846 Method 8260B (SOP KNOX-ID-0011)
USEPA Method 10	I and II	Continuous	Carbon monoxide	USEPA Method 10
USEPA Method 7E	I and II	Continuous	Oxides of nitrogen	USEPA Method 7E
USEPA Method 25A	I and II	Continuous	Total hydrocarbons	USEPA Method 25A
Facility CEMS (USEPA Performance Specification 4B)	I and II	Continuous	Carbon monoxide	Facility CEMS (USEPA Performance Specification 4B)
Facility CEMS (USEPA Performance Specification 2)	I and II	Continuous	Oxides of nitrogen	Facility CEMS (USEPA Performance Specification 2)

**TABLE 7-1 (CONTINUED)
STACK GAS SAMPLING AND ANALYSIS**

SAMPLING METHOD^{1,2}	CONDITION	SAMPLING DURATION	ANALYTICAL PARAMETER	ANALYTICAL METHOD^{1,2}
Facility CEMS (USEPA Performance Specification 8A)	I and II	Continuous	Total hydrocarbons	Facility CEMS (USEPA Performance Specification 8A)
Facility CEMS (USEPA Performance Specification 4B)	I and II	Continuous	Oxygen	Facility CEMS (USEPA Performance Specification 4B)

¹ SW-846 refers to *Test Methods for Evaluating Solid Waste, Third Edition*. USEPA Method refers to New Source Performance Standards, Test Methods and Procedures, Appendix A, 40 CFR Part 60. USEPA Performance Specification refers to New Source Performance Standards, Performance Specifications, Appendix B, 40 CFR Part 60.

² All methods will be performed in accordance with the laboratory's Louisiana Environmental Laboratory Accreditation Program (LELAP) approved standard operating procedures (SOPs).

³ Each run will include a minimum of 12 batch cycles. This equates to a run time of approximately four hours. Sampling will be continuous over the entire 12-batch period.

⁴ Each tube set will be timed to correspond to one batch cycle, which is approximately 20 minutes in duration. The testing will begin at the start of each batch and end as soon as the batch is completed, regardless of the exact sample time or sample volume.

Appendix A: QUALITY ASSURANCE PROJECT PLAN



EXPLOSIVE SERVICE INTERNATIONAL
BATON ROUGE, LOUISIANA

QUALITY ASSURANCE PROJECT PLAN
FOR
CONTAINED BURNING SYSTEM
OPERATED AT CAMP MINDEN

NOVEMBER 2015
REVISION 1: JANUARY 2016
REVISION 2: APRIL 2016

Coterie ENVIRONMENTAL

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PROJECT TEAM SIGNATURE PAGE

Facility: Explosive Service International, Baton Rouge, Louisiana
Unit ID: Contained Burning System at Camp Minden
Test Title: Comprehensive Performance Test

This quality assurance project plan (QAPP) has been developed for the comprehensive performance test (CPT) to be conducted for the Contained Burning System at Camp Minden. This QAPP has been distributed to and read by the signatories. By signing, the signatories agree to the appropriate information pertaining to their project responsibilities provided in the QAPP.

_____ Performance Test Manager Dean S. Schellhase Explosive Service International	_____ Date
_____ Project Coordinator Morgan Frampton El Dorado Engineering	_____ Date
_____ Stack Testing Director Mike Hutcherson TestAmerica Air Emissions Corporation dba METCO Environmental	_____ Date

Notes: The individuals listed above: 1) have received, read, and agreed to the appropriate information pertaining to their project responsibilities listed and provided in this QAPP and 2) agree that no testing methods have been modified.

These pages will be signed after approval of the plans.

LABORATORY SIGNATURE PAGE

Facility: Explosive Service International, Baton Rouge, Louisiana
Unit ID: Contained Burning System at Camp Minden
Test Title: Comprehensive Performance Test

This quality assurance project plan (QAPP) has been developed for the comprehensive performance test (CPT) to be conducted for the Contained Burning System at Camp Minden. This QAPP has been distributed to and read by the signatories. By signing, the signatories agree to the appropriate information pertaining to their project responsibilities provided in the QAPP. Laboratory representatives have reviewed the methods specified in the QAPP and certify that all analytical methods will be performed in accordance with their Louisiana Environmental Laboratory Accreditation Program (LELAP) approved standard operating procedures (SOPs), and any deviations will be noted. Any modifications to methods must be approved United States Environmental Protection Agency (USEPA) Region 6 prior to the CPT.

Laboratory Project Manager
Kevin Woodcock
TestAmerica Laboratories, Inc. – Knoxville, Tennessee

Date

Notes: The individuals listed above: 1) have received, read, and agreed to the appropriate information pertaining to their project responsibilities listed and provided in this QAPP and 2) agree that no testing methods have been modified.

These pages will be signed after approval of the plans.

LABORATORY SIGNATURE PAGE

Facility: Explosive Service International, Baton Rouge, Louisiana
Unit ID: Contained Burning System at Camp Minden
Test Title: Comprehensive Performance Test

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Laboratory Project Manager
Robert Adams, Ph.D.
TestAmerica Air Emissions Corporation dba METCO Environmental

Date

Notes: The individuals listed above: 1) have received, read, and agreed to the appropriate information pertaining to their project responsibilities listed and provided in this QAPP and 2) agree that no testing methods have been modified.

These pages will be signed after approval of the plans.

TABLE OF CONTENTS

1.0	Introduction	1-1
1.1	Facility Overview	1-1
1.2	Thermal Treatment System Overview	1-1
1.3	Comprehensive Performance Test Overview	1-2
1.4	Quality Assurance Project Plan Organization	1-3
1.5	Document Revision History	1-3
2.0	Organization of Personnel, Responsibilities, and Qualifications	2-1
2.1	Performance Test Manager	2-2
2.2	Project Coordinator	2-2
2.3	Stack Testing Director	2-2
2.4	Laboratories	2-2
3.0	Sampling Procedures	3-1
3.1	Waste Sampling	3-1
3.2	Natural Gas Sampling.....	3-1
3.3	Stack Gas Sampling	3-1
3.3.1	Sampling Point Determination – USEPA Method 1 Modified.....	3-3
3.3.2	Flue Gas Velocity and Volumetric Flow Rate – USEPA Method 2.....	3-3
3.3.3	Flue Gas Composition and Molecular Weight – USEPA Method 3A.....	3-3
3.3.4	Flue Gas Moisture Content – USEPA Method 4.....	3-4
3.3.5	Dioxins and Furans – SW-846 Method 0023A	3-4
3.3.6	Particulate Matter Less Than 10 Micron – USEPA Methods 5 and 202.....	3-5
3.3.7	Dinitrotoluene, Dibutylphthalate, and Diphenylamine – SW-846 Method 0010.....	3-6
3.3.8	Volatile Organics – SW-846 Method 0030.....	3-6
3.3.9	Arsenic, Beryllium, Cadmium, Chromium, and Lead – USEPA Method 29.....	3-7
3.3.10	Carbon Monoxide – USEPA Method 10	3-8
3.3.11	Oxide of Nitrogen – USEPA Method 7E	3-8
3.3.12	Total Hydrocarbons – USEPA Method 25A.....	3-8
3.3.13	Carbon Monoxide, Oxides of Nitrogen, Total Hydrocarbons, and Oxygen – USEPA Performance Specifications 2, 4B, and 8A	3-8
3.4	Sampling Quality Control Procedures.....	3-9
4.0	Sample Handling and Documentation	4-1
4.1	Field Sampling Operations	4-1
4.2	Field Laboratory Operations	4-2
5.0	Analytical Procedures	5-1
6.0	Data Quality Objectives	6-1
6.1	Quality Control Parameters	6-1
6.1.1	Precision.....	6-2

6.1.2	Accuracy.....	6-3
6.1.3	Representativeness.....	6-3
6.1.4	Comparability.....	6-3
6.1.5	Completeness	6-4
6.2	Evaluation of Contamination Effects	6-4
6.3	Performance Audits	6-5
6.4	Corrective Action	6-6
6.4.1	Equipment Failure.....	6-6
6.4.2	Analytical Deviations.....	6-6
6.4.3	Contamination	6-6
6.4.4	Procedural Deviations.....	6-7
7.0	Calibration Procedures and Preventative Maintenance.....	7-1
7.1	Sampling Equipment.....	7-1
7.1.1	Pitot Tubes	7-3
7.1.2	Differential Pressure Gauges	7-3
7.1.3	Digital Temperature Indicator	7-3
7.1.4	Dry Gas Meter and Orifice	7-3
7.1.5	Barometer.....	7-3
7.1.6	Nozzle.....	7-4
7.1.7	Continuous Emissions Monitors	7-4
7.2	Analytical Equipment.....	7-4
7.3	Preventative Maintenance	7-7
7.3.1	Sampling Equipment.....	7-7
7.3.2	Analytical Equipment.....	7-8
8.0	Data Reduction, Validation and Reporting	8-1
8.1	Data Reduction	8-1
8.2	Data Validation	8-1
8.2.1	Review of Field Documentation.....	8-2
8.2.2	Laboratory Review of Data	8-2
8.2.3	Evaluation of Data Quality	8-2
8.3	Data Reporting.....	8-2
8.3.1	Management of Non-Detects	8-3
8.3.2	Background/Blank Correction.....	8-3
8.3.3	Rounding and Significant Figures.....	8-3
9.0	Quality Assurance Reports.....	9-1
10.0	References	10-1

LIST OF TABLES

Table 1-1	Emissions Demonstrations Overview	1-2
Table 1-2	Document Revision History	1-3

Table 3-1	Stack Gas Sampling	3-2
Table 4-1	Sample Custody Documentation Requirements.....	4-1
Table 5-1	Sample Preparation and Analysis Procedures for Stack Gas Samples.....	5-1
Table 6-1	Laboratory Quality Control Objectives for Stack Gas Samples	6-2
Table 6-2	Blank Analysis Objectives for Stack Gas Samples	6-5
Table 7-1	Sampling Equipment Calibration Requirements.....	7-2
Table 7-2	Summary of Analytical Equipment Calibration and Quality Control Checks	7-4
Table 7-3	Maintenance Activities For Field Sampling Equipment	7-7
Table 7-4	Maintenance Activities for Analytical Equipment	7-8

LIST OF FIGURES

Figure 2-1	Project Organization	2-3
Figure 3-1	SW-846 Method 0023A Sampling Train.....	3-10
Figure 3-2	USEPA Methods 5 and 202 Sampling Train	3-11
Figure 3-3	SW-846 Method 0010 Sampling Train	3-12
Figure 3-4	SW-846 Method 0030 Sampling Train	3-13
Figure 3-5	USEPA Method 29 Sampling Train	3-14

LIST OF ATTACHMENTS

- Attachment A: Project Team Contact Information
- Attachment B: Project Team Resumes
- Attachment C: Louisiana Environmental Laboratory Accreditation Program Certificates
- Attachment D: Target Volatile Organics
- Attachment E: Example Chain of Custody

1.0 INTRODUCTION

This quality assurance project plan (QAPP) is being submitted by Explosive Service International (ESI) for a thermal treatment system, designated as the Contained Burning System, located at Camp Minden, in Minden, Louisiana. The Contained Burning System is designed to destroy M6 propellant and clean burning igniter (CBI) that has been stored at Camp Minden. This QAPP describes the quality assurance (QA) and quality control (QC) program associated with the comprehensive performance test (CPT) to be conducted for the Contained Burning System.

1.1 FACILITY OVERVIEW

Camp Minden is almost 15,000 acres in size and located in Webster Parish, Louisiana. The facility was formerly known as the Louisiana Military Ammunition Plant, which is a National Priorities List Superfund site primarily because of problems caused by groundwater contamination, and remediation is on-going. Large quantities of explosive and propellant materials are currently stored at Camp Minden. The State of Louisiana entered into a contract with ESI on June 17, 2015, to conduct the destruction of approximately 15,687,247 pounds of M6 propellant and approximately 320,890 pounds of CBI currently stored at Camp Minden.

All correspondence should be directed to the ESI contact at the following address and telephone number:

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(225) 275-2152
dean@explosiveserviceintl.com

1.2 THERMAL TREATMENT SYSTEM OVERVIEW

The Contained Burning System consists of a Contained Burn Chamber (CBC) and a Pollution Abatement System (PAS). The Contained Burning System will provide a maximum throughput rate of approximately 2,640 pounds per hour (lb/hr) or 63,360 pounds per day (lb/day) of propellant waste. This will provide a capability to complete the destruction of the M6 propellant and CBI material workload at Camp Minden in less than one year following start of operations at the maximum throughput rate.



[REDACTED]

[REDACTED]

1.3 COMPREHENSIVE PERFORMANCE TEST OVERVIEW

The CPT is designed to demonstrate compliance with the Applicable, Relevant, and Appropriate Requirements (ARARs) provided by United States Environmental Protection Agency (USEPA) and to establish operating parameter limits (OPLs). Two test conditions will be performed for the Contained Burning System during the CPT. Condition I will be performed to demonstrate compliance with the dioxins and furans (D/F), particulate matter less than or equal to 10 microns in size (PM10), carbon monoxide (CO), total hydrocarbons (THC), oxides of nitrogen (NO_x), emission limits and the destruction and removal efficiency (DRE) requirement while feeding neat M6 propellant to the Contained Burning System. Condition II will be performed to demonstrate compliance with the D/F, PM10, CO, THC, NO_x, semivolatile metals (SVM), and low volatile metals (LVM) emission limits and the DRE requirement while feeding M6 propellant and packaging materials to the Contained Burning System.

Table 1-1 provides an overview of the emissions demonstrations planned for each test condition.

**TABLE 1-1
EMISSIONS DEMONSTRATIONS OVERVIEW**

EMISSION DEMONSTRATION	CONDITION I	CONDITION II
Dioxins and furans	✓	✓
Particulate matter less than 10 micron	✓	✓
Semivolatile metals		✓
Low volatile metals		✓
Semivolatile organics (dinitrotoluene, dibutylphthalate, and diphenylamine)	✓	✓
Volatile organics	✓	✓
Carbon monoxide	✓	✓
Oxides of nitrogen	✓	✓
Total hydrocarbons	✓	✓

This CPT is being coordinated by El Dorado Engineering (EDE) under the direction of ESI personnel. EDE will provide oversight of the system operations and the stack sampling activities during the test

program. TestAmerica Air Emissions Corporation dba METCO Environmental (METCO) will perform all of the stack sampling for the test program. METCO will be responsible for all emission samples collected during the test program, with oversight by EDE. The emission samples will be sent to METCO and TestAmerica Laboratories, Inc. in Knoxville, Tennessee, (TestAmerica) for analysis.

1.4 QUALITY ASSURANCE PROJECT PLAN ORGANIZATION

This QAPP has been prepared following the USEPA document entitled *Preparation Aids for the Development of Category I Quality Assurance Project Plan*. The QAPP will serve as an essential guidance by which the CPT will be performed. The QAPP defines all aspects of QA/QC procedures and establishes sampling and analytical quality indicators that will demonstrate achievement of the test objectives. Additionally, this QAPP defines precision and accuracy criteria for all of the required measurements that will be used to demonstrate that all associated test data is of sufficient quality to demonstrate compliance. The remaining sections of the QAPP provide the following information:

- Section 2 presents information on the CPT project team;
- Section 3 describes the CPT sampling procedures;
- Section 4 presents sample handling and documentation information;
- Section 5 discusses the CPT analytical procedures;
- Section 6 presents the CPT data quality objectives;
- Section 7 discusses calibration procedures and preventative maintenance;
- Section 8 discusses data reduction, validation, and reporting procedures;
- Section 9 discusses QA reports; and
- Section 10 includes a list of reference documents for the QAPP.

1.5 DOCUMENT REVISION HISTORY

The original version of this QAPP was submitted in November 2015. The nature and date of any future revisions will be summarized in Table 1-2.

**TABLE 1-2
DOCUMENT REVISION HISTORY**

REVISION	DATE	DESCRIPTION OF CHANGES
0	November 2015	Original submittal
1	January 2016	Revisions to respond to LDEQ and USEPA comments.
2	April 2016	Revisions to respond to USEPA comments.

2.0 ORGANIZATION OF PERSONNEL, RESPONSIBILITIES, AND QUALIFICATIONS

ESI and their contractors will have specific and unique duties in the implementation of the CPT project. The project team duties are summarized below. A project organization flow chart is provided in Figure 2-1. Any key personnel that become unavailable will be replaced by equally qualified personnel prior to test mobilization. This QAPP will be distributed to key project personnel for review prior to the CPT. These personnel will sign the appropriate QAPP signature page.

Key personnel contact information is summarized in Attachment A. Resumes for key project team members are provided in Attachment B. Copies of the Louisiana Environmental Laboratory Accreditation Program (LELAP) certificates for the stack sampling contractor and each laboratory are provided in Attachment C. Attachment C also contains the pertinent pages from the analyte and methods listings (showing the methods that will be performed for the CPT).

ESI, through the Performance Test Manager, will:

- Prepare waste feeds;
- Operate the Contained Burning System at the designated conditions; and
- Report all feed rates and Contained Burning System process parameters.

EDE, through the Project Coordinator, will:

- Serve as liaison with regulatory agencies and the CPT team;
- Provide oversight for the project;
- Perform a detailed QA review of all analytical results; and
- Prepare the final report.

METCO, through the Stack Testing Director and stack sampling field team, will:

- Perform stack gas sampling;
- Implement the QA program for the emissions testing and sample analysis;
- Provide custody of all samples generated by the test efforts;
- Transport the samples to the laboratories for analysis; and
- Prepare the stack sampling report and supporting documentation.

The laboratories will:

- Perform sample analyses;
- Perform method and QAPP specified QA/QC;

-
- Provide a detailed case narrative; and
 - Generate an analytical data report in a format similar to the USEPA's Contract Laboratory Program (CLP) format, as appropriate.

2.1 PERFORMANCE TEST MANAGER

Dean Schellhase will serve as the ESI Performance Test Manager. Mr. Schellhase will be responsible for directing ESI personnel in the operations of the Contained Burning System during the testing. He will also ensure that all necessary unit operating data is collected during the test.

2.2 PROJECT COORDINATOR

Morgan Frampton of EDE will act as the Project Coordinator and provide coordination and oversight during the test program. Mr. Frampton will ensure that all test team members communicate throughout the test program and that the objectives of the CPT plan are met (*i.e.*, test operating conditions, spiking rates, field sampling objectives).

2.3 STACK TESTING DIRECTOR

Mike Hutcherson of METCO will serve as the Stack Testing Director for the CPT. Mr. Hutcherson will be responsible for technical supervision of the project, data interpretation, and overall report preparation and will coordinate with all laboratories and outside service providers. A project manager, who reports to Mr. Hutcherson, will oversee the field crew during the testing, will be responsible for all aspects of sample collection, and will report any deviations immediately to the Performance Test Manager and Project Coordinator. The Stack Testing Director may or may not be onsite during the CPT.

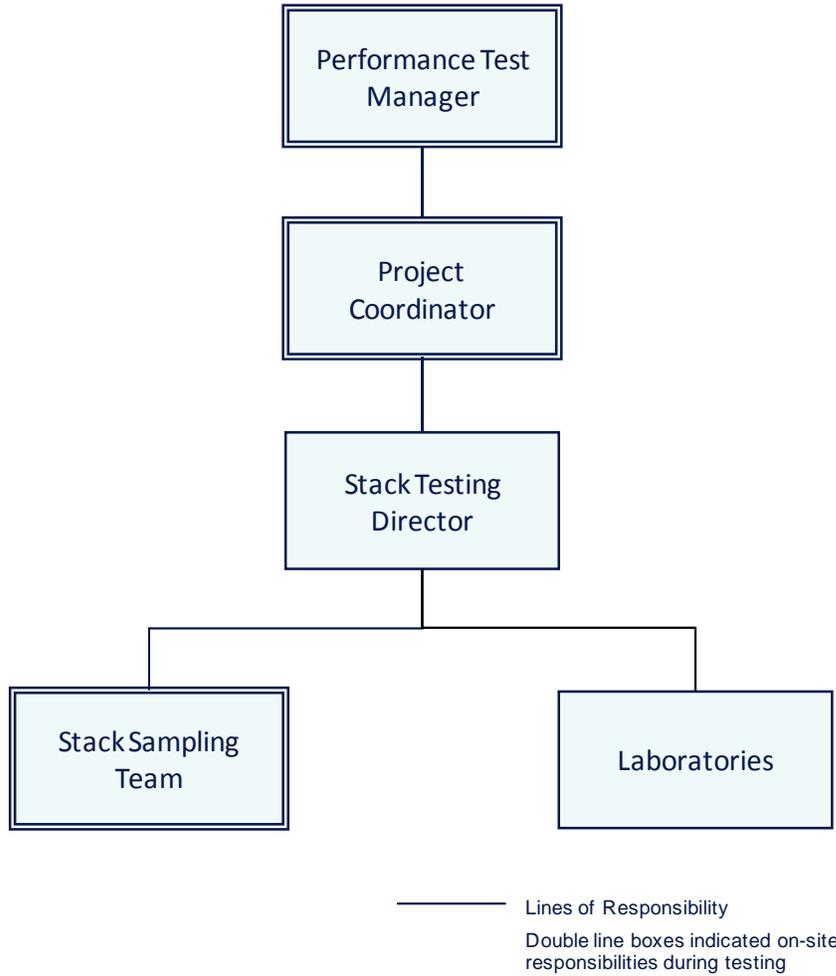
2.4 LABORATORIES

METCO and TestAmerica will be the subcontracted laboratories. The points of contact for each laboratory are:

- Robert Adams, Ph.D. for METCO; and
- Kevin Woodcock for TestAmerica.

Each of these laboratories is well experienced in conducting analyses per the methods described in this QAPP. Prior to test execution, each laboratory representative is required to review the QAPP to understand their project responsibilities. Each laboratory representative will sign the appropriate QAPP signature page. The laboratory representative will be responsible for ensuring that the laboratory follows all analytical methods specified in the QAPP in accordance with their Louisiana Environmental Laboratory Accreditation Program (LELAP) approved standard operating procedure (SOPs), that a detailed case narrative is prepared that addresses all analytical deviations, and that the laboratory report is provided in CLP-like format.

FIGURE 2-1
PROJECT ORGANIZATION



3.0 SAMPLING PROCEDURES

This section provides descriptions of the process and stack sampling procedures to be performed during the CPT.

3.1 WASTE SAMPLING

The M6 propellant and packaging will not be sampled and analyzed for the CPT. Data from the relevant military standard (MIL STD) and manufacturer's data, as described in the CPT plan, will be used to determine the compositions of the M6 propellant and packaging. This information will be used for all DRE calculations.

The MIL STD and manufacturer's data does not include information on metals and chlorine contents of the feed materials. To determine the metals and chlorine contents, each feed material was sampled and analyzed in October 2015. The results of these analyses are shown in the CPT plan. This data will be used for all metals and chlorine feed rate calculations for the CPT.

3.2 NATURAL GAS SAMPLING

The natural gas will not be sampled during the CPT. Analysis of this feedstream is not required for the compliance demonstrations.

3.3 STACK GAS SAMPLING

The stack gas sampling will follow the methods documented in 40 CFR Part 60 Appendix A (USEPA Methods) and *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846 Methods). Brief descriptions of these methods are provided in this section. Any modifications to prescribed USEPA or SW-846 test methods are outlined in the sampling procedure descriptions below and will be approved by USEPA Region 6 prior to the CPT. Table 3-1 summarizes the sampling procedures to be used during the CPT for collection of stack gas samples.

**TABLE 3-1
STACK GAS SAMPLING**

CONDITION	PARAMETER	SAMPLING METHOD	SAMPLE FRACTION(S)
I, II	Traverse points, gas flow rate, composition, and moisture content	USEPA Methods 1, 2, 3A, and 4	Not applicable
I, II	Dioxins and furans	SW-846 Method 0023A	Filter
			Front-half acetone and methylene chloride rinse
			Front-half toluene rinse
			Back-half acetone and methylene chloride rinse
			Back-half toluene rinse
			XAD-2 resin
I, II	Particulate matter less than 10 micron	USEPA Methods 5 and 202	Filter and front-half acetone rinse
			Condensable particulate matter impinger contents and deionized water rinse
			Acetone and hexane rinses
I, II	Dinitrotoluene, dibutylphthalate, and diphenylamine	SW-846 Method 0010	Filter (for particulate only)
			Impinger contents (for moisture determination)
			XAD-2 resin
			Train solvent rinses
			"Condensate" from knockout impinger
I, II	Volatile organics (see Attachment D)	SW-846 Method 0030	Tenax™ resin
			Tenax™ resin/charcoal
			Condensate
II	Arsenic, beryllium, cadmium, chromium, and lead	USEPA Method 29	Filter and front-half nitric acid rinse
			Nitric acid/hydrogen peroxide impinger contents and rinses
I, II	Carbon monoxide	USEPA Method 10	Not applicable
I, II	Oxides of nitrogen	USEPA Method 7E	Not applicable
I, II	Total hydrocarbons	USEPA Method 25A	Not applicable
I, II	Carbon monoxide	Facility CEMS (USEPA Performance Specification 4B)	Not applicable

**TABLE 3-1 (CONTINUED)
STACK GAS SAMPLING**

CONDITION	PARAMETER	SAMPLING METHOD	SAMPLE FRACTION(S)
I, II	Oxides of nitrogen	Facility CEMS (USEPA Performance Specification 2)	Not applicable
I, II	Total hydrocarbons	Facility CEMS (USEPA Performance Specification 8A)	Not applicable
I, II	Oxygen	Facility CEMS (USEPA Performance Specification 4B)	Not applicable

3.3.1 SAMPLING POINT DETERMINATION – USEPA METHOD 1 MODIFIED

Due to the hazardous nature of the wastes processed in the Contained Burning System, ESI will not permit stack sampling contractors to be present on the stack when waste is being processed in the CBC. Therefore, it is not possible to perform the stack sampling at multiple points throughout the stack in accordance with the referenced methods and USEPA Method 1. As an alternative, a preliminary flow traverse will be conducted for each condition following USEPA Method 2, as described below. From these flow measurements, the sampling point for the three test runs will be established as the point of average velocity in the stack. Verification of absence of cyclonic flow at this location will be conducted prior to testing following the procedure described in USEPA Method 1. The cyclonic flow check will be performed once for each condition.

3.3.2 FLUE GAS VELOCITY AND VOLUMETRIC FLOW RATE – USEPA METHOD 2

The flue gas velocity and volumetric flow rate will be determined according to the procedures outlined in USEPA Method 2. Velocity measurements will be made using Type S pitot tubes conforming to the geometric specifications outlined in USEPA Method 2. Differential pressures will be measured with fluid manometers. Effluent gas temperatures will be measured with thermocouples equipped with digital readouts.

3.3.3 FLUE GAS COMPOSITION AND MOLECULAR WEIGHT – USEPA METHOD 3A

The composition of the bulk gas and the gas molecular weight at the stack (concentrations of carbon dioxide and oxygen) will be determined by USEPA Method 3A. The stack sampling contractor will supply oxygen and carbon dioxide analyzers and all other associated equipment. The analyzers will be calibrated according to the procedures outlined in the method. A continuous sample of stack gas will be withdrawn via a sample probe. The gas will be filtered and passed through a conditioning system for removal of particulates and moisture prior to being sent to the analyzer.

The calculated molecular weight will be used for all isokinetic calculations. The measured oxygen concentration will also be used to correct emission concentrations to seven or 17 percent oxygen.

3.3.4 FLUE GAS MOISTURE CONTENT – USEPA METHOD 4

The flue gas moisture content will be determined in conjunction with each isokinetic train according to the sampling and analytical procedures outlined in USEPA Method 4. The impingers will be connected in series and will contain reagents as described for each sampling method. The impingers will be housed in an ice bath to ensure condensation of the moisture from the flue gas stream. Any moisture that is not condensed in the impingers is captured in the silica gel. Moisture content is determined by weighing the various sample fractions.

3.3.5 DIOXINS AND FURANS – SW-846 METHOD 0023A

The sampling procedures outlined in SW-846 Method 0023A will be used to determine D/F concentrations in the stack gas during Conditions I and II. The sampling train will consist of a glass fiber filter and coil condenser followed by a XAD-2 resin trap and a series of impingers. A total of four impingers will be used in the sampling train. The first of these impingers will be empty and will be followed by two impingers each containing 100 milliliters (mL) of high performance liquid chromatography (HPLC) water. These impingers will be followed by an impinger containing at least 250 grams of silica gel. A recirculating pump will also be connected to the sampling train to continuously circulate cold water to the condenser and resin trap in order to maintain the resin trap temperature below 68°F. A diagram of the sampling train is presented in Figure 3-1.

In preparation for the sampling event, a number of labeled sampling standards will be introduced inside the resin to monitor sampling efficiencies as well as to provide insights to the sample preservation and storage conditions. Upon preparation of the spiked resin traps, a separate fraction of resin from the same batch will be spiked the same day using the same solutions used in the field sampling modules and will be refrigerated in the laboratory until the return of the field samples. At such time, the control resin will become the laboratory method blank.

All sampling train components will be constructed of materials specified in the methods and will be cleaned and prepared per method specifications prior to testing. The probe and filter temperatures will be maintained between 223 and 273 degrees Fahrenheit (°F) (120 ± 14 degrees Celsius (°C)). The sampling runs will be performed within ± 10 percent of isokinetic conditions. The sampling will be performed using a single sampling point as described in Section 3.3.1. A minimum of 88.3 dry standard cubic feet (dscf) (2.5 dry standard cubic meters (dscm)) of sample gas will be collected over a minimum of 180 minutes. Each test run will include a minimum of 12 batch cycles. This equates to a run time of approximately four hours. Sampling will be continuous over the entire 12-batch period. Sampling train data will be recorded every three minutes. Sampling train adjustments will be made as necessary to ensure isokinetic conditions. If a delays between batch cycles is expected to exceed 10 minutes in duration, the sampling train will be stopped until the next batch begins. If the delay exceeds four hours, the sampling train will be aborted, and new train will be started once the operating issues are resolved.

The sampling train will be recovered according to the procedures specified in the method. The recovery of the sampling train will result in the sample fractions listed in Table 3-1. The filter will be shipped in a

Petri dish, and all rinses will be collected in amber glass jars. The XAD-2 resin will be wrapped and shipped in the glass trap.

The front-half and back-half sample fractions will be spiked with extraction standards. The XAD-2 resin and front- and back-halves of the sampling train will be analyzed separately for D/F using TestAmerica SOP KNOX-ID-0004, which is based on SW-846 Methods 0023A and 8290 (high resolution gas chromatograph/high resolution mass spectroscopy).

3.3.6 PARTICULATE MATTER LESS THAN 10 MICRON – USEPA METHODS 5 AND 202

The sampling and analytical procedures outlined in USEPA Methods 5 and 202 will be used to determine PM₁₀ concentrations in the stack gas during Conditions I and II. The sampling train will consist of a glass/quartz fiber filter, a coil condenser with recirculation pump, an empty short-stemmed impinger, and empty modified Greenburg-Smith impinger, a condensable particulate matter (CPM) filter holder containing the CPM filter, a thermocouple, a modified Greenburg-Smith impinger containing 100 ml of Deionized (DI) water, and a modified Greenburg-Smith impinger containing silica gel. A diagram of the sampling train is provided in Figure 3-2.

All sampling train components will be constructed of materials specified in the test method and will be cleaned and prepared per method specifications prior to testing. The probe and filter temperatures will be maintained between 223 and 273°F. The CPM filter holder will be maintained between 65 and 85°F. The sampling runs will be performed within ± 10 percent of isokinetic conditions. The sampling will be performed using a single sampling point as described in Section 3.3.1. A minimum of 35.3 dscf (1.0 dscm) of sample gas will be collected over a minimum of 60 minutes. Each test run will include a minimum of 12 batch cycles. This equates to a run time of approximately four hours. Sampling will be continuous over the entire 12-batch period. Sampling train data will be recorded every three minutes. Sampling train adjustments will be made as necessary to ensure isokinetic conditions. If a delay between batch cycles is expected to exceed 10 minutes in duration, the sampling train will be stopped until the next batch begins. If the delay exceeds four hours, the sampling train will be aborted, and new train will be started once the operating issues are resolved.

Sample recovery procedures will follow those outlined in the test method. After the run, the condenser and impinger contents will immediately be purged with nitrogen at a rate of at least 14 liters per minute for at least one hour in order to remove dissolved sulfur dioxide from the sample system. The filterable PM portion of the sample system will be recovered according to USEPA Method 5. The CPM impinger contents will be recovered, and the glassware will be rinsed first with DI water followed by an acetone rinse and then a final rinse with hexane. The acetone and hexane rinses will be recovered in the same container, separate from the DI rinse. Recovery of the USEPA Methods 5 and 202 sampling train will result in the sample fraction listed in Table 3-1. For sample transport, the filter portion will be packaged in a Petri dish, and the rinse portions will be collected in glass jars.

The total particulate matter collected from the USEPA Methods 5 and 202 sampling train will be assumed to be PM10.

3.3.7 DINITROTOLUENE, DIBUTYLPHthalate, AND DIPHENYLAMINE – SW-846 METHOD 0010

The sampling procedures outlined in SW-846 Method 0010 will be used to determine dinitrotoluene, dibutylphthalate, and diphenylamine concentrations in the stack gas during Conditions I and II. The sampling train will consist of a glass or quartz fiber filter, a coil condenser, a XAD-2 resin cartridge, and a series of impingers. The XAD-2 resin will be spiked, prior to testing, with the appropriate standards according to the procedures of the test method. The impinger train will include two impingers each containing 100 mL of deionized water, an empty impinger, and an impinger containing at least 250 grams of silica gel. A recirculating pump will also be connected to continuously circulate cold water to the condenser and resin trap to maintain the resin trap temperature below 68°F. A diagram of the sampling train is presented in Figure 3-3.

All sampling train components will be constructed of materials specified in the method and will be cleaned and prepared per method specifications prior to testing. The probe and filter temperatures will be maintained between 223 and 273°F. The sampling runs will be performed within ± 10 percent of isokinetic conditions. The sampling will be performed using a single sampling point as described in Section 3.3.1. A minimum of 105.9 dscf (3.0 dscm) of sample gas will be collected over a minimum of 180 minutes. Each test run will include a minimum of 12 batch cycles. This equates to a run time of approximately four hours. Sampling will be continuous over the entire 12-batch period. Sampling train data will be recorded every three minutes. Sampling train adjustments will be made as necessary to ensure isokinetic conditions. If a delays between batch cycles is expected to exceed 10 minutes in duration, the sampling train will be stopped until the next batch begins. If the delay exceeds four hours, the sampling train will be aborted, and new train will be started once the operating issues are resolved.

Sample recovery procedures will follow those outlined in the test method. Recovery of the SW-846 Method 0010 sampling train will result in the sample fractions listed in Table 3-1. The filter will be packaged in a Petri dish for shipment, and the XAD-2 resin will be wrapped and shipped in the glass trap. All rinses will be collected and shipped in amber glass jars.

3.3.8 VOLATILE ORGANICS – SW-846 METHOD 0030

The sampling procedures outlined in SW-846 Method 0030 will be used to determine volatile organic concentrations (See Attachment D) in the stack gas during Conditions I and II. The sampling train draws effluent stack gas through a series of sorbent traps. The first trap will contain Tenax™ resin, and the second will contain a section of Tenax™ followed by a section of activated charcoal. A water-cooled condenser will be arranged so that condensate will drain vertically through the traps. New Teflon sample transfer lines will be used, and the sampling train will use greaseless fittings and connectors. The Tenax™ resin will be cleaned and tested, prior to testing, according to the QA requirements of the method. A diagram of the sampling train is presented in Figure 3-4.

Four pairs of sorbent traps will be collected per run. The sampled gas will be passed through each pair of traps for the length of one batch cycle, which is approximately 20 minutes. The testing will begin at the start of each batch and end as soon as the batch is completed, regardless of the exact sample time or sample volume. The total sampling time for each run will be approximately 80 minutes. One sample of condensate will be collected per sampling run (four pairs). Three of the four pairs of tubes will be analyzed for each run. The fourth pair will be archived and will be analyzed if any of the other three tube sets cannot be analyzed. The sampling probe will be kept at or above 130°C during sampling. The sampling train will be operated at a sampling rate of approximately 1.0 liters per minute (L/min) for a total of approximately 20 liters (L) of gas per sample. Because the actual sampling time for each tube set will be dependent on the batch cycle time, the sample volume for some tube sets may not reach 20 L. The sampling rate will be maintained at 1.0 L/min regardless of the actual sampling time for each tube set.

Because of safety concerns for the stack sampling, the SW-846 Method 0030 sampling train will be run separately from the other sampling trains in each condition. The SW-846 Method 0030 sampling will be performed at the end of each test run, after all other sampling trains have finished.

Each pair of traps will be analyzed separately to evaluate breakthrough. Breakthrough is present if the catch on the second tube exceeds 30 percent of the catch on the first tube and is above 75 nanograms (ng).

3.3.9 ARSENIC, BERYLLIUM, CADMIUM, CHROMIUM, AND LEAD – USEPA METHOD 29

The sampling procedures outlined in USEPA Method 29 will be used to determine the concentrations of arsenic, beryllium, cadmium, chromium, and lead in the stack gas during Condition II. The sampling train will consist of a glass or quartz fiber filter followed by three to four impingers. If high moisture conditions are expected, the first impinger will be an empty knockout impinger. This impinger is optional and will only be used if necessary. The next two impingers will each contain 100 mL of a five percent nitric acid (HNO₃) and ten percent hydrogen peroxide solution (H₂O₂) solution. The final impinger will contain between 200 and 300 grams of silica gel. A detailed description of the types of impingers used in this sampling train can be found in USEPA Method 29. A diagram of the sampling train is provided in Figure 3-5.

All sampling train components will be constructed of materials specified in the methods and will be cleaned and prepared per method specifications prior to testing. The probe and filter temperatures will be maintained between 223 and 273°F. The sampling runs will be performed within ± 10 percent of isokinetic conditions. The sampling will be performed using a single sampling point as described in Section 3.3.1. A minimum of 70.6 dscf (2.0 dscm) of sample gas will be collected over a minimum of 120 minutes. Each test run will include a minimum of 12 batch cycles. This equates to a run time of approximately four hours. Sampling will be continuous over the entire 12-batch period. Sampling train data will be recorded every three minutes. Sampling train adjustments will be made as necessary to ensure isokinetic conditions. If a delays between batch cycles is expected to exceed 10 minutes in

duration, the sampling train will be stopped until the next batch begins. If the delay exceeds four hours, the sampling train will be aborted, and new train will be started once the operating issues are resolved.

Sample recovery procedures will follow those outlined in the test method. The USEPA Method 29 sampling train will produce the sample fractions identified in Table 3-1. The filter will be packaged in a Petri dish for shipping. All other sample fractions will be collected in amber glass jars.

3.3.10 CARBON MONOXIDE – USEPA METHOD 10

The procedures outlined in USEPA Method 10 will be used to measure the concentration of CO in the stack gas during Conditions I and II. The stack sampling contractor will supply a CO analyzer and all other associated equipment.

A continuous sample of stack gas will be withdrawn via a sample probe. The sampled gas will be filtered and will be passed through a conditioning system for removal of particulates and moisture prior to being sent to the analyzer. The CO concentration will be reported in parts per million by volume dry basis (ppmv dry) at stack conditions.

3.3.11 OXIDE OF NITROGEN – USEPA METHOD 7E

The procedures outlined in USEPA Method 7E will be used to measure the concentration of NO_x in the stack gas during Conditions I and II. The stack sampling contractor will supply a NO_x analyzer and all other associated equipment.

A continuous sample of stack gas will be withdrawn via a sample probe. The sampled gas will be filtered and will be passed through a conditioning system for removal of particulates and moisture prior to being sent to the analyzer. The NO_x concentration will be reported in ppmv dry at stack conditions.

3.3.12 TOTAL HYDROCARBONS – USEPA METHOD 25A

The procedures outlined in USEPA Method 25A will be used to measure the concentration of THC in the stack gas during Conditions I and II. The stack sampling contractor will supply an THC analyzer with a span calibrated to match the anticipated THC concentration of the stack gas.

A continuous sample of stack gas will be withdrawn via a sample probe. The sampled gas will be filtered for removal of particulates prior to being sent to the analyzer. All parts of the sampling system and the analyzer will be heated to a temperature of at least 250°F. The wet-basis THC concentration will be reported in parts per million by volume (ppmv), as propane, at stack conditions and corrected to seven or 17 percent oxygen.

3.3.13 CARBON MONOXIDE, OXIDES OF NITROGEN, TOTAL HYDROCARBONS, AND OXYGEN – USEPA PERFORMANCE SPECIFICATIONS 2, 4B, AND 8A

The facility's continuous emissions monitoring systems (CEMS) will be used to measure the concentration of CO, NO_x, THC, and oxygen in the stack gas during Conditions I and II. The CO and

oxygen CEMS comply with Performance Specification 4B in 40 CFR Part 60 Appendix B. The NO_x CEMS comply with Performance Specification 2 in 40 CFR Part 60 Appendix B. The THC CEMS comply with Performance Specification 8A in 40 CFR Part 60 Appendix B. Performance and calibration of the CEMS during the CPT will follow the requirements of the QA/QC program and the continuous monitoring systems (CMS) performance evaluation test (PET) plan.

3.4 SAMPLING QUALITY CONTROL PROCEDURES

Specific sampling QC procedures will be followed to ensure the production of useful and valid data throughout the course of this test program.

Prior to the start of testing, all sampling equipment will be thoroughly checked to ensure clean and operable components and to ensure that no damage occurred during shipping. Once the equipment has been set up, the manometer used to measure pressure across the pitot tube will be leveled and zeroed, and the number and location of all sampling traverse points will be checked.

At the start of each test day and throughout the testing, all sample train components will be checked to ensure that they remain in good condition and continue to operate properly. Electrical components will be checked for damaged wiring or bad connections. All glassware will be inspected to make sure no cracks or chips are present.

All sampling trains will be assembled and recovered in a mobile laboratory to ensure a clean environment, free of uncontrolled dust. To ensure that the sampling trains are free of contamination, all glassware will remain sealed until assembly of the sampling train.

Pre-test and post-test leak checks will be performed for each sampling train, as required by the respective test methods. Care will be taken to make sure that all sampling trains are being operated within the specifications of their respective method.

At the end of testing each day, all sampling equipment will be sealed and covered to protect from possible contamination and weather damage.

FIGURE 3-1
SW-846 METHOD 0023A SAMPLING TRAIN

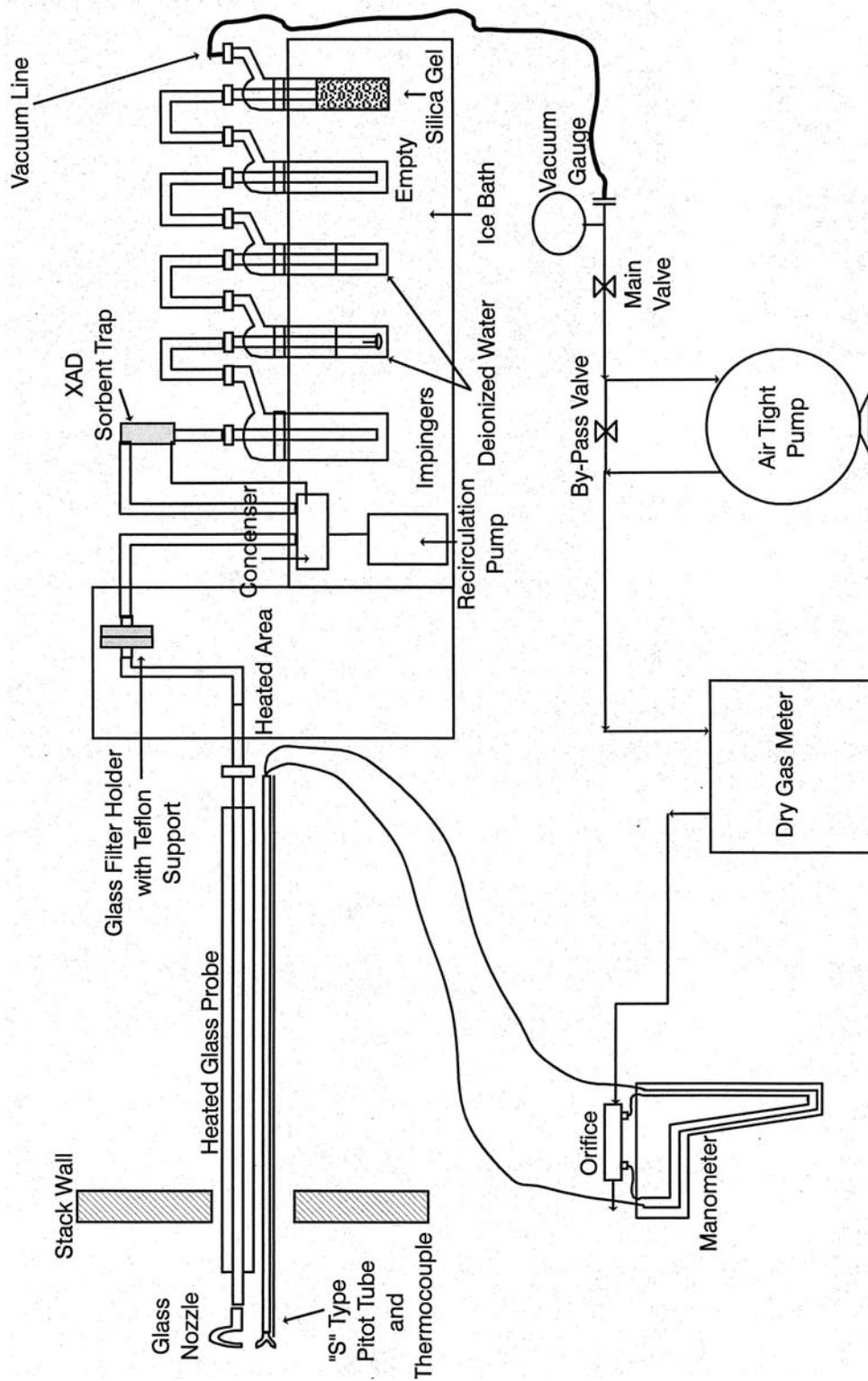


FIGURE 3-2
USEPA METHODS 5 AND 202 SAMPLING TRAIN

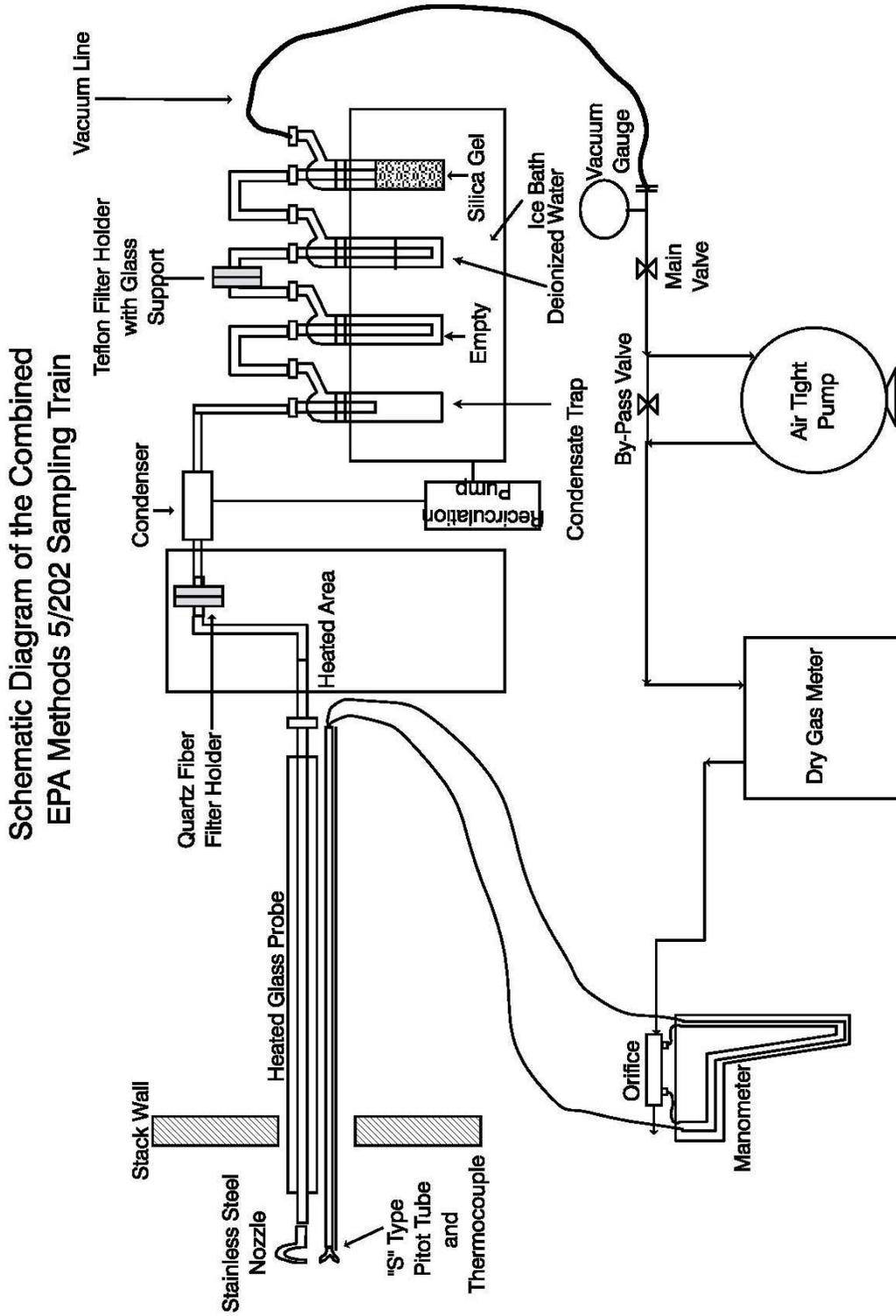


FIGURE 3-3
SW-846 METHOD 0010 SAMPLING TRAIN

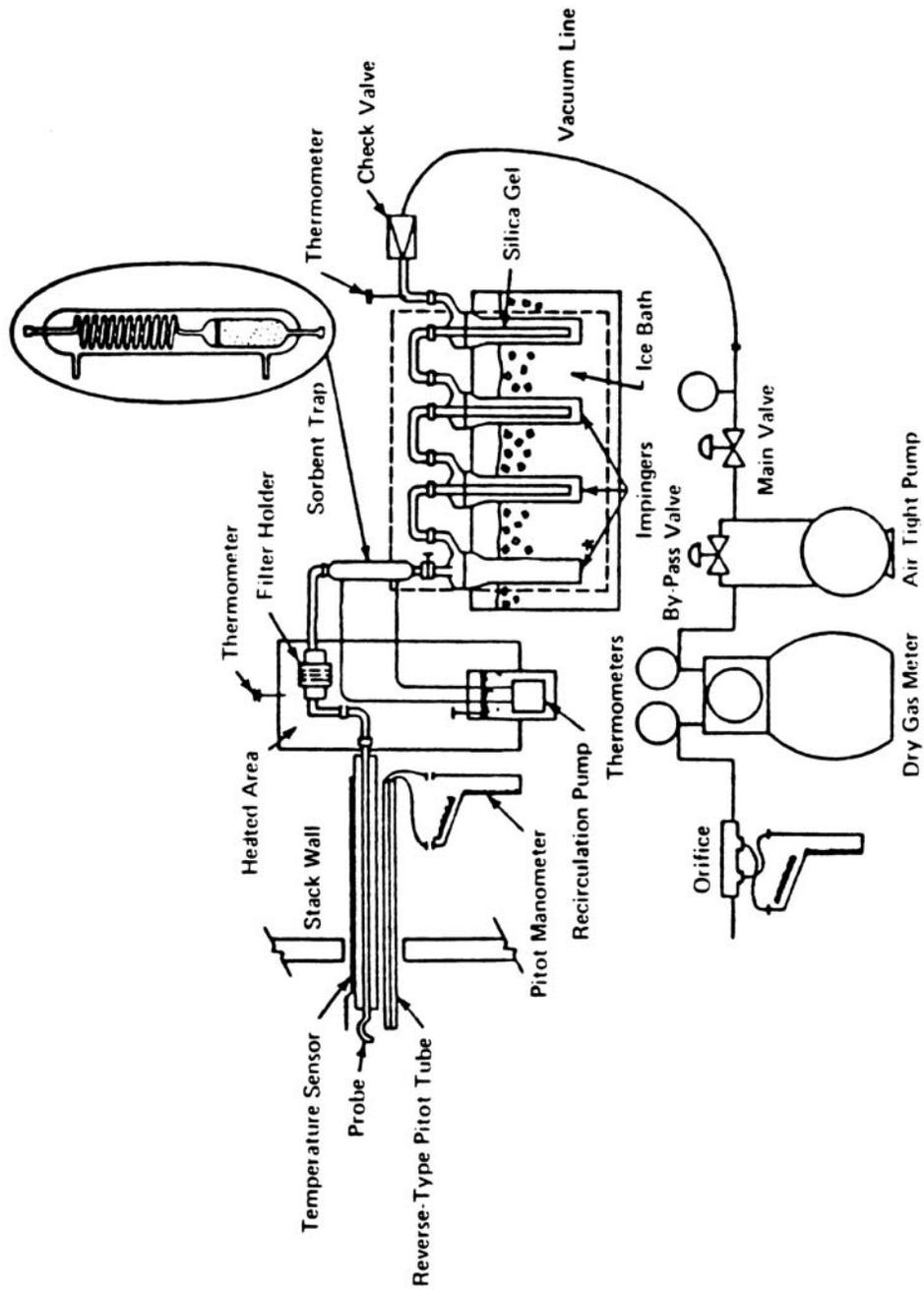


FIGURE 3-4
SW-846 METHOD 0030 SAMPLING TRAIN

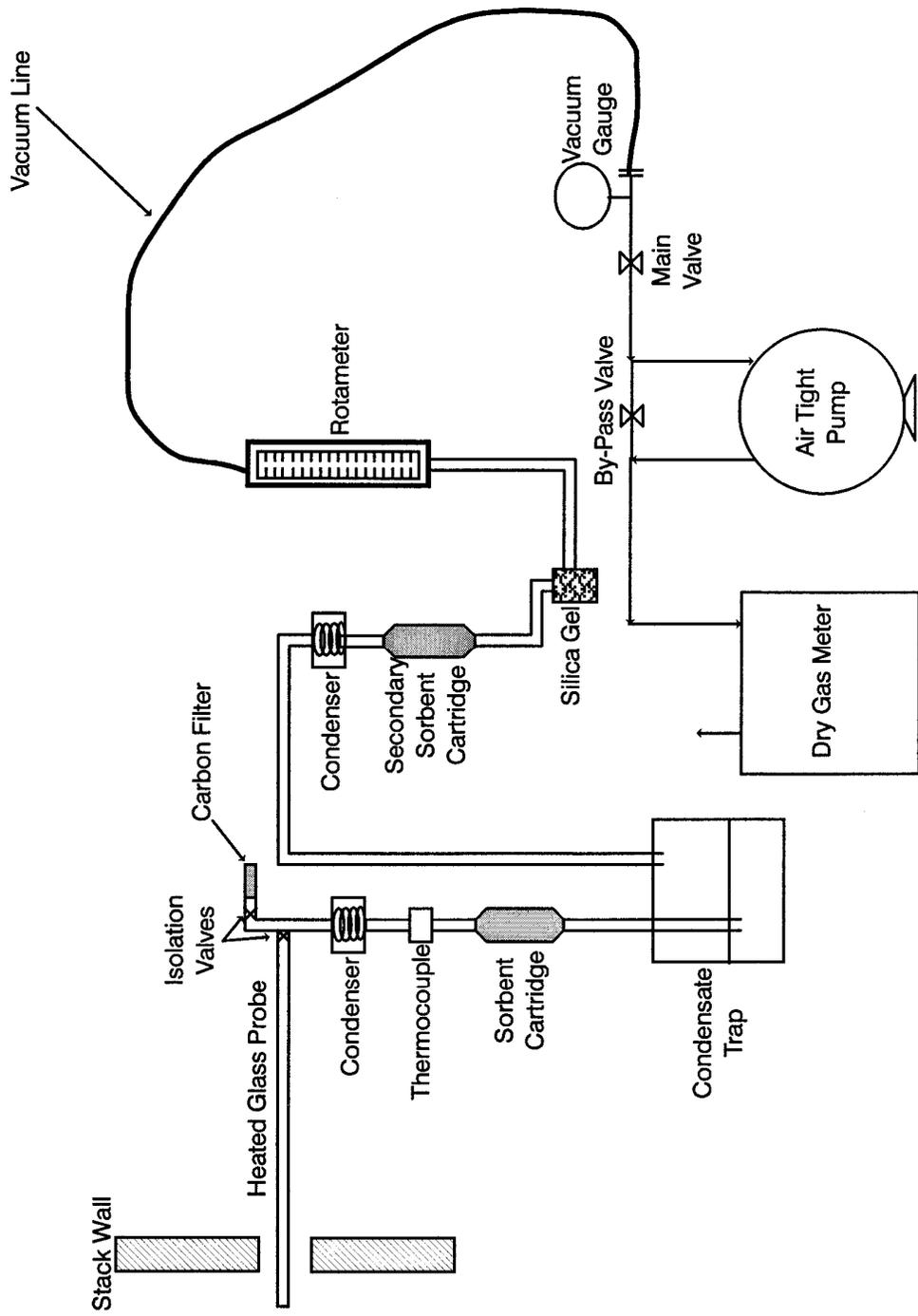
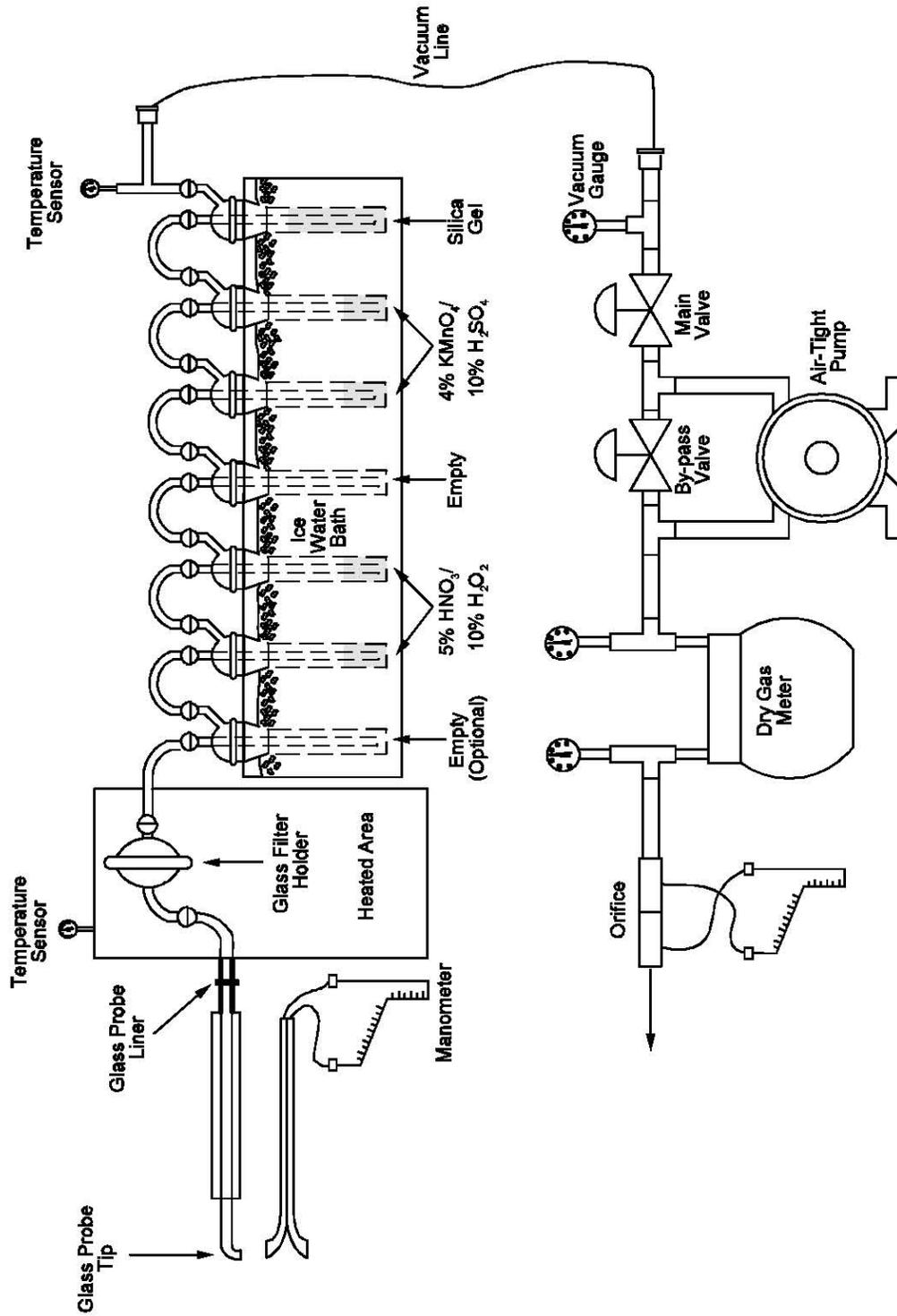


FIGURE 3-5
USEPA METHOD 29 SAMPLING TRAIN



Note: If mercury is not an analyte, the fourth through sixth impingers are not required.

4.0 SAMPLE HANDLING AND DOCUMENTATION

Sample custody procedures for this program are based on procedures from *Handbook: QA/QC Procedures for Hazardous Waste Incineration* (QA/QC Handbook) and SW-846, Chapter One. The procedures that will be used are discussed below.

4.1 FIELD SAMPLING OPERATIONS

The stack sampling contractor will be responsible for ensuring that custody and sample tracking documentation procedures are followed for the field sampling and field analytical efforts. Documentation of all sample collection activities will be recorded on pre-printed data collection forms. Table 4-1 provides a summary of sample custody documentation requirements.

TABLE 4-1
SAMPLE CUSTODY DOCUMENTATION REQUIREMENTS

CUSTODY DOCUMENT	REQUIRED INFORMATION
Sample identification log	List of all samples taken
	Time and date of sampling
	Description of sample
	Unique identifier for each sample
Sample data forms	Sampler's name
	Date and time of sample collection
	Sampling technique
	Compositing technique (waste samples)
	Sample identifier
	Sampling location
Chain of custody	Identifier of every sample shipped
	Sample preservation requirements
	Analysis and preparation procedures requested
	Signature of individual relinquishing sample custody

Samples will be collected, transported, and stored in clean containers that are constructed of materials inert to the analytical matrix, such as glass jars. Only containers that allow airtight seals will be used. Amber glass will be employed when specified by the method. Sample tracking and custody forms, which include sample identification and analysis requests, will be enclosed in the sample shipment container.

Onsite, all samples will be stored in a secure location controlled by the stack sampling contractor. When the testing is completed, all samples will be carried back to the stack sampling contractor's office for shipment to the laboratories. All samples will have appropriate custody seals and forms when shipped.

Upon receipt by the laboratory, information pertaining to the samples will be recorded on the sample tracking and custody form or an attachment to the form. The laboratory will note the overall condition of the samples, including the temperature of the samples upon receipt. The laboratory will also note any discrepancy in the sample identification between the sample labels and the custody forms. The signature of the person receiving the samples will be provided on the chain of custody (COC). An example COC is provided as Attachment E.

Every record pertaining to sample collection activities, including, but not limited to, stack sampling data sheets, sample tracking forms, sample identification log, sampling equipment calibration forms, balance calibration forms, and reagent preparation will be submitted with the report to provide evidence that the samples were handled properly, taken at the correct time and in the correct manner, assigned a unique identifier, received intact by the laboratory, and preserved as appropriate. Adherence to the holding times indicated in Table 5-1 will be noted in the laboratory analytical results.

4.2 FIELD LABORATORY OPERATIONS

The stack sampling contractor will provide an onsite laboratory trailer for sample train assembly and recovery and documentation and recordkeeping activities. Sample tracking documentation, shipping records, reagent and standards traceability, and all sampling activity records will be maintained in the laboratory trailer.

Documentation of onsite analytical activities, such as calibration, standards traceability, sample preparation steps, and raw measurement results will also be maintained onsite.

5.0 ANALYTICAL PROCEDURES

The analytical methods to be used during this test effort are detailed in Table 5-1. The table presents the referenced analytical method, the laboratory performing the analysis, the extraction and analysis holding time, and if required, the sample preservation and sample preparation method. Collection of these samples was described in Section 3.

TABLE 5-1
SAMPLE PREPARATION AND ANALYSIS PROCEDURES FOR STACK GAS SAMPLES

PARAMETER	ANALYTICAL METHOD ^{1,2}	LAB	PRESERVATIVE REQUIRED	EXTRACTION HOLDING TIME (DAYS)	ANALYSIS HOLDING TIME (DAYS)	PREPARATION METHOD ^{1,2}
Molecular weight	USEPA Method 3A	NA ³	NA	NA	NA	NA
Moisture	USEPA Method 4	NA	NA	NA	NA	NA
Dioxins and furans	SOP KNOX-ID-0004 ⁴	TestAmerica	Ice	30	45 following extraction	SOP KNOX-ID-0004 ⁴
Particulate matter less than 10 micron	USEPA Methods 5 and 202	METCO	< 85°F	NA	180	NA
Dinitrotoluene, dibutylphthalate, and diphenylamine	SW-846 Method 8270C	TestAmerica	Ice	14	40 following extraction	SW-846 Method 3542 ⁵
Volatile organics (see Attachment D)	SOP KNOX-ID-0011 ⁶	TestAmerica	Ice	NA	14	SOP KNOX-ID-0011 ⁶
Arsenic, beryllium, cadmium, chromium, and lead	SW-846 Method 6010C	TestAmerica	NA	NA	180	USEPA Method 29

¹ SW-846 refers to Test Methods for Evaluating Solid Waste, Third Edition. USEPA Method refers to New Source Performance Standards, Test Methods and Procedures, Appendix A, 40 CFR Part 60.

² All methods will be performed in accordance with the laboratory's LELAP-approved SOP.

³ NA indicates not applicable.

⁴ Methods will be performed in accordance with the LELAP-approved SOP KNOX-ID-0004. This SOP is based on SW-846 Methods 0023A and 8290.

⁵ SW-846 Method 3542 includes references to SW-846 Methods 3520 and 3540.

⁶ Methods will be performed in accordance with the LELAP-approved SOP KNOX-ID-0011. This SOP is based on SW-846 Methods 8260B and 5041A.

6.0 DATA QUALITY OBJECTIVES

The purpose of this test program is to demonstrate compliance with the ARARs. ESI is committed to ensuring that the data generated during this project are scientifically valid, defensible, complete, and of known precision and accuracy. These objectives can be best achieved by applying the requirements of USEPA accepted methodology as well as the more specific recommendations and guidelines for test burns. To ensure the consistency and adequacy of plans, reports, and overall data quality, guidance from Chapter One of SW-846 and the QA/QC Handbook has been integrated into the approaches and philosophies of this QAPP.

Key measures of performance include the objectives for precision, accuracy, representativeness, completeness, and comparability (commonly referred to as PARCC parameters). This section presents project-specific data quality objectives for this CPT. These objectives represent the level of data quality that would be considered acceptable for valid decision making, as measured in a manner that best reflects performance in the actual project matrices. These objectives will be communicated to the entire project team, including onsite sampling personnel and offsite contract laboratories.

6.1 QUALITY CONTROL PARAMETERS

QC objectives include precision, accuracy, representativeness, comparability, and completeness. Typical QC parameters include matrix spike (MS) and MS duplicate (MSD) samples, laboratory control sample (LCS) and LCS duplicate (LCSD) samples, surrogates, standards, spikes, and duplicates. Table 6-1 provides the project specific QC procedures for assessing accuracy and precision for critical measurement parameters. Critical parameters are those that directly relate to the demonstration of regulatory compliance. This table lists the parameter of analysis, the QC parameter, the QC procedure, the frequency at which accuracy and precision are determined, and the objective.

**TABLE 6-1
LABORATORY QUALITY CONTROL OBJECTIVES FOR STACK GAS SAMPLES**

ANALYTICAL PARAMETERS	QC PARAMETER	QC PROCEDURE	FREQUENCY¹	OBJECTIVE¹
Dioxins and furans	Accuracy	Extraction standards	Every sample	40-135% recovery
	Accuracy	Sampling standards	Every back-half sample	70-130% recovery
	Accuracy	Laboratory control sample	Two per analytical batch	70-130% recovery
	Precision	Laboratory control sample duplicate	Two per analytical batch	≤50% relative percent difference
Particulate matter less than 10 micron	Accuracy	None ²	None	None
	Precision	Sample duplicate	Each front-half sample fraction	≤0.5 mg difference
Dinitrotoluene, dibutylphthalate, and diphenylamine	Accuracy	Laboratory control sample	One per analytical batch	50-150% recovery ³
	Accuracy	Surrogates	Every sample	50-150% recovery ³
	Precision	Laboratory control sample duplicate	One per analytical batch	≤35% relative percent difference ³
Volatile organics (see Attachment D)	Accuracy	Laboratory control sample	One per analytical batch	50-130% recovery ³
	Accuracy	Surrogates	Every sample	50-130% recovery ³
	Precision	Laboratory control sample duplicate	One per analytical batch	≤25% relative percent difference ³
Arsenic, beryllium, cadmium, chromium, and lead	Accuracy	Laboratory control sample	One per analytical batch	80-120% recovery
	Accuracy	Post digestion spike	One per analytical sequence	75-125% recovery
	Precision	Laboratory control sample duplicate	One per analytical batch	≤25% relative percent difference

¹ Unless specified otherwise, the frequency and objective provided for each parameter are based on specifications in the analytical method.

² The method does not specify any accuracy objectives for the analysis.

³ Limits specified are generally applicable. Actual limits are determined by the laboratory and are compound specific based on internal performance data.

6.1.1 PRECISION

Precision is a measure of the reproducibility of results under a given set of conditions. It is expressed in terms of the distribution, or scatter, of replicate measurement results, calculated as the relative standard deviation (RSD) or, for duplicates, as relative percent difference (RPD). RPD and RSD values are calculated using the following equations:

$$RPD = \left(\frac{|X_1 - X_2|}{\text{avg } X} \right) \times 100$$

$$\text{RSD} = \left(\frac{\text{STDEV}}{\text{avg } X} \right) \times 100$$

Where X_1 and X_2 represent each of the duplicate results.

6.1.2 ACCURACY

Accuracy is a measure of the difference between an analysis result and the “true” value. Accuracy is expressed in terms of percent recovery (e.g., for surrogates, spikes, and reference material). Percent recovery for spiked samples, such as MS samples, is calculated using the following equation:

$$\% \text{ Recovery} = \left(\frac{\text{SSR} - \text{SR}}{\text{SA}} \right) \times 100$$

Where:

SSR = Spiked sample result
SR = Sample result
SA = Spike added

Percent recovery for other QC parameters, such as LCS, surrogates, and standards, is calculated using the following equation:

$$\% \text{ Recovery} = \left(\frac{\text{Measured Value}}{\text{True Value}} \right) \times 100$$

6.1.3 REPRESENTATIVENESS

Representativeness is defined as the degree to which data accurately and precisely represent a characteristic of a population, a parameter variations at a sampling point, a process condition, or an environmental condition. An appropriate sampling strategy that addresses collection of representative samples in time and space is crucial to subsequent decision-making and defensibility of the data. There are no numerical objectives for representativeness. The selection of suitable locations and sampling strategies, as described in this QAPP, and adherence to sample collection protocols are the bases for ensuring representativeness.

6.1.4 COMPARABILITY

Comparability is defined as expressing the confidence with which one data set can be compared to another. There are no numerical objectives for comparability. A representative sample whose results are comparable to other data sets is ensured primarily through the use of standard reference sampling and analytical methods. Reported in common units, the results generated should thus be comparable to those obtained from other emissions tests and allow for consistent decision-making.

6.1.5 COMPLETENESS

Completeness is defined as “the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under optimal normal conditions.” Completeness can be defined quantitatively using the following equation:

$$\% \text{ Completeness} = \left(\frac{\text{No. of Valid Data}}{\text{No. of Data Planned}} \right) \times 100$$

In the overall project context, the target is 100 percent completeness, which for a valid test condition is defined as consisting of three valid test runs. A valid test run is one in which sufficient valid data are presented to make any necessary demonstrations and to enable the permit writer/reviewer to write appropriate permit conditions or to be confident about demonstration of compliance with a current permit or regulation.

A run can be valid even though the completeness objective of 100 percent for the data package is not achieved. Given the possibility of human error (and other unpredictable problems) and the inability of collecting additional samples after a test is completed, the impact of achieving less than 100 percent completeness must be assessed in the specific situation, rather than arbitrarily rejecting all the useable scientific information for the run without such consideration. For example, satisfying the completeness objective for a single piece of analytical data includes providing documentation that proves the following:

- The sample collection log was completed;
- Shipping documents and laboratory instructions were prepared and followed;
- The correct analytical procedures were followed;
- Any necessary modifications to methodology were documented and justified;
- Approved laboratory records were complete;
- Proper data reduction procedures were followed; and
- Analytical instrument printouts were included.

Any errors or omissions in a data package will be identified and accompanied by a discussion of the potential impact on the validity of the data package, the conclusions of the report, and the demonstration of performance standards for the consideration and approval of the Louisiana Department of Environmental Quality (LDEQ) and USEPA.

6.2 EVALUATION OF CONTAMINATION EFFECTS

Various blanks will be collected throughout the test program to evaluate the effects of contamination on results. Field blanks will be collected and analyzed at the end of the test program to evaluate the impact of the sampling train recovery process on test results. Blank samples of all reagents used in the stack sampling program will also be collected. Method blanks will be prepared and analyzed by the respective

laboratories to evaluate the cleanliness of sample handling and preparation and overall laboratory practices.

Table 6-2 provides the type and acceptance criteria for each stack gas blank to be analyzed. All of these blanks provide critical information on the potential contamination that may occur in test program samples. The results of blank analyses can prove very useful when attempting to understand anomalies in data, or generally higher than expected test results.

**TABLE 6-2
BLANK ANALYSIS OBJECTIVES FOR STACK GAS SAMPLES**

ANALYTICAL PARAMETERS	BLANK TYPE	FREQUENCY	OBJECTIVE
Dioxins and furans	Field blank	One per test program	<Reporting limit
	Method blank	One per analytical batch	<Reporting limit
	Reagent blanks	One set per test program	Archived ¹
Particulate matter less than 10 micron	Field blank	One per test program	<Reporting limit
	Acetone reagent blank	One per test program	<0.001 percent
	Deionized water and hexane reagent blanks	One per test program	Archived ¹
Dinitrotoluene, dibutylphthalate, and diphenylamine	Field blank	One per test program	<Reporting limit
	Method blank	One per analytical batch	<Reporting limit
	Reagent blanks	One per test program	Archived ¹
Volatile organics (see Attachment D)	Field blank	One per condition	<Reporting limit ²
	Trip blank	One per shipment	Archived ¹
	Method blank	One per analytical batch	<Reporting limit ²
	Reagent blanks	One set per test program	Archived ¹
Arsenic, beryllium, cadmium, chromium, and lead	Initial calibration blank	Following initial calibration verification	<Reporting limit
	Continuing calibration blank	Following continuing calibration verification	<Reporting limit
	Field blank	One per test program	<Reporting limit
	Method blank	One per analytical batch	<Reporting limit
	Reagent blanks	One set per test program	<Reporting limit

¹ The specified reagent and trip blanks will initially be archived. These blanks will only be analyzed if the field blank indicates possible sample contamination. Possible contamination will be assessed using the objectives for field blanks stated in this table.

² Criteria is <5 times reporting limit for acetone and methylene chloride.

6.3 PERFORMANCE AUDITS

On September 13, 2010, the USEPA issued a final rule to restructure the stationary source audit program. The program requires that audit samples be analyzed along with the samples collected while testing for regulatory compliance. This analysis helps the regulatory agency determine the validity of

compliance test results. The rule requires sources to obtain and use audit samples from accredited providers. The USEPA has approved the National Environmental Laboratory Accreditation Conference (NELAC) Institute (TNI) Stationary Source Audit Program to provide accredited audit samples.

Audit samples are currently available for USEPA Method 29. ESI will obtain the required audit samples prior to the CPT.

6.4 CORRECTIVE ACTION

During any testing project, simple or complex, there is potential that deviations from data quality objectives may occur. This section gives corrective action procedures to be used to mitigate such problems.

6.4.1 EQUIPMENT FAILURE

Any equipment found to be out of calibration or operating improperly will be repaired or replaced before additional measurements are made. If equipment repair is made onsite, calibrations will be performed in accordance with the applicable methods prior to use. It may be necessary to transport equipment offsite for calibration. If calibrations cannot be performed, the equipment will not be used. If measurements are made with equipment subsequently found to be out of calibration or operating improperly, a detailed explanation of the cause of the malfunction will be provided. The effect of the malfunction on the data will be assessed, and the data will be qualified.

6.4.2 ANALYTICAL DEVIATIONS

For analyses where a method QC check sample, such as a method blank, does not meet method specifications, the problem will be investigated to determine the cause as well as any corrective action that should be taken. Once the corrective action has been taken, the analysis will be re-examined to verify that the problem has been eliminated.

In instances of out of specification spikes or calibrations, the samples involved will be re-extracted or reanalyzed if possible. In those instances where reanalyzing the sample is not possible, corrective measures will be taken to improve method performance prior to analysis of the next batch of samples.

6.4.3 CONTAMINATION

The handling procedures for sorbent traps and all other samples taken during this test project, from blank testing to sample collection and analysis, are designed to eliminate contamination by limiting their exposure to contaminants in the ambient air and other outside sources. If levels of contamination are present above the reporting limits in the analyzed blanks, the archived blank samples will be analyzed. Corrective action will be taken if the results of the field blanks are significantly different from those of the reagent blanks or trip blanks. This comparison will indicate whether high levels in the field blank are due to contamination from exposure to outside sources, contamination of reagent materials or, in the case of sorbent traps, from degradation of the traps.

6.4.4 PROCEDURAL DEVIATIONS

SOPs for the methods being performed will be available onsite during all testing. ESI and the project team will determine an appropriate action in all cases where standard procedures cannot resolve the problem. The action will be implemented after approval from the representatives of the LDEQ and USEPA.

7.0 CALIBRATION PROCEDURES AND PREVENTATIVE MAINTENANCE

This section presents a brief discussion of calibration and routine maintenance procedures to be used for sampling and analytical equipment. Criteria for analytical calibrations are also included. Calibration procedures for each analytical method are discussed in detail within the methods.

7.1 SAMPLING EQUIPMENT

All sampling equipment will be provided by the stack sampling contractor. The equipment will be calibrated prior to arrival onsite and after all testing has been completed. The sampling equipment calibration requirements and acceptance limits are listed in Table 7-1.

The equipment will be calibrated according to the criteria specified in the reference method being employed. In addition, the stack sampling contractor will follow the guidelines set forth in the *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods*. When these methods are inapplicable, methods such as those prescribed by the ASTM International (ASTM) will be used. Dry gas meters, orifices, nozzles, and pitot tubes are calibrated in accordance with these documents. 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 four 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 that approximates the levels anticipated in the actual measurement.

Data obtained during calibrations are recorded on standardized forms, which are checked for completeness and accuracy. Data reduction and subsequent calculations are performed using computer software. Calculations are checked at least twice for accuracy. Copies of calibration forms will be included in the test or project reports.

**TABLE 7-1
SAMPLING EQUIPMENT CALIBRATION REQUIREMENTS**

STACK GAS PARAMETER	QUALITY PARAMETER	METHOD OF DETERMINATION	FREQUENCY	CRITERIA
Gas flow	Pitot tube angle and dimensions	Measurements with a vernier micrometer and angle indicator	Pre-test and post-test	To specifications in USEPA Method 2
	Barometer	Calibrated vs. National Weather Service station	Pre-test and post-test	Within 0.1 inches mercury
	Stack gas thermocouple	Calibrated vs. ASTM mercury-in-glass thermometer	Pre-test and post-test	Within 1.5% as °R
Isokinetic sampling trains	Dry gas meter	Calibrated against a reference wet test meter	Pre-test and post-test	1. Y within 0.05 of pre-test Y 2. H@ within 0.15 of pre-test
	Probe nozzle ¹	Measurements with a vernier micrometer to 0.001 inches	Pre-test	Maximum difference in any two dimensions within 0.004 inches
	Dry gas meter thermocouples	Calibrated vs. ASTM mercury-in-glass thermometer	Pre-test and post-test	Within 1.5% as °R
	Trip balance	Calibrated vs. standard weights	Pre-test	Within 0.5 grams
Non-isokinetic sampling trains	Dry gas meter	Calibrated against a reference wet test meter	Pre-test and post-test	1. Y within 0.05 of pre-test Y 2. H@ within 0.15 of pre-test
	Dry gas meter thermocouples	Calibrated vs. ASTM mercury-in-glass thermometer	Pre-test and post-test	Within 1.5% as °R
Carbon dioxide and oxygen analyzers	Analyzer calibration error test	Checked using USEPA Protocol 1 calibration gases	Before the test run and after any failed system bias or drift check	±2% of calibration span
	System bias test	Checked using USEPA Protocol 1 calibration gases	Before and after each test run	±5% of calibration span
	System drift check	Checked using USEPA Protocol 1 calibration gases	After the post-test system bias test	±3% of calibration span
Carbon monoxide analyzer	Analyzer calibration error test	Checked using USEPA Protocol 1 calibration gases	Before the test run and after any failed system bias or drift check	±2% of calibration span
	System bias test	Checked using USEPA Protocol 1 calibration gases	Before and after each test run	±5% of calibration span
	System drift check	Checked using USEPA Protocol 1 calibration gases	After the post-test system bias test	±3% of calibration span

**TABLE 7-1 (CONTINUED)
SAMPLING EQUIPMENT CALIBRATION REQUIREMENTS**

STACK GAS PARAMETER	QUALITY PARAMETER	METHOD OF DETERMINATION	FREQUENCY	CRITERIA
Oxides of nitrogen analyzer	Analyzer calibration error test	Checked using USEPA Protocol 1 calibration gases	Before the test run and after any failed system bias or drift check	±2% of calibration span
	System bias test	Checked using USEPA Protocol 1 calibration gases	Before and after each test run	±5% of calibration span
	System drift check	Checked using USEPA Protocol 1 calibration gases	After the post-test system bias test	±3% of calibration span
Total hydrocarbon analyzer	Calibration error test	Checked using USEPA Protocol 1 calibration gases	Prior to the first test run and after any failed drift test	±5% of calibration gas value
	Drift test	Checked using USEPA Protocol 1 calibration gases	After the last test run and hourly during the test period	±3% of span value

¹ Glass or Quartz nozzles will be used, and the calibration cannot change.

7.1.1 PITOT TUBES

Each pitot tube is inspected in accordance with the geometry standards contained in USEPA Method 2. A calibration coefficient is calculated for each pitot tube.

7.1.2 DIFFERENTIAL PRESSURE GAUGES

Fluid manometers do not require calibration other than leak checks. Manometers are leak-checked in the field prior to each test series and again upon completion of testing.

7.1.3 DIGITAL TEMPERATURE INDICATOR

One digital temperature indicator is used to determine the flue gas temperature, probe temperature, oven temperature, impinger outlet temperature, and dry gas meter temperature. The digital temperature indicator is calibrated over a seven-point range (32 to 375°F) using an ASTM mercury-in-glass thermometer as a reference. The calibration is acceptable if the agreement is within ±1.5 percent in degrees Rankine (°R) in the temperature range of 492 to 654°R (32 to 194°F).

7.1.4 DRY GAS METER AND ORIFICE

A calibrated wet test meter is used as a reference meter to fully calibrate the dry gas meter and orifice. For the orifice, an orifice calibration factor is calculated for each of the 18 flow settings. For the dry gas meter, the full calibration provides the calibration factor of the dry gas meter.

7.1.5 BAROMETER

The stack sampling contractor personnel will calibrate the barometer prior to arrival onsite against a National Weather Service station.

7.1.6 NOZZLE

Glass nozzles will be calibrated onsite using a micrometer. Eight readings will be taken at quarter turns, followed by two measurements at random. The arithmetic average of the values obtained during the calibration is used.

7.1.7 CONTINUOUS EMISSIONS MONITORS

The stack sampling contractor will supply CEMS to measure the concentrations of carbon dioxide, oxygen, CO, NO_x, and THC in the stack gas. The monitors will be calibrated according to the procedures outlined in the respective test methods.

The facility's CEMS will be used to measure the concentrations of CO, NO_x, THC, and oxygen in the stack gas. A calibration drift check is performed daily for these CEMS.

7.2 ANALYTICAL EQUIPMENT

Analytical equipment calibration and QC procedures and internal QC checks are included to ensure accuracy of the measurements made by laboratory equipment. Table 7-2 provides a summary of the calibration and QC checks included for each analytical method for this test program.

**TABLE 7-2
SUMMARY OF ANALYTICAL EQUIPMENT CALIBRATION AND QUALITY CONTROL CHECKS**

PARAMETER	QUALITY CONTROL CHECK	METHOD OF DETERMINATION	FREQUENCY	ACCEPTANCE CRITERIA
Dioxins and furans	Initial calibration	Five high resolution concentration calibration solutions	Prior to sample analysis	<ol style="list-style-type: none"> 1. Mean relative response factor for unlabeled standards: <20% relative standard deviation 2. Mean relative response factor for labeled reference compounds: <30% relative standard deviation
	Calibration verification	Midlevel standard	At the beginning and end of each 12-hour shift	<ol style="list-style-type: none"> 1. Response factors within ±20% of the initial calibration mean relative response factor for unlabeled standards in beginning standard 2. Response factors within ±25% of the initial calibration mean relative response factor for unlabeled standards in ending standard 3. Response factors within ±30% of the initial calibration mean relative response factor for labeled standards in beginning standard 4. Response factors within ±35% of the initial calibration mean relative response factor for unlabeled standards in ending standard

TABLE 7-2 (CONTINUED)
SUMMARY OF ANALYTICAL EQUIPMENT CALIBRATION AND QUALITY CONTROL CHECKS

PARAMETER	QUALITY CONTROL CHECK	METHOD OF DETERMINATION	FREQUENCY	ACCEPTANCE CRITERIA
Dioxins and furans (continued)	Retention time window verification and gas chromatograph column performance	Monitor retention times, verify gas chromatograph column performance	At the beginning of each 12-hour shift	Compliance with Section 8.2.1 of SW-846 Method 8290
Particulate matter less than 10 micron	Calibration check	Class S weights	Daily	≤0.5 milligrams
Dinitrotoluene, dibutylphthalate, and diphenylamine	Initial calibration	Five levels, as per target list	Initially and as needed	<ol style="list-style-type: none"> 1. Compounds with linear response factor, relative standard deviation of initial calibration ≤ 15% 2. Compounds with non-linear response factor, correlation coefficient or coefficient of determination ≥ 0.99 3. Relative response factors for system performance check compounds ≥ 0.050 4. Relative response factor of calibration check compounds ≤ 30% relative standard deviation
	Continuing calibration	Continuing calibration verification	Every 12 hours following tune as required	<ol style="list-style-type: none"> 1. Response factor for system performance check compounds: Same as initial calibration 2. Percent difference of calibration check compounds relative response factor from initial calibration: ≤ 20%
	Consistency in chromatography	Internal standards	Every sample and standard	<ol style="list-style-type: none"> 1. Retention time relative to daily standard: ≤ 30 seconds 2. Area counts relative to daily standard: 50-200%

TABLE 7-2 (CONTINUED)
SUMMARY OF ANALYTICAL EQUIPMENT CALIBRATION AND QUALITY CONTROL CHECKS

PARAMETER	QUALITY CONTROL CHECK	METHOD OF DETERMINATION	FREQUENCY	ACCEPTANCE CRITERIA
Volatile organics (see Attachment D)	Initial calibration	Five levels, as per target list	Prior to sample analysis	<ol style="list-style-type: none"> 1. Compounds with linear response factor, relative standard deviation of initial calibration $\leq 15\%$ 2. Compounds with non-linear response factor, correlation coefficient or coefficient of determination ≥ 0.99 3. Relative response factors for system performance check compounds: ≥ 0.10 for chloromethane, 1,1-dichloroethane, and bromoform, ≥ 0.30 for 1,1,2,2-tetrachloroethane and chlorobenzene 4. Relative response factor of calibration check compounds: $\pm 30\%$ relative standard deviation
	Continuing calibration	Continuing calibration verification	Every 12 hours following tune as required	<ol style="list-style-type: none"> 1. Response factor for system performance check compounds: Same as initial calibration 2. Percent difference of calibration check compounds relative response factor from initial calibration: $\leq 20\%$
	Consistency in chromatography	Internal standards	Every sample and standard	<ol style="list-style-type: none"> 1. Retention time relative to daily standard: ≤ 30 seconds 2. Area counts relative to daily standard: 50-200%
Arsenic, beryllium, cadmium, chromium, and lead	Initial calibration	Calibration blank with at least one standard	Daily before analysis	Analysis of second calibration standard $\pm 10\%$ difference
	Calibration check	Instrument calibration verification	Following initial calibration	$\pm 10\%$ difference with relative standard deviation $< 5\%$ from replicate (minimum of two) integrations
	Serial dilution	Five-fold dilution of sample digestate	1 per batch	For samples $> 50x$ instrument detection limit, dilutions must agree within 10%
	Interference check	Interference check sample A/AB analysis	Beginning of sequence	<ol style="list-style-type: none"> 1. $< 2x$ reporting limit for applicable analytes 2. Recovery $\pm 20\%$ (as applicable)
	Continuing calibration	Continuing calibration verification	Every 10 samples and at the end of the sequence	$\pm 10\%$ difference with relative standard deviation $< 5\%$ from replicate (minimum of two) integrations

7.3 PREVENTATIVE MAINTENANCE

To ensure the quality and reliability of the data obtained, preventative maintenance is performed on the sampling and analytical equipment. The following sections outline those procedures.

7.3.1 SAMPLING EQUIPMENT

The potential impact of equipment malfunction on data completeness is minimized through two complimentary approaches. An in-house equipment maintenance program is part of routine operations. The maintenance program's strengths include:

- Availability of personnel experienced in the details of equipment maintenance and fabrication;
- Maintenance of an adequate spare parts inventory; and
- Availability of tools and specialized equipment.

For field equipment, preventive maintenance schedules are developed from historical data. Table 7-3 gives specific maintenance procedures for field equipment. Maintenance schedules for major analytical instruments (*e.g.*, balances, gas chromatographs) are based on manufacturer's recommendations.

**TABLE 7-3
MAINTENANCE ACTIVITIES FOR FIELD SAMPLING EQUIPMENT**

EQUIPMENT	MAINTENANCE ACTIVITIES	SPARE PARTS
Vacuum system	Before and after field program: 1) Check oil and oiler jar 2) Leak check 3) Verify vacuum gauge is functional Yearly or as needed: 1) Replace valves in pump	Spare fluid
Inclined manometer	Before and after each field program: 1) Leak check 2) Check fluid for discoloration or visible matter Yearly or as needed: 1) Disassemble and clean 2) Replace fluid	Spare fluid, o-rings
Dry gas meter	Before and after each field program: 1) Check meter dial for erratic rotation Every 3 months: 1) Remove panels and check for excessive oil or corrosion 2) Disassemble and clean	None
Nozzles	Before and after each test: 1) Verify no dents, corrosion or other damage 2) Glass or quartz nozzles, check for chips and cracks	Spare nozzles
Diaphragm pump	Before and after each test: 1) Leak check, change diaphragm if needed	None
Miscellaneous	Check for availability of spare parts	Fuses, fittings, thermocouples, thermocouple wire, variable transformers.

7.3.2 ANALYTICAL EQUIPMENT

In addition to including QC checks in the analysis of test program samples, the laboratories also perform regular inspection and maintenance of the laboratory equipment. Table 7-4 lists some of the routine maintenance procedures associated with the analytical equipment to be used in this test program.

**TABLE 7-4
MAINTENANCE ACTIVITIES FOR ANALYTICAL EQUIPMENT**

PARAMETER	EQUIPMENT	MAINTENANCE PROCEDURES
Dioxins and furans	High resolution gas chromatograph/high resolution mass spectroscopy	<ul style="list-style-type: none">– Change rotary pump oil– Clean beam center/focus stack and outer source– Clean ion volume– Change source slit
Dinitrotoluene, dibutylphthalate, and diphenylamine	Gas chromatograph/mass spectroscopy	<ul style="list-style-type: none">– Clean source– Replace column, filaments– Change pump oil– Change injector liner, seal and syringe
Volatile organics (see Attachment D)	Gas chromatograph/mass spectroscopy	<ul style="list-style-type: none">– Redo tune– Replace filament(s)
Arsenic, beryllium, cadmium, chromium, and lead	Inductively coupled plasma	<ul style="list-style-type: none">– Check gases, vacuum pump and cooling water, nebulizer, capillary tubing, peristaltic pump, high voltage switch, exhaust screens and torch, glassware and aerosol injector tube– Clean plasma torch, nebulizer, and filters– Replace pump tubing– Clean and lubricate sampler arm– Clean power unit and coolant water filters

8.0 DATA REDUCTION, VALIDATION AND REPORTING

This section presents the approaches to be used to reduce, validate, and report measurement data. With respect to the CPT, a quality team of companies and laboratories will be working together to ensure the success of this project. The team will make certain that:

- All raw data packages are paginated and assigned a unique project number. Each project number will reflect the type of analyses performed (*i.e.*, organic, inorganic, waste feed, air emissions).
- The data packages contain a case narrative, sample description information, sample receipt information, COC documentation, and summary report. All associated QA/QC results, run/batch data, instrument calibration data, sample extraction/preparation logs, and chromatograms, *etc.* will be included in the final laboratory report.
- These data are assigned to a specific appendix in the stack sampling report for easy reference and data review.

8.1 DATA REDUCTION

The methods referenced in this QAPP for field measurements and lab analyses are standard methods and are routinely used for such measurements and analysis. Data reduction procedures will follow the specific calculations presented in the reference methods.

Extreme care will be exercised to ensure hand recorded data are written accurately and legibly. Additionally, prepared and formatted data recording forms will be required for all data collection. This is an important aid to verify that all necessary data items are recorded. The collected field and laboratory data will be reviewed for correctness and completeness.

The stack sampling contractor will reduce and validate all of the sampling and field measurement data that are collected. The sampling data will include flow measurements, calibrations, *etc.* Each laboratory will reduce all analytical results prior to submission. The analytical data will be used to determine concentrations and emission rates of the compounds of interest. The manner in which the derived quantities will be reported is discussed in Section 8.3.

8.2 DATA VALIDATION

Validation demonstrates that a process, item, data set, or service satisfies the requirements defined by the user. For this program, review and evaluation of documents and records will be performed to assess the validity of samples collected, methodologies used, and data reported. This review comprises three parts: review of field documentation, review of laboratory data reports, and evaluation of data quality. The Project Coordinator has ultimate responsibility for validating all data for this project.

The sampling and analytical methods for this program have been selected because of their accepted validity for these types of applications. Adherence to the accepted methods, as described in this QAPP and the laboratory's LELAP approved SOPs, is the first criterion for validation. The effectiveness of the analytical methods as applied to this particular study will be evaluated based on project-specific quality indicators, such as audit samples, replicate samples, and matrix and surrogate spikes.

8.2.1 REVIEW OF FIELD DOCUMENTATION

Sample validation is intended to ensure that the samples collected are representative of the population under study. Criteria for acceptance include positive identification, documentation of sample shipment, preservation, and storage, and documentation demonstrating adherence to sample collection protocols and QC checks. As part of the review of field documentation, field data sheets and master logbooks will be checked for completeness, correctness, and consistency.

8.2.2 LABORATORY REVIEW OF DATA

The representative from each laboratory will approve all data results. The representative's signature will be included in the report. This signature will indicate that all QA/QC expectations were met. If expectations were not met, the discrepancies will be explained in the laboratory case narrative. The laboratory representatives will discuss the QA/QC issues and include the impact of these issues on the data results in the case narrative.

Laboratory raw data packages will include the following information:

- A table of contents for the raw data; and
- Numbered pages, correlating to the table of contents.

8.2.3 EVALUATION OF DATA QUALITY

The project team will review and evaluate the reported data. Data quality will be assessed. Review of the laboratory reports will result in an evaluation of the following parameters:

- Holding time for samples from date of collection to date of preparation and/or analysis;
- Sample storage conditions during the holding period prior to analysis;
- Tuning and calibration of instruments;
- PARCC parameter results and acceptance criteria;
- Blank sample analysis results; and
- Performance evaluation (audit) sample results, if applicable.

8.3 DATA REPORTING

The CPT report will be submitted to LDEQ and USEPA within 90 days of completing the testing or an extension will be requested. The analytical data packages will be provided in a CLP-like format, as appropriate. Both electronic and hard copies of the report will be provided.

All data will be reported in the appropriate units as applicable to the sample stream and the method of analysis. Emission results will be reported on a concentration basis to allow comparison to the emission limits.

Specific procedures will be followed when reporting test results. This section describes the conventions for detection limits, blank correction, and the use of significant figures.

8.3.1 MANAGEMENT OF NON-DETECTS

There are several specific situations that will arise in which calculations will need to be performed, but the analytical results are non-detects (at some level). Contracted laboratories are requested to achieve the lowest detection limits possible for each of the methods included in this QAPP. All detection limits shall be defined in the laboratory reports. No data results shall be reported as “ND” without a defined numerical value provided as the detection limit.

The procedures for handling non-detects will be communicated to each laboratory and the stack sampling contractor. When dealing with detection limits and non-detect data, the following guidelines will be used:

- Reporting limits (RLs), method detection limits (MDLs), reliable detection limits (RDLs), or estimated detection limits (EDLs) will be used to report emissions analytical data, as appropriate;
- For D/F emissions results, the SW-846 Method 0023A train will be operated for a minimum of three hours during each test run, and all non-detects will be assumed to be present at zero concentration, in accordance with 40 CFR § 63.1208(b)(1)(iii); and
- Any results that use non-detects will be reported as maxima (*i.e.*, with a less-than sign – “<”).

8.3.2 BACKGROUND/BLANK CORRECTION

Some of the methods specified for use in this test program allow background or blank correction. Every effort will be made to use reagents and sampling media of the highest quality to ensure that no contamination is indicated in any of the blank samples. In the event that background contamination is found, any background or blank correction will be carefully documented, and all calculations (*e.g.*, emission rates) will be developed using both corrected and uncorrected data. All corrections will be performed according to the applicable method.

8.3.3 ROUNDING AND SIGNIFICANT FIGURES

Observational results will be made with as many significant figures as possible. Rounding will be deferred until all resultant calculations have been made. The following rules will be applied in rounding data:

- When the digit after the one to be rounded is less than five, the one to be rounded is left unchanged; and
- When the digit after the one to be rounded is greater than or equal to five, the one to be rounded is increased by one.

Intermediate results will be presented in the final report at an appropriate level of significance (*i.e.*, rounded), although the derived, or resultant, calculations will be based on unrounded intermediate data. Consequently, it may not be possible to precisely reconstruct the resultant calculations on any particular table from the rounded intermediate results due to rounding errors.

9.0 QUALITY ASSURANCE REPORTS

Activities affecting data quality will be reviewed by the project team daily in the field, and as appropriate during non-field efforts. This will allow assessment of the overall effectiveness of the QAPP. These reviews will include the following:

- Summary of key QA activities, stressing measures that are being taken to ensure adherence to the QAPP;
- Description of problems observed that may impact data quality and corrective actions taken;
- Status of sample shipment and integrity at time of receipt and progress of sample analysis;
- Assessment of the QC data gathered over that time period;
- Any changes in QA organizational activities and personnel; and
- Results of internal or external assessments and the plan for correcting identified deficiencies, if any.

The testing program will have multiple tiers of QA/QC reviews. The specific laboratory performing the analysis will review the data for which they are responsible, and the laboratory project manager will sign the analytical data reports. Any QA/QC anomalies will be discussed in the case narrative. The Project Coordinator will also review the laboratory data package to discuss how the QA/QC anomalies may impact the emissions calculations. Any data that is determined to be invalid will be stated in the final report, and the impact of the invalid data on the test program will be assessed. Through this multiple tier process, all stages of the testing program will be tracked, monitored, reviewed, and documented.

10.0 REFERENCES

ASTM. *Annual Book of ASTM Standards*, latest annual edition.

USEPA. June 5, 2015, and June 8, 2015, update. *Applicable, Relevant, and Appropriate Requirements for the Camp Minden Superfund Removal Site*.

USEPA. November 1986 and updates. *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods*. USEPA 530/SW-846.

USEPA. 1994. *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods*. Office of Research and Development. EPA/600/R-94/038C.

USEPA. February 1991. *Preparation Aids for the Development of Category I Quality Assurance Project Plan*. Office of Research and Development. EPA/600/8-91/003.

USEPA. 1990. *Handbook: QA/QC Procedures for Hazardous Waste Incineration*. Office of Research and Development. EPA/625/6-89/023.

USEPA. National Emission Standards for Hazardous Air Pollutants from Hazardous Waste Combustors, 40 CFR Part 63, Subpart EEE, September 30, 1999, and as amended through October 28, 2008.

USEPA. New Source Performance Standards, Test Methods and Procedures, Appendix A, 40 CFR Part 60.

USEPA. New Source Performance Standards, Performance Specifications, Appendix B, 40 CFR Part 60.

**Attachment A:
PROJECT TEAM CONTACT INFORMATION**

Performance Test Manager	Dean S. Schellhase Explosive Service International 9985 Baringer Foreman Road Baton Rouge, LA 70809 225-275-2152 dean@explosiveserviceintl.com
Project Coordinator	Morgan Frampton El Dorado Engineering 2964 West 4700 South, Suite 109 Salt Lake City, UT 84129 801-966-8288 mframpton@eldoradoengineering.com
Stack Test Director	Mike Hutcherson METCO Environmental, Inc. 3226 Commander Drive Carrollton, TX 75006 800-394-1194 mhutcherson@metcoenv.com
Laboratory	Robert Adams, Ph.D. METCO Environmental, Inc. 3226 Commander Drive Carrollton, TX 75006 800-394-1194 radams@testamericainc.com
Laboratory	Kevin Woodcock TestAmerica Laboratories, Inc. 5815 Middlebrook Pike Knoxville, TN 37921 865-291-3000 kevin.woodcock@testamericainc.com

**Attachment B:
PROJECT TEAM RESUMES**

COMPANY: El Dorado Engineering, Inc.
NAME: Morgan Frampton
EDUCATION: Utah State University, Mech Engr., B.S. 2007

Summary of Experience:

Mr. Frampton has served as a design engineer, project engineer, and lead field engineer on complex equipment and systems used for demilitarization and other processing of energetic materials. Mr. Frampton currently serves as the project engineer for the Camp Minden facility.

EL DORADO ENGINEERING, INC.

PRESENT

- Lead Design and Field engineer on Belgium Explosive Waste Incinerator, including advanced pollution abatement system
- Project Engineer for a Stationary Thermal Treatment System for energetic materials for a commercial client in Mexico.
- Design Engineer for material handling system for first-of-a-kind explosives recovery plant for 60 mm mortar rounds.
- Design Engineer for a Transportable Flashing Furnace for flashing operations at Anniston Army Depot.
- Lead Field Engineer for Magnesium recovery and processing plant for recycling magnesium based energetic materials from military flares
- Provided consulting and design to improve researcher site access and safety at a remote site in Death Valley in which routine monitoring and research was performed.
- Design engineer responsible for combustion and thermal analyses for Letterkenny Rocket Motor Propellant Contained Burn Thermal Treatment System

MICHAEL K. HUTCHERSON; Director of Field Operations

Education B. S. 1985, Texas Tech University; Lubbock, Texas, in Wildlife Management.

Professional Training Courses Attended a two-day short course, "Performing and Observing Source Sampling" in Dallas, Texas, November 1988.

Attended 40-hour Occupational and Environmental Training Program on Hazardous Materials (CFR 1910.120) Dallas, Texas; February 1991.

Certifications Certified Visible Emissions Evaluator
HAZMAT certified

Technical Experience Participated in the sampling of over 500 sources, including several of which were sampled simultaneously using more than one sampling train. Thoroughly trained in all EPA testing procedures, 1986-present.

Over twenty-four years experience with EPA and Texas Air Control Board (TACB) methods of sampling stationary sources.

Thoroughly trained in the following EPA and TACB testing procedures: CFR, Title 40, Chapter I, Part 60, EPA Methods 1 through 17, 20, 23 through 25, and 101 through 110. Performance Specifications 1 through 5. "Sampling Procedures Manual, Texas Air Control Board, January 1983," Parts 1-1 through 8-8, 13-1 through 14-6, Appendix B through Appendix M.

Experienced with sampling Methods 0010, 0030, 0050, Method 23 (Modified Method 5 Sampling Train), and various EPA and "Site-Specific" multiple metal and acid gas sampling trains. Has performed on-site gravimetric particulate analysis, sulfur trioxide, and sulfur dioxide analysis.

(continued)

HUTCHERSON, Mike (cont'd)

Technical
Experience
(cont'd)

Experienced in the sampling of commercial calibration gas cylinders for sulfur dioxide, oxides of nitrogen, carbon dioxide, oxygen, and carbon monoxide.

Thoroughly trained in the operation and routine maintenance of the following:

- MSA LIRA Model 202S Infrared Carbon Monoxide Analyzer
- Thermo Environmental Model 10S and 42C Oxides of Nitrogen Analyzers
- Teledyne Model 326 Oxygen Analyzer
- Ratfisch Model RS 100 Total Hydrocarbon Analyzer
- Ratfisch Model RS 55 Total Hydrocarbon Analyzer
- Thermo Environmental Model 40 Sulfur Dioxide Analyzer
- Thermo Environmental Model 48 Carbon Monoxide Analyzer
- Western Research Model 721 AT Sulfur Dioxide Analyzer
- Horiba Model PIR 2000 Carbon Dioxide Analyzer
- Shimadzu C-R1B Gas Chromatograph
- J.U.M. Model VE-7 Total Hydrocarbon Analyzer

Thoroughly trained in the calibration techniques for all field testing equipment.

Kevin Woodcock
Sr. Project Manager

Qualifications Summary

Mr. Woodcock has more than fifteen years of experience in the environmental laboratory industry that includes extensive management of complex, stack emissions testing programs. He possesses excellent communication skills and has passion for a high level of quality and customer service. He also has an excellent ability to effectively handle multiple projects and tasks. He has received three years of formal education and training in business management from the University of Phoenix and has been employed in the analytical service industry for sixteen years. He is currently a senior level project manager for TestAmerica Laboratories, Inc.

Professional Experience

Sr. Project Manager – TestAmerica Laboratories, Inc. - 2010 to Present

In addition to coordinating and managing client's projects through all phases of laboratory operations, Mr. Woodcock is training and mentoring a Specialty Projects Management Assistant for stack emissions testing programs. He maintains communications with clients and account executives and serves as a liaison between clients and laboratory staff to meet client's needs. He monitors compliance with industry regulations and contractual agreements, writes and reviews RFPs to obtain potential contracts and coordinates contract negotiations for existing contracts. Generates and reviews final reports to ensure accuracy and facilitates corrective action when needed.

Project Manager II – TestAmerica Laboratories, Inc. - 2007 to 2010

Coordinates and manages client's projects through all phases of laboratory operations, ensuring fulfillment of TestAmerica's commitments to client requirements, error-free work, and on-time delivery. Assisting clients with project planning and QAPP development and determining analysis needs. Maintains communications with clients and account executives and serves as a liaison between clients and laboratory staff to meet client's needs. Monitors compliance with industry regulations and contractual agreements. Writes and reviews RFPs to obtain potential contracts and coordinates contract negotiations for existing contracts. Generates and reviews final reports to ensure accuracy and facilitates corrective action when needed.

Project Manager II

TestAmerica (formerly Severn Trent Laboratories (STL)) Knoxville, TN 1998 to 2007

Coordinates and manages client's projects through all phases of laboratory operations, ensuring fulfillment of TestAmerica's commitments to client requirements, error-free work, and on-time delivery. Assisting clients with project planning and QAPP development and determining analysis needs. Maintains communications with clients and account executives and serves as a liaison between clients and laboratory staff to meet client's needs. Monitors compliance with industry regulations and contractual agreements. Writes and reviews RFPs to obtain potential contracts and coordinates contract negotiations for existing contracts. Generates and reviews final reports to ensure accuracy and facilitates corrective action when needed.

Kevin Woodcock
Sr. Project Manager

Sample Coordinator

OnSite Environmental, Raleigh, NC – 1997 to 1998

Military

Mr. Woodcock is a Veteran of the United States Army Gulf War and has received numerous awards along with two commendations during his distinguished military career.

Education

- ◆ Coursework in Business Management, University of Phoenix, Knoxville, TN (2003 to 2006)
- ◆ United States Army Aviation Logistics School, Fort Eustis, VA (1994)
- ◆ United States Army Non-Commissioned Officers Academy, Fort Stewart, GA (1992)

Professional Training

- ◆ Customer Service Training, 2004
- ◆ Certified Hazardous Waste Operator, OSHA 29 CFR 1910.120 Certification, 1997

ROBERT E. ADAMS, Ph.D.; Project Manager

Education

Ph.D. Analytical Chemistry, 1977; University of Georgia, Athens, Georgia.

B.S. Chemistry, 1971; University of North Carolina, Chapel Hill, North Carolina.

Professional Memberships

American Chemical Society, Analytical Division
Air and Waste Management Association
Alpha Chi Sigma

Technical Experience

Participated in the sampling of multiple sources, including several of which were sampled simultaneously using more than one sampling train, from 1990-present.

As a Quality Assurance Director, conducted quality audits, implemented new methods, and improved laboratory operations for several environmental laboratories. Also, worked to develop proposals and review reports.

Supervised the development and reviewed, under stringent quality assurance/ quality control (QA/QC), generalized GC, HPLC, and GC/MS methods for the analysis of hazardous waste incinerator effluents. QA/QC plans were developed to control these experiments.

Developed procedures for the analysis of volatile and semi-volatile organic compounds as an Organic Lab Manager.

Managed the analysis of hazardous waste samples for EPA's Superfund program (2 contracts). This program involved the determination of volatiles and base/neutral/acid fractions by GC/MS and pesticides by GC/ECD.

(continued)

ADAMS, Robert E., Ph.D.; (continued)

Technical
Experience
(cont'd)

Thoroughly trained in the operation and routine maintenance of the following:

- Agilent 1090 HPLC
- Agilent 5971 GC/MS
- Agilent 5972 GC/MS
- Agilent 5973 GC/MS
- Agilent 5890 GC/FID/ECD/FPD
- Extractive FTIR
- Shimadzu GC 17 FID
- Shimadzu GC 14 FID/FPD
- Perkin-Elmer A Analyst Graphite Furnace AA
- Leeman Labs DRE ICP-AES
- Dionex 100 Ion Chromatograph

Professional
Training
Courses

Attended 40-hour Hazardous Waste Operations and Emergency Response in accordance with 29 CFR 1910.120, Dallas, Texas in February 2004. Also attended 8-hour HAZWOPER refresher course from 2005.

Certifications

Adult CPR certified
Standard First Aid certified
HAZWOPER certified

Publications and
Presentations

Adams, R.E.; Caudle, M.D. *The Use of Portable FTIR for Industrial Gas Analysis and Process Optimization*. Paper presented at the Air and Waste Management Association—Southern Section 2002 Annual Meeting and Technical Conference, Orange Beach, AL; 2002 September 15-18.

Weinberg, D.S.; Adams, R.E.; Manier, M.L. *Software Programs for Processing PCDF/PCDD GC/MS Data*. Paper presented at the 39th ASMA Conference on Mass Spectrometry and Allied Topics, Nashville, TN; 1991 May 19-24.

(continued)

ADAMS, Robert E., Ph.D.; (continued)

Publications and
Presentations
(cont'd)

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Adams, R.E.; Hass, J.R.; Smith, W.S.; Wong, T. *Sampling and Analysis for Volatile and Semivolatile POHC During RCRA Trial Burns: Techniques and Problems*. Proceedings of the 80th annual meeting of the Air Pollution Control Association, New York, NY; 1987, June 21-26.

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(cont'd)

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**Attachment C:
LOUISIANA ENVIRONMENTAL LABORATORY ACCREDITATION
PROGRAM CERTIFICATES**



STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY



Is hereby granting a Louisiana Environmental Laboratory Accreditation to

TestAmerica Air Emissions Corp dba METCO Environmental
3226 Commander Dr
Carrollton, Texas 75006
Agency Interest No. 30711

According to the Louisiana Administrative Code, Title 33, Part I, Subpart 3, LABORATORY ACCREDITATION, the State of Louisiana formally recognizes that this laboratory is technically competent to perform the environmental analyses listed on the scope of accreditation detailed in the attachment.

The laboratory agrees to perform all analyses listed on this scope of accreditation according to the Part I, Subpart 3 requirements and agrees to adapt to any changes in the requirements. It also acknowledges that continued accreditation is dependent on successful ongoing compliance with the applicable requirements of Part I and the 2009 TNI Standard by which the laboratory was assessed. Please contact the Department of Environmental Quality, Louisiana Environmental Laboratory Accreditation Program (LELAP) to verify the laboratory's scope of accreditation and accreditation status.

Accreditation by the State of Louisiana is not an endorsement or a guarantee of validity of the data generated by the laboratory. To be accredited initially and maintain accreditation, the laboratory agrees to participate in two single-blind, single-concentration PT studies, where available, per year for each field of testing for which it seeks accreditation or maintains accreditation as required in LAC 33:1.4711.

Lourdes Iturralde, Administrator
Notifications and Accreditations Section
Public Participation & Permit Support Services Division

Certificate Number: 02034

Expiration Date: June 30, 2016
Issued On: July 1, 2015



3226 Commander Dr, Carrollton, Texas 75006

Certificate Number: 02034

Air Emissions

Analyte	Method Name	Method Code	Type	AB
3880 - Opacity	CEMS Performance Specification 1	753	NELAP	LA
3840 - Hydrogen sulfide	CEMS Performance Specification 7	760	NELAP	LA
3850 - Moisture content	EPA ALT-008	1117	NELAP	LA
3885 - Oxides of nitrogen	EPA 20	1250	NELAP	LA
3895 - Oxygen	EPA 20	1250	NELAP	LA
4010 - Sulfur dioxide	EPA 20	1250	NELAP	LA
100025 - Sampling	EPA 25C	1266	State	LA
3995 - Stack gas velocity, volume flow rate	EPA 2B	1272	NELAP	LA
4000 - Stack gas velocity, volume flow rate in small stacks/ducts	EPA 2D	1274	NELAP	LA
3995 - Stack gas velocity, volume flow rate	EPA 2F	1276	NELAP	LA
3995 - Stack gas velocity, volume flow rate	EPA 2G	1277	NELAP	LA
3995 - Stack gas velocity, volume flow rate	EPA 2H	1278	NELAP	LA
100025 - Sampling	EPA Method 29	1861	State	LA
4815 - Formaldehyde	EPA 318	2108	NELAP	LA
4930 - Methanol	EPA 318	2108	NELAP	LA
100025 - Sampling	METCO SOP 0309-01 Rev. 1 - Integrated and Grab sampling with Rigid Containers	2174	State	LA
100025 - Sampling	EPA 16C	2564	State	LA
1095 - Mercury	CEMS Performance Specification 12	2571	NELAP	LA
100025 - Sampling	40 CFR Part 50 Appendix B	10000304	State	LA
3973 - Total Suspended Particulate (TSP)	40 CFR Part 50 Appendix B	10000304	NELAP	TX
100025 - Sampling	40 CFR Part 50 Appendix J	10000507	State	LA
100025 - Sampling	40 CFR 50 Appendix L	10000709	State	LA
100025 - Sampling	EPA 0011	10001806	State	LA
100025 - Sampling	EPA 0023A	10002207	State	LA
100025 - Sampling	EPA 0031	10002605	State	LA
100019 - Sampling of Principal Organic Hazardous Constituents from Combustion Sources Using Tedlar® Bags	EPA 0040	10002809	State	LA
100025 - Sampling	EPA 0050	10003006	State	LA
100051 - Midget Impinger HCl/Cl ₂ Sampling Train	EPA 0051	10003200	State	LA
3915 - Particulates	EPA 0060	10003404	NELAP	LA
100025 - Sampling	EPA 0060	10003404	State	LA
1045 - Chromium VI	EPA 0061	10003608	NELAP	LA
100025 - Sampling	EPA 0061	10003608	State	LA
3840 - Hydrogen sulfide	EPA 11	10004109	NELAP	TX
100025 - Sampling	EPA 11	10004109	State	LA
100023 - Total Gaseous Organic Compounds	EPA 18	10011300	NELAP	LA
9152 - 2,2',3,4,5,6'-Hexachlorobiphenyl (BZ-143)	EPA 305	10053802	NELAP	LA
4815 - Formaldehyde	EPA 316	10055706	NELAP	TX
100025 - Sampling	EPA 316	10055706	State	LA
3915 - Particulates	CEMS Performance Specification 11	10214592	NELAP	LA
3885 - Oxides of nitrogen	CEMS Performance Specification 2	10214627	NELAP	LA
4010 - Sulfur dioxide	CEMS Performance Specification 2	10214627	NELAP	LA
3755 - Carbon dioxide	CEMS Performance Specification 3	10214638	NELAP	LA

Clients and Customers are urged to verify the laboratory's current certification status with the Louisiana Environmental Laboratory Accreditation Program.

Air Emissions

Analyte	Method Name	Method Code	Type	AB
3895 - Oxygen	CEMS Performance Specification 3	10214638	NELAP	LA
3780 - Carbon monoxide	CEMS Performance Specification 4	10214649	NELAP	LA
3970 - Total reduced sulfur	CEMS Performance Specification 5	10214661	NELAP	LA
100215 - Calibration Drift and Relative Accuracy Tests	CEMS Performance Specification 6	10214672	NELAP	LA
3995 - Stack gas velocity, volume flow rate	CEMS Performance Specification 6	10214672	NELAP	LA
100018 - Volatile organics	CEMS Performance Specification 8	10214694	NELAP	LA
1515 - Ammonia as N	EPA CTM-027	10214707	NELAP	TX
100025 - Sampling	EPA CTM-027	10214707	State	LA
1773 - Hydrogen Cyanide	EPA CTM-033	10214774	NELAP	TX
100025 - Sampling	EPA CTM-033	10214774	State	LA
100144 - Particulate = or < 10 um	EPA OTM-27	10217513	NELAP	LA
1773 - Hydrogen Cyanide	EPA OTM-029, Rev.2011	10217535	NELAP	LA
100076 - Traverse Points	EPA Method 1	10246614	NELAP	LA
3780 - Carbon monoxide	EPA Method 10	10246625	NELAP	LA
9318 - 1,3-Butadiene	EPA 18	10246636	NELAP	TX
4410 - 2-Butanone (Methyl ethyl ketone, MEK)	EPA 18	10246636	NELAP	LA
4300 - Acetaldehyde	EPA 18	10246636	NELAP	LA
9300 - Acetic acid	EPA 18	10246636	NELAP	LA
100097 - Butene (all isomers)	EPA 18	10246636	NELAP	TX
4747 - Ethane	EPA 18	10246636	NELAP	TX
4926 - Methane	EPA 18	10246636	NELAP	TX
4930 - Methanol	EPA 18	10246636	NELAP	TX
4836 - Propylene	EPA 18	10246636	NELAP	TX
100025 - Sampling	EPA 18	10246636	State	LA
100023 - Total Gaseous Organic Compounds	EPA 18	10246636	NELAP	TX
5007 - n-Butane	EPA 18	10246636	NELAP	TX
4855 - n-Hexane	EPA 18	10246636	NELAP	TX
5028 - n-Pentane	EPA 18	10246636	NELAP	TX
5029 - n-Propane	EPA 18	10246636	NELAP	TX
3885 - Oxides of nitrogen	EPA Method 19	10246647	NELAP	LA
3915 - Particulates	EPA Method 19	10246647	NELAP	LA
3940 - Particulates, SO2, NOx, sulfur removal efficiency	EPA Method 19	10246647	NELAP	LA
100025 - Sampling	EPA Method 19	10246647	State	LA
4010 - Sulfur dioxide	EPA Method 19	10246647	NELAP	LA
3780 - Carbon monoxide	CEMS Performance Specification 4A	10246650	NELAP	LA
100076 - Traverse Points	EPA Method 1A	10246658	NELAP	LA
3995 - Stack gas velocity, volume flow rate	EPA Method 2	10246669	NELAP	LA
3795 - Total enclosure criteria	EPA Method 204	10246670	NELAP	LA
100025 - Sampling	EPA Method 25	10246738	State	LA
100025 - Sampling	EPA Method 25A	10246749	State	LA
100023 - Total Gaseous Organic Compounds	EPA Method 25A	10246749	NELAP	LA
3755 - Carbon dioxide	EPA Method 3A	10247684	NELAP	LA
3895 - Oxygen	EPA Method 3A	10247684	NELAP	LA
100142 - Emission Rate Correction Factors	EPA Method 3B	10247695	NELAP	LA
3755 - Carbon dioxide	EPA 3C	10247708	NELAP	LA
100025 - Sampling	EPA 3C	10247708	State	LA
100025 - Sampling	EPA TO-11A	10248007	State	LA
100024 - Modified Method 5 Sampling Train	EPA 0010	10250201	State	LA
100025 - Sampling	EPA 0030	10251000	State	LA
100025 - Sampling	EPA 101	10254601	State	LA

Air Emissions

Analyte	Method Name	Method Code	Type	AB
4930 - Methanol	EPA 308	10274507	NELAP	LA
100025 - Sampling	EPA 308	10274507	State	LA
100021 - Extractive FTIR Specifications	EPA 320	10274552	NELAP	LA
100020 - Organic and Inorganic Emissions by FTIR	EPA 320	10274552	NELAP	LA
100025 - Sampling	EPA 320	10274552	State	LA
4815 - Formaldehyde	EPA 323	10274585	NELAP	LA
9152 - 2,2',3,4,5,6'-Hexachlorobiphenyl (BZ-143)	EPA 305	10276003	NELAP	LA
100025 - Sampling	EPA 315	10277153	State	LA
100025 - Sampling	EPA TO-6	10312626	State	LA
100065 - Phenol Cresols	EPA TO-8	10312648	NELAP	LA
100025 - Sampling	EPA 101A	10401204	State	LA
100025 - Sampling	EPA 12 (FAA)	10401908	State	LA
1730 - Fluoride	EPA 13A	10402003	NELAP	TX
100025 - Sampling	EPA 13A	10402003	State	LA
1730 - Fluoride	EPA 13B	10402105	NELAP	TX
100025 - Sampling	EPA 13B	10402105	State	LA
4450 - Carbon disulfide	EPA 15	10402207	NELAP	LA
7215 - Carbonyl sulfide	EPA 15	10402207	NELAP	LA
3840 - Hydrogen sulfide	EPA 15	10402207	NELAP	LA
3845 - Hydrogen sulfide, carbonyl sulfide, carbon disulfide	EPA 15	10402207	NELAP	LA
100025 - Sampling	EPA 15	10402207	State	LA
3970 - Total reduced sulfur	EPA 15A	10402309	NELAP	LA
4729 - Dimethyl disulfide	EPA 16	10402401	NELAP	LA
3830 - H2S, methyl mercaptan, dimethyl sulfide, dimethyl disulfide	EPA 16	10402401	NELAP	LA
100025 - Sampling	EPA 16	10402401	State	LA
3970 - Total reduced sulfur	EPA 16	10402401	NELAP	LA
100025 - Sampling	EPA 16A	10402503	State	LA
6116 - Dimethyl sulfide	EPA 16B	10402605	NELAP	LA
3840 - Hydrogen sulfide	EPA 16B	10402605	NELAP	LA
7507 - Methyl mercaptan	EPA 16B	10402605	NELAP	LA
100025 - Sampling	EPA 16B	10402605	State	LA
3915 - Particulates	EPA 17	10402707	NELAP	TX
100025 - Sampling	EPA 17	10402707	State	LA
3950 - Particulates <10 um	EPA 201	10402809	NELAP	TX
3915 - Particulates	EPA 201A	10402901	NELAP	TX
3950 - Particulates <10 um	EPA 201A	10402901	NELAP	TX
100025 - Sampling	EPA 201A	10402901	State	LA
100045 - Condensable Particulate Matter	EPA 202	10403006	NELAP	TX
3805 - Fine particulates <2.5 um	EPA 202	10403006	NELAP	TX
3915 - Particulates	EPA 202	10403006	NELAP	TX
100025 - Sampling	EPA 202	10403006	State	LA
1540 - Bromide	EPA 26	10403108	NELAP	LA
1541 - Bromine	EPA 26	10403108	NELAP	LA
1575 - Chloride	EPA 26	10403108	NELAP	LA
1580 - Chlorine	EPA 26	10403108	NELAP	TX
1730 - Fluoride	EPA 26	10403108	NELAP	LA
1770 - Hydrochloric acid (Hydrogen chloride (gas only))	EPA 26	10403108	NELAP	TX
100096 - Hydrogen Bromide (HBr)	EPA 26	10403108	NELAP	TX
1775 - Hydrogen fluoride (Hydrofluoric acid)	EPA 26	10403108	NELAP	TX
3835 - Hydrogen halides and halogens	EPA 26	10403108	NELAP	LA

Air Emissions

Analyte	Method Name	Method Code	Type	AB
3765 - Carbon dioxide, oxygen, dry molecular weight	EPA Method 3	10403766	NELAP	LA
100141 - Field Validation of Pollutant Measurement Methods	EPA 301	10403777	NELAP	LA
100025 - Sampling	EPA 306 (GFAA)	10403802	State	LA
1040 - Chromium	EPA 306 (ICP)	10403904	NELAP	TX
100025 - Sampling	EPA 306 (ICP)	10403904	State	LA
1095 - Mercury	EPA 30B	10404203	NELAP	LA
100025 - Sampling	EPA 30B	10404203	State	LA
3850 - Moisture content	EPA Method 4	10404258	NELAP	LA
3915 - Particulates	EPA 5	10404305	NELAP	TX
100025 - Sampling	EPA 5	10404305	State	LA
3915 - Particulates	EPA 5A	10404407	NELAP	TX
100025 - Sampling	EPA 5A	10404407	State	LA
3915 - Particulates	EPA 5B	10404509	NELAP	TX
100025 - Sampling	EPA 5B	10404509	State	LA
3915 - Particulates	EPA 5D	10404601	NELAP	TX
100025 - Sampling	EPA 5D	10404601	State	LA
3915 - Particulates	EPA 5E	10404703	NELAP	TX
100025 - Sampling	EPA 5E	10404703	State	LA
3870 - Non-sulfate particulates	EPA 5F	10404805	NELAP	LA
3915 - Particulates	EPA 5F	10404805	NELAP	TX
100025 - Sampling	EPA 5F	10404805	State	LA
3915 - Particulates	EPA 5I	10405104	NELAP	TX
100025 - Sampling	EPA 5I	10405104	State	LA
100025 - Sampling	EPA 6	10405206	State	LA
4010 - Sulfur dioxide	EPA 6	10405206	NELAP	TX
4010 - Sulfur dioxide	EPA Method 6C	10405411	NELAP	LA
3885 - Oxides of nitrogen	EPA 7	10405502	NELAP	TX
100025 - Sampling	EPA 7	10405502	State	LA
3885 - Oxides of nitrogen	EPA Method 7E	10405911	NELAP	TX
100025 - Sampling	EPA 8	10406005	State	LA
2015 - Sulfite-SO3	EPA 8	10406005	NELAP	LA
4010 - Sulfur dioxide	EPA 8	10406005	NELAP	TX
100143 - Sulfuric acid mist	EPA 8	10406005	NELAP	LA
4020 - Sulfuric acid mist, sulfur dioxide	EPA 8	10406005	NELAP	TX
3880 - Opacity	EPA Method 9	10406403	NELAP	LA
100025 - Sampling	NCASI 8A	60031223	State	LA
4010 - Sulfur dioxide	NCASI 8A	60031223	NELAP	LA
100143 - Sulfuric acid mist	NCASI 8A	60031223	NELAP	LA
4410 - 2-Butanone (Methyl ethyl ketone, MEK)	NCASI CI/SG/PULP-94.02	60031245	NELAP	LA
4300 - Acetaldehyde	NCASI CI/SG/PULP-94.02	60031245	NELAP	LA
4315 - Acetone	NCASI CI/SG/PULP-94.02	60031245	NELAP	LA
4815 - Formaldehyde	NCASI CI/SG/PULP-94.02	60031245	NELAP	LA
4930 - Methanol	NCASI CI/SG/PULP-94.02	60031245	NELAP	LA
100025 - Sampling	NCASI DI/HAPS-99.01	60031303	State	LA
4815 - Formaldehyde	NCASI 98.01	60031358	NELAP	LA
4930 - Methanol	NCASI 98.01	60031358	NELAP	LA
6625 - Phenol	NCASI 98.01	60031358	NELAP	LA
100025 - Sampling	NCASI 98.01	60031358	State	LA
4410 - 2-Butanone (Methyl ethyl ketone, MEK)	NCASI IM/CAN/WP-99.01	60031643	NELAP	LA
4300 - Acetaldehyde	NCASI IM/CAN/WP-99.01	60031643	NELAP	LA
4930 - Methanol	NCASI IM/CAN/WP-99.01	60031643	NELAP	LA
6935 - Propanal (Propionaldehyde)	NCASI IM/CAN/WP-99.01	60031643	NELAP	LA



**STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY**

Is hereby granting a Louisiana Environmental Laboratory Accreditation to



**TestAmerica Laboratories Inc Knoxville
5815 Middlebrook Pike
Knoxville, Tennessee 37921-5947**

Agency Interest No. 83979

According to the Louisiana Administrative Code, Title 33, Part I, Subpart 3, LABORATORY ACCREDITATION, the State of Louisiana formally recognizes that this laboratory is technically competent to perform the environmental analyses listed on the scope of accreditation detailed in the attachment.

The laboratory agrees to perform all analyses listed on this scope of accreditation according to the Part I, Subpart 3 requirements and agrees to adapt to any changes in the requirements. It also acknowledges that continued accreditation is dependent on successful ongoing compliance with the applicable requirements of Part I and the 2009 TNI Standard by which the laboratory was assessed. Please contact the Department of Environmental Quality, Louisiana Environmental Laboratory Accreditation Program (LELAP) to verify the laboratory's scope of accreditation and accreditation status.

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Lourdes Iturralde, Administrator
Notifications and Accreditations Section
Public Participation & Permit Support Services Division

Certificate Number: 03079

**Expiration Date: June 30, 2016
Issued On: July 1, 2015**



5815 Middlebrook Pike, Knoxville, Tennessee 37921-5947

Certificate Number: 03079

Air Emissions

Analyte	Method Name	Method Code	Type	AB
100068 - Desorption of Sorbent Cartridges	SOP KNOX-MS-0011	2027	NELAP	LA
100069 - Total Organic Emissions	SOP KNOX-GC-0010	2031	NELAP	LA
1580 - Chlorine	SOP KNOX WC-0005	2041	NELAP	LA
1770 - Hydrochloric acid (Hydrogen chloride (gas only))	SOP KNOX WC-0005	2041	NELAP	LA
6380 - 1-Methylnaphthalene	SOP KNOX-ID-0016	2042	NELAP	LA
9501 - 1-Methylphenanthrene	SOP KNOX-ID-0016	2042	NELAP	LA
6852 - 2,3,5-Trimethylnaphthalene	SOP KNOX-ID-0016	2042	NELAP	LA
6188 - 2,6-Dimethylnaphthalene	SOP KNOX-ID-0016	2042	NELAP	LA
6385 - 2-Methylnaphthalene	SOP KNOX-ID-0016	2042	NELAP	LA
5500 - Acenaphthene	SOP KNOX-ID-0016	2042	NELAP	LA
5505 - Acenaphthylene	SOP KNOX-ID-0016	2042	NELAP	LA
5555 - Anthracene	SOP KNOX-ID-0016	2042	NELAP	LA
5575 - Benzo(a)anthracene	SOP KNOX-ID-0016	2042	NELAP	LA
5580 - Benzo(a)pyrene	SOP KNOX-ID-0016	2042	NELAP	LA
5585 - Benzo(b)fluoranthene	SOP KNOX-ID-0016	2042	NELAP	LA
5605 - Benzo(e)pyrene	SOP KNOX-ID-0016	2042	NELAP	LA
5590 - Benzo(g,h,i)perylene	SOP KNOX-ID-0016	2042	NELAP	LA
5600 - Benzo(k)fluoranthene	SOP KNOX-ID-0016	2042	NELAP	LA
5640 - Biphenyl	SOP KNOX-ID-0016	2042	NELAP	LA
5855 - Chrysene	SOP KNOX-ID-0016	2042	NELAP	LA
5895 - Dibenz(a,h) anthracene	SOP KNOX-ID-0016	2042	NELAP	LA
6265 - Fluoranthene	SOP KNOX-ID-0016	2042	NELAP	LA
6270 - Fluorene	SOP KNOX-ID-0016	2042	NELAP	LA
6315 - Indeno(1,2,3-cd) pyrene	SOP KNOX-ID-0016	2042	NELAP	LA
5005 - Naphthalene	SOP KNOX-ID-0016	2042	NELAP	LA
6608 - Perylene	SOP KNOX-ID-0016	2042	NELAP	LA
6615 - Phenanthrene	SOP KNOX-ID-0016	2042	NELAP	LA
6665 - Pyrene	SOP KNOX-ID-0016	2042	NELAP	LA
9105 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl (BZ-209)	SOP KNOX-ID-0013	2061	NELAP	LA
9095 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (BZ-206)	SOP KNOX-ID-0013	2061	NELAP	LA
9065 - 2,2',3,3',4,4',5-Heptachlorobiphenyl (BZ-170)	SOP KNOX-ID-0013	2061	NELAP	LA
9107 - 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl (BZ-208)	SOP KNOX-ID-0013	2061	NELAP	LA
9123 - 2,2',3,3',5,5',6,6'-Octachlorobiphenyl (BZ-202)	SOP KNOX-ID-0013	2061	NELAP	LA
9146 - 2,2',3,4',5,6,6'-Heptachlorobiphenyl (BZ-188)	SOP KNOX-ID-0013	2061	NELAP	LA
9134 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl (BZ-180)	SOP KNOX-ID-0013	2061	NELAP	LA
9176 - 2,2',4,4',6,6'-Hexachlorobiphenyl (BZ-155)	SOP KNOX-ID-0013	2061	NELAP	LA
9182 - 2,2',4,6,6'-Pentachlorobiphenyl (BZ-104)	SOP KNOX-ID-0013	2061	NELAP	LA
9187 - 2,2',6,6'-Tetrachlorobiphenyl (BZ-54)	SOP KNOX-ID-0013	2061	NELAP	LA
9188 - 2,2',6-Trichlorobiphenyl (BZ-19)	SOP KNOX-ID-0013	2061	NELAP	LA

Clients and Customers are urged to verify the laboratory's current certification status with the Louisiana Environmental Laboratory Accreditation Program.

Air Emissions

Analyte	Method Name	Method Code	Type	AB
9189 - 2,2'-Dichlorobiphenyl (BZ-4)	SOP KNOX-ID-0013	2061	NELAP	LA
9000 - 2,3',4,4',5'-Pentachlorobiphenyl (BZ-123)	SOP KNOX-ID-0013	2061	NELAP	LA
9055 - 2,3',4,4',5,5'-Hexachlorobiphenyl (BZ-167)	SOP KNOX-ID-0013	2061	NELAP	LA
8995 - 2,3',4,4',5-Pentachlorobiphenyl (BZ-118)	SOP KNOX-ID-0013	2061	NELAP	LA
9045 - 2,3,3',4,4',5'-Hexachlorobiphenyl (BZ-157)	SOP KNOX-ID-0013	2061	NELAP	LA
9190 - 2,3,3',4,4',5,5',6-Octachlorobiphenyl (BZ-205)	SOP KNOX-ID-0013	2061	NELAP	LA
9085 - 2,3,3',4,4',5,5'-Heptachlorobiphenyl (BZ-189)	SOP KNOX-ID-0013	2061	NELAP	LA
9050 - 2,3,3',4,4',5-Hexachlorobiphenyl (BZ-156)	SOP KNOX-ID-0013	2061	NELAP	LA
8985 - 2,3,3',4,4'-Pentachlorobiphenyl (BZ-105)	SOP KNOX-ID-0013	2061	NELAP	LA
9005 - 2,3,4,4',5-Pentachlorobiphenyl (BZ-114)	SOP KNOX-ID-0013	2061	NELAP	LA
8915 - 2-Chlorobiphenyl (BZ-1)	SOP KNOX-ID-0013	2061	NELAP	LA
9060 - 3,3',4,4',5,5'-Hexachlorobiphenyl (BZ-169)	SOP KNOX-ID-0013	2061	NELAP	LA
9015 - 3,3',4,4',5-Pentachlorobiphenyl (BZ-126)	SOP KNOX-ID-0013	2061	NELAP	LA
8965 - 3,3',4,4'-Tetrachlorobiphenyl (BZ-77)	SOP KNOX-ID-0013	2061	NELAP	LA
8970 - 3,4,4',5-Tetrachlorobiphenyl (BZ-81)	SOP KNOX-ID-0013	2061	NELAP	LA
9266 - 3,4,4'-Trichlorobiphenyl (BZ-37)	SOP KNOX-ID-0013	2061	NELAP	LA
9273 - 4,4'-Dichlorobiphenyl (BZ-15)	SOP KNOX-ID-0013	2061	NELAP	LA
100071 - 4-monochlorobiphenyl	SOP KNOX-ID-0013	2061	NELAP	LA
100072 - Total Decachlorobiphenyl	SOP KNOX-ID-0013	2061	NELAP	LA
8876 - Total Dichlorobiphenyls	SOP KNOX-ID-0013	2061	NELAP	LA
8877 - Total Heptachlorobiphenyls	SOP KNOX-ID-0013	2061	NELAP	LA
8888 - Total Hexachlorobiphenyls	SOP KNOX-ID-0013	2061	NELAP	LA
8889 - Total Monochlorobiphenyls	SOP KNOX-ID-0013	2061	NELAP	LA
8891 - Total Nonachlorobiphenyls	SOP KNOX-ID-0013	2061	NELAP	LA
8892 - Total Octachlorobiphenyls	SOP KNOX-ID-0013	2061	NELAP	LA
8896 - Total Pentachlorobiphenyls	SOP KNOX-ID-0013	2061	NELAP	LA
8893 - Total Tetrachlorobiphenyls	SOP KNOX-ID-0013	2061	NELAP	LA
8894 - Total Trichlorobiphenyls	SOP KNOX-ID-0013	2061	NELAP	LA
9519 - 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	SOP KNOX-ID-0004	2067	NELAP	LA
9516 - 1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	SOP KNOX-ID-0004	2067	NELAP	LA
9426 - 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	SOP KNOX-ID-0004	2067	NELAP	LA
9420 - 1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	SOP KNOX-ID-0004	2067	NELAP	LA
9423 - 1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	SOP KNOX-ID-0004	2067	NELAP	LA
9453 - 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	SOP KNOX-ID-0004	2067	NELAP	LA
9471 - 1,2,3,4,7,8-Hexachlorodibenzofuran	SOP KNOX-ID-0004	2067	NELAP	LA

Air Emissions

Analyte	Method Name	Method Code	Type	AB
(1,2,3,4,7,8-Hxcdf)				
9456 - 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-Hxcd)	SOP KNOX-ID-0004	2067	NELAP	LA
9474 - 1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	SOP KNOX-ID-0004	2067	NELAP	LA
9459 - 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcd)	SOP KNOX-ID-0004	2067	NELAP	LA
9477 - 1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	SOP KNOX-ID-0004	2067	NELAP	LA
9540 - 1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	SOP KNOX-ID-0004	2067	NELAP	LA
9543 - 1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	SOP KNOX-ID-0004	2067	NELAP	LA
9480 - 2,3,4,6,7,8-Hexachlorodibenzofuran	SOP KNOX-ID-0004	2067	NELAP	LA
9549 - 2,3,4,7,8-Pentachlorodibenzofuran	SOP KNOX-ID-0004	2067	NELAP	LA
9618 - 2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	SOP KNOX-ID-0004	2067	NELAP	LA
9612 - 2,3,7,8-Tetrachlorodibenzofuran	SOP KNOX-ID-0004	2067	NELAP	LA
100073 - Total Hexachlorodibenzofuran	SOP KNOX-ID-0004	2067	NELAP	LA
9438 - Total Hpcdd	SOP KNOX-ID-0004	2067	NELAP	LA
9444 - Total Hpcdf	SOP KNOX-ID-0004	2067	NELAP	LA
9468 - Total Hxcd	SOP KNOX-ID-0004	2067	NELAP	LA
9555 - Total Pecdd	SOP KNOX-ID-0004	2067	NELAP	LA
100074 - Total Pentachlorodibenzofuran	SOP KNOX-ID-0004	2067	NELAP	LA
9609 - Total TCDD	SOP KNOX-ID-0004	2067	NELAP	LA
9615 - Total TCDF	SOP KNOX-ID-0004	2067	NELAP	LA
5155 - 1,2,4-Trichlorobenzene	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
4610 - 1,2-Dichlorobenzene	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
4615 - 1,3-Dichlorobenzene	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
4620 - 1,4-Dichlorobenzene	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6835 - 2,4,5-Trichlorophenol	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6840 - 2,4,6-Trichlorophenol	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6000 - 2,4-Dichlorophenol	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6130 - 2,4-Dimethylphenol	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6175 - 2,4-Dinitrophenol	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6185 - 2,4-Dinitrotoluene (2,4-DNT)	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6190 - 2,6-Dinitrotoluene (2,6-DNT)	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5795 - 2-Chloronaphthalene	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5800 - 2-Chlorophenol	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6360 - 2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6385 - 2-Methylnaphthalene	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6400 - 2-Methylphenol (o-Cresol)	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6460 - 2-Nitroaniline	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6490 - 2-Nitrophenol	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5945 - 3,3'-Dichlorobenzidine	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6465 - 3-Nitroaniline	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5660 - 4-Bromophenyl phenyl ether	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5700 - 4-Chloro-3-methylphenol	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5745 - 4-Chloroaniline	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5825 - 4-Chlorophenyl phenylether	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6410 - 4-Methylphenol (p-Cresol)	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6470 - 4-Nitroaniline	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6500 - 4-Nitrophenol	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5545 - Aniline	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5610 - Benzoic acid	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL

Air Emissions

Analyte	Method Name	Method Code	Type	AB
5630 - Benzyl alcohol	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5670 - Butyl benzyl phthalate	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5680 - Carbazole	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6065 - Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5925 - Di-n-butyl phthalate	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6200 - Di-n-octyl phthalate	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5905 - Dibenzofuran	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6070 - Diethyl phthalate	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6135 - Dimethyl phthalate	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6275 - Hexachlorobenzene	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
4835 - Hexachlorobutadiene	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6285 - Hexachlorocyclopentadiene	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
4840 - Hexachloroethane	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6320 - Isophorone	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5015 - Nitrobenzene	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6605 - Pentachlorophenol	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6625 - Phenol	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5095 - Pyridine	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5760 - bis(2-Chloroethoxy)methane	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5765 - bis(2-Chloroethyl) ether	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
5780 - bis(2-Chloroisopropyl) ether	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6545 - n-Nitrosodi-n-propylamine	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
6535 - n-Nitrosodiphenylamine	SOP KNOX-MS-0017GC/MS	3012	NELAP	FL
3973 - Total Suspended Particulate	40 CFR Part 50 Appendix B	10000304	NELAP	TX
3950 - Particulates <10 um	40 CFR Part 50 Appendix J	10000507	NELAP	TX
100025 - Sampling	EPA 0031	10002605	NELAP	LA
100019 - Sampling of Principal Organic Hazardous Constituents from Combustion Sources Using Tedlar® Bags	EPA 0040	10002809	NELAP	LA
100516 - Metals Sampling Train	EPA 0060	10003404	NELAP	LA
100011 - Extraction of Semivolatile	EPA 3542	10140600	NELAP	LA
Analytes Collected Using Method 0010 (Modified Method 5 Sampling Train)				
1406 - Purge and trap for aqueous phase samples	EPA 5030B	10153409	NELAP	LA
1000 - Aluminum	EPA 6010C	10155803	NELAP	LA
1005 - Antimony	EPA 6010C	10155803	NELAP	LA
1010 - Arsenic	EPA 6010C	10155803	NELAP	LA
1015 - Barium	EPA 6010C	10155803	NELAP	LA
1020 - Beryllium	EPA 6010C	10155803	NELAP	LA
1030 - Cadmium	EPA 6010C	10155803	NELAP	LA
1035 - Calcium	EPA 6010C	10155803	NELAP	LA
1040 - Chromium	EPA 6010C	10155803	NELAP	LA
1050 - Cobalt	EPA 6010C	10155803	NELAP	LA
1055 - Copper	EPA 6010C	10155803	NELAP	LA
1070 - Iron	EPA 6010C	10155803	NELAP	LA
1075 - Lead	EPA 6010C	10155803	NELAP	LA
1080 - Lithium	EPA 6010C	10155803	NELAP	LA
1085 - Magnesium	EPA 6010C	10155803	NELAP	LA
1090 - Manganese	EPA 6010C	10155803	NELAP	LA
1100 - Molybdenum	EPA 6010C	10155803	NELAP	LA
1105 - Nickel	EPA 6010C	10155803	NELAP	LA
1125 - Potassium	EPA 6010C	10155803	NELAP	LA
1140 - Selenium	EPA 6010C	10155803	NELAP	LA
1150 - Silver	EPA 6010C	10155803	NELAP	LA

Air Emissions

Analyte	Method Name	Method Code	Type	AB
1155 - Sodium	EPA 6010C	10155803	NELAP	LA
1160 - Strontium	EPA 6010C	10155803	NELAP	LA
1165 - Thallium	EPA 6010C	10155803	NELAP	LA
1175 - Tin	EPA 6010C	10155803	NELAP	LA
1180 - Titanium	EPA 6010C	10155803	NELAP	LA
1910 - Total Phosphorus	EPA 6010C	10155803	NELAP	LA
1185 - Vanadium	EPA 6010C	10155803	NELAP	LA
1190 - Zinc	EPA 6010C	10155803	NELAP	LA
1045 - Chromium VI	EPA 7199	10163005	NELAP	LA
1095 - Mercury	EPA 7470A	10165807	NELAP	LA
5105 - 1,1,1,2-Tetrachloroethane	EPA 8260B	10184802	NELAP	LA
5160 - 1,1,1-Trichloroethane	EPA 8260B	10184802	NELAP	LA
5110 - 1,1,2,2-Tetrachloroethane	EPA 8260B	10184802	NELAP	LA
5185 - 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	EPA 8260B	10184802	NELAP	LA
5165 - 1,1,2-Trichloroethane	EPA 8260B	10184802	NELAP	LA
4630 - 1,1-Dichloroethane	EPA 8260B	10184802	NELAP	LA
4640 - 1,1-Dichloroethylene	EPA 8260B	10184802	NELAP	LA
4670 - 1,1-Dichloropropene	EPA 8260B	10184802	NELAP	LA
5150 - 1,2,3-Trichlorobenzene	EPA 8260B	10184802	NELAP	LA
5180 - 1,2,3-Trichloropropane	EPA 8260B	10184802	NELAP	LA
5155 - 1,2,4-Trichlorobenzene	EPA 8260B	10184802	NELAP	LA
5210 - 1,2,4-Trimethylbenzene	EPA 8260B	10184802	NELAP	LA
4570 - 1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260B	10184802	NELAP	LA
4585 - 1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260B	10184802	NELAP	LA
4610 - 1,2-Dichlorobenzene	EPA 8260B	10184802	NELAP	LA
4635 - 1,2-Dichloroethane (Ethylene dichloride)	EPA 8260B	10184802	NELAP	LA
4655 - 1,2-Dichloropropane	EPA 8260B	10184802	NELAP	LA
5215 - 1,3,5-Trimethylbenzene	EPA 8260B	10184802	NELAP	LA
9318 - 1,3-Butadiene	EPA 8260B	10184802	NELAP	LA
4615 - 1,3-Dichlorobenzene	EPA 8260B	10184802	NELAP	LA
4660 - 1,3-Dichloropropane	EPA 8260B	10184802	NELAP	LA
4620 - 1,4-Dichlorobenzene	EPA 8260B	10184802	NELAP	LA
4665 - 2,2-Dichloropropane	EPA 8260B	10184802	NELAP	LA
4410 - 2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260B	10184802	NELAP	LA
5812 - 2-Chloropropane	EPA 8260B	10184802	NELAP	LA
4535 - 2-Chlorotoluene	EPA 8260B	10184802	NELAP	LA
4860 - 2-Hexanone	EPA 8260B	10184802	NELAP	LA
4540 - 4-Chlorotoluene	EPA 8260B	10184802	NELAP	LA
4910 - 4-Isopropyltoluene (p-Cymene)	EPA 8260B	10184802	NELAP	LA
4995 - 4-Methyl-2-pentanone (MIBK)	EPA 8260B	10184802	NELAP	LA
4315 - Acetone	EPA 8260B	10184802	NELAP	LA
4320 - Acetonitrile	EPA 8260B	10184802	NELAP	LA
4340 - Acrylonitrile	EPA 8260B	10184802	NELAP	LA
4375 - Benzene	EPA 8260B	10184802	NELAP	LA
4385 - Bromobenzene	EPA 8260B	10184802	NELAP	LA
4390 - Bromochloromethane	EPA 8260B	10184802	NELAP	LA
4395 - Bromodichloromethane	EPA 8260B	10184802	NELAP	LA
4400 - Bromoform	EPA 8260B	10184802	NELAP	LA
4450 - Carbon disulfide	EPA 8260B	10184802	NELAP	LA
4455 - Carbon tetrachloride	EPA 8260B	10184802	NELAP	LA
4475 - Chlorobenzene	EPA 8260B	10184802	NELAP	LA

Air Emissions

Analyte	Method Name	Method Code	Type	AB
4575 - Chlorodibromomethane	EPA 8260B	10184802	NELAP	LA
4485 - Chloroethane (Ethyl chloride)	EPA 8260B	10184802	NELAP	LA
4505 - Chloroform	EPA 8260B	10184802	NELAP	LA
4595 - Dibromomethane (Methylene bromide)	EPA 8260B	10184802	NELAP	LA
4625 - Dichlorodifluoromethane (Freon-12)	EPA 8260B	10184802	NELAP	LA
4765 - Ethylbenzene	EPA 8260B	10184802	NELAP	LA
4835 - Hexachlorobutadiene	EPA 8260B	10184802	NELAP	LA
4870 - Iodomethane (Methyl iodide)	EPA 8260B	10184802	NELAP	LA
4900 - Isopropylbenzene	EPA 8260B	10184802	NELAP	LA
4950 - Methyl bromide (Bromomethane)	EPA 8260B	10184802	NELAP	LA
4960 - Methyl chloride (Chloromethane)	EPA 8260B	10184802	NELAP	LA
5000 - Methyl tert-butyl ether (MTBE)	EPA 8260B	10184802	NELAP	LA
4975 - Methylene chloride (Dichloromethane)	EPA 8260B	10184802	NELAP	LA
5005 - Naphthalene	EPA 8260B	10184802	NELAP	LA
5100 - Styrene	EPA 8260B	10184802	NELAP	LA
5115 - Tetrachloroethylene (Perchloroethylene)	EPA 8260B	10184802	NELAP	LA
5140 - Toluene	EPA 8260B	10184802	NELAP	LA
5170 - Trichloroethene (Trichloroethylene)	EPA 8260B	10184802	NELAP	LA
5175 - Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	EPA 8260B	10184802	NELAP	LA
5230 - Vinyl bromide (Bromoethane)	EPA 8260B	10184802	NELAP	LA
5235 - Vinyl chloride	EPA 8260B	10184802	NELAP	LA
5260 - Xylene (total)	EPA 8260B	10184802	NELAP	LA
4705 - cis & trans-1,2-Dichloroethene	EPA 8260B	10184802	NELAP	LA
4645 - cis-1,2-Dichloroethylene	EPA 8260B	10184802	NELAP	LA
4680 - cis-1,3-Dichloropropene	EPA 8260B	10184802	NELAP	LA
4600 - cis-1,4-Dichloro-2-butene	EPA 8260B	10184802	NELAP	LA
5240 - m+p-xylene	EPA 8260B	10184802	NELAP	LA
4435 - n-Butylbenzene	EPA 8260B	10184802	NELAP	LA
4855 - n-Hexane	EPA 8260B	10184802	NELAP	LA
5090 - n-Propylbenzene	EPA 8260B	10184802	NELAP	LA
5250 - o-Xylene	EPA 8260B	10184802	NELAP	LA
4440 - sec-Butylbenzene	EPA 8260B	10184802	NELAP	LA
4445 - tert-Butylbenzene	EPA 8260B	10184802	NELAP	LA
4700 - trans-1,2-Dichloroethylene	EPA 8260B	10184802	NELAP	LA
4685 - trans-1,3-Dichloropropylene	EPA 8260B	10184802	NELAP	LA
4605 - trans-1,4-Dichloro-2-butene	EPA 8260B	10184802	NELAP	LA
6715 - 1,2,4,5-Tetrachlorobenzene	EPA 8270C	10185805	NELAP	LA
5155 - 1,2,4-Trichlorobenzene	EPA 8270C	10185805	NELAP	LA
4610 - 1,2-Dichlorobenzene	EPA 8270C	10185805	NELAP	LA
6220 - 1,2-Diphenylhydrazine	EPA 8270C	10185805	NELAP	LA
6885 - 1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8270C	10185805	NELAP	LA
4615 - 1,3-Dichlorobenzene	EPA 8270C	10185805	NELAP	LA
4620 - 1,4-Dichlorobenzene	EPA 8270C	10185805	NELAP	LA
5790 - 1-Chloronaphthalene	EPA 8270C	10185805	NELAP	LA
6735 - 2,3,4,6-Tetrachlorophenol	EPA 8270C	10185805	NELAP	LA
6835 - 2,4,5-Trichlorophenol	EPA 8270C	10185805	NELAP	LA
6840 - 2,4,6-Trichlorophenol	EPA 8270C	10185805	NELAP	LA
6000 - 2,4-Dichlorophenol	EPA 8270C	10185805	NELAP	LA
6130 - 2,4-Dimethylphenol	EPA 8270C	10185805	NELAP	LA
6175 - 2,4-Dinitrophenol	EPA 8270C	10185805	NELAP	LA
6185 - 2,4-Dinitrotoluene (2,4-DNT)	EPA 8270C	10185805	NELAP	LA
6005 - 2,6-Dichlorophenol	EPA 8270C	10185805	NELAP	LA

Air Emissions

Analyte	Method Name	Method Code	Type	AB
6190 - 2,6-Dinitrotoluene (2,6-DNT)	EPA 8270C	10185805	NELAP	LA
5515 - 2-Acetylaminofluorene	EPA 8270C	10185805	NELAP	LA
5795 - 2-Chloronaphthalene	EPA 8270C	10185805	NELAP	LA
5800 - 2-Chlorophenol	EPA 8270C	10185805	NELAP	LA
6360 - 2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	EPA 8270C	10185805	NELAP	LA
5145 - 2-Methylaniline (o-Toluidine)	EPA 8270C	10185805	NELAP	LA
6385 - 2-Methylnaphthalene	EPA 8270C	10185805	NELAP	LA
6400 - 2-Methylphenol (o-Cresol)	EPA 8270C	10185805	NELAP	LA
6460 - 2-Nitroaniline	EPA 8270C	10185805	NELAP	LA
6490 - 2-Nitrophenol	EPA 8270C	10185805	NELAP	LA
6690 - 2-Sec-butyl-4,6-dinitrophenol (DNBP, Dinoseb)	EPA 8270C	10185805	NELAP	LA
6412 - 3+4 Methylphenol	EPA 8270C	10185805	NELAP	LA
5945 - 3,3'-Dichlorobenzidine	EPA 8270C	10185805	NELAP	LA
6355 - 3-Methylcholanthrene	EPA 8270C	10185805	NELAP	LA
6465 - 3-Nitroaniline	EPA 8270C	10185805	NELAP	LA
5660 - 4-Bromophenyl phenyl ether	EPA 8270C	10185805	NELAP	LA
5700 - 4-Chloro-3-methylphenol	EPA 8270C	10185805	NELAP	LA
5745 - 4-Chloroaniline	EPA 8270C	10185805	NELAP	LA
5825 - 4-Chlorophenyl phenylether	EPA 8270C	10185805	NELAP	LA
6105 - 4-Dimethyl aminoazobenzene	EPA 8270C	10185805	NELAP	LA
6470 - 4-Nitroaniline	EPA 8270C	10185805	NELAP	LA
6500 - 4-Nitrophenol	EPA 8270C	10185805	NELAP	LA
6115 - 7,12-Dimethylbenz(a) anthracene	EPA 8270C	10185805	NELAP	LA
5500 - Acenaphthene	EPA 8270C	10185805	NELAP	LA
5505 - Acenaphthylene	EPA 8270C	10185805	NELAP	LA
5510 - Acetophenone	EPA 8270C	10185805	NELAP	LA
5545 - Aniline	EPA 8270C	10185805	NELAP	LA
5555 - Anthracene	EPA 8270C	10185805	NELAP	LA
5595 - Benzidine	EPA 8270C	10185805	NELAP	LA
5575 - Benzo(a)anthracene	EPA 8270C	10185805	NELAP	LA
5580 - Benzo(a)pyrene	EPA 8270C	10185805	NELAP	LA
5585 - Benzo(b)fluoranthene	EPA 8270C	10185805	NELAP	LA
5590 - Benzo(g,h,i)perylene	EPA 8270C	10185805	NELAP	LA
5600 - Benzo(k)fluoranthene	EPA 8270C	10185805	NELAP	LA
5610 - Benzoic acid	EPA 8270C	10185805	NELAP	LA
5630 - Benzyl alcohol	EPA 8270C	10185805	NELAP	LA
5670 - Butyl benzyl phthalate	EPA 8270C	10185805	NELAP	LA
5680 - Carbazole	EPA 8270C	10185805	NELAP	LA
5855 - Chrysene	EPA 8270C	10185805	NELAP	LA
6065 - Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	EPA 8270C	10185805	NELAP	LA
5925 - Di-n-butyl phthalate	EPA 8270C	10185805	NELAP	LA
6200 - Di-n-octyl phthalate	EPA 8270C	10185805	NELAP	LA
5895 - Dibenz(a,h) anthracene	EPA 8270C	10185805	NELAP	LA
5905 - Dibenzofuran	EPA 8270C	10185805	NELAP	LA
6070 - Diethyl phthalate	EPA 8270C	10185805	NELAP	LA
6135 - Dimethyl phthalate	EPA 8270C	10185805	NELAP	LA
6205 - Diphenylamine	EPA 8270C	10185805	NELAP	LA
6260 - Ethyl methanesulfonate	EPA 8270C	10185805	NELAP	LA
6265 - Fluoranthene	EPA 8270C	10185805	NELAP	LA
6270 - Fluorene	EPA 8270C	10185805	NELAP	LA
6275 - Hexachlorobenzene	EPA 8270C	10185805	NELAP	LA
4835 - Hexachlorobutadiene	EPA 8270C	10185805	NELAP	LA
6285 - Hexachlorocyclopentadiene	EPA 8270C	10185805	NELAP	LA

Air Emissions

Analyte	Method Name	Method Code	Type	AB
4855 - n-Hexane	EPA TO-15	10248803	NELAP	FL
5026 - n-Nonane	EPA TO-15	10248803	NELAP	LA
5027 - n-Octane	EPA TO-15	10248803	NELAP	LA
5028 - n-Pentane	EPA TO-15	10248803	NELAP	LA
5090 - n-Propylbenzene	EPA TO-15	10248803	NELAP	LA
6747 - n-Undecane	EPA TO-15	10248803	NELAP	LA
100713 - n-butylcyclohexane	EPA TO-15	10248803	NELAP	LA
4440 - sec-Butylbenzene	EPA TO-15	10248803	NELAP	LA
4420 - tert-Butyl alcohol	EPA TO-15	10248803	NELAP	LA
4445 - tert-Butylbenzene	EPA TO-15	10248803	NELAP	LA
4700 - trans-1,2-Dichloroethylene	EPA TO-15	10248803	NELAP	FL
4685 - trans-1,3-Dichloropropylene	EPA TO-15	10248803	NELAP	FL
9519 - 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	EPA TO-9A	10249408	NELAP	FL
9516 - 1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	EPA TO-9A	10249408	NELAP	FL
9426 - 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	EPA TO-9A	10249408	NELAP	FL
9420 - 1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	EPA TO-9A	10249408	NELAP	FL
9423 - 1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	EPA TO-9A	10249408	NELAP	FL
9453 - 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	EPA TO-9A	10249408	NELAP	FL
9471 - 1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	EPA TO-9A	10249408	NELAP	FL
9456 - 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-Hxcdd)	EPA TO-9A	10249408	NELAP	FL
9474 - 1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	EPA TO-9A	10249408	NELAP	FL
9459 - 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	EPA TO-9A	10249408	NELAP	FL
9477 - 1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	EPA TO-9A	10249408	NELAP	FL
9540 - 1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	EPA TO-9A	10249408	NELAP	FL
9543 - 1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	EPA TO-9A	10249408	NELAP	FL
9480 - 2,3,4,6,7,8-Hexachlorodibenzofuran	EPA TO-9A	10249408	NELAP	FL
9549 - 2,3,4,7,8-Pentachlorodibenzofuran	EPA TO-9A	10249408	NELAP	FL
9618 - 2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	EPA TO-9A	10249408	NELAP	FL
9612 - 2,3,7,8-Tetrachlorodibenzofuran	EPA TO-9A	10249408	NELAP	FL
100120 - Particulate and Methylene Chloride Extractable Matter (MCEM)	EPA 315	10277153	NELAP	LA
1095 - Mercury	EPA Method 29 (CVAA)	10403302	NELAP	LA
1005 - Antimony	EPA Method 29 (ICP)	10403608	NELAP	LA
1010 - Arsenic	EPA Method 29 (ICP)	10403608	NELAP	LA
1015 - Barium	EPA Method 29 (ICP)	10403608	NELAP	LA
1020 - Beryllium	EPA Method 29 (ICP)	10403608	NELAP	LA
1030 - Cadmium	EPA Method 29 (ICP)	10403608	NELAP	LA
1040 - Chromium	EPA Method 29 (ICP)	10403608	NELAP	LA
1050 - Cobalt	EPA Method 29 (ICP)	10403608	NELAP	LA
1055 - Copper	EPA Method 29 (ICP)	10403608	NELAP	LA

Air Emissions

Analyte	Method Name	Method Code	Type	AB
1075 - Lead	EPA Method 29 (ICP)	10403608	NELAP	LA
1090 - Manganese	EPA Method 29 (ICP)	10403608	NELAP	LA
1105 - Nickel	EPA Method 29 (ICP)	10403608	NELAP	LA
1140 - Selenium	EPA Method 29 (ICP)	10403608	NELAP	LA
1150 - Silver	EPA Method 29 (ICP)	10403608	NELAP	LA
1165 - Thallium	EPA Method 29 (ICP)	10403608	NELAP	LA
1910 - Total Phosphorus	EPA Method 29 (ICP)	10403608	NELAP	LA
1190 - Zinc	EPA Method 29 (ICP)	10403608	NELAP	LA
3915 - Particulates	EPA 5	10404305	NELAP	LA
3755 - Carbon dioxide	ASTM D1946-90	30024465	NELAP	LA
3780 - Carbon monoxide	ASTM D1946-90	30024465	NELAP	LA
4747 - Ethane	ASTM D1946-90	30024465	NELAP	LA
4752 - Ethylene	ASTM D1946-90, Rev.1990	30024465	NELAP	LA
1767 - Helium	ASTM D1946-90	30024465	NELAP	LA
1772 - Hydrogen	ASTM D1946-90	30024465	NELAP	LA
4926 - Methane	ASTM D1946-90	30024465	NELAP	LA
1843 - Nitrogen	ASTM D1946-90	30024465	NELAP	LA
3895 - Oxygen	ASTM D1946-90	30024465	NELAP	LA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
1145 - Silicon	EPA 200.7	10013602	NELAP	FL
1000 - Aluminum	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1005 - Antimony	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1010 - Arsenic	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1015 - Barium	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1020 - Beryllium	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1025 - Boron	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1030 - Cadmium	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1035 - Calcium	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1040 - Chromium	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1050 - Cobalt	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1055 - Copper	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1070 - Iron	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1075 - Lead	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1085 - Magnesium	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1090 - Manganese	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1100 - Molybdenum	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1105 - Nickel	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1125 - Potassium	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1140 - Selenium	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1150 - Silver	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1155 - Sodium	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1165 - Thallium	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1175 - Tin	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1180 - Titanium	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1185 - Vanadium	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1190 - Zinc	EPA 200.7, Rev.4.4	10013806	NELAP	FL
1095 - Mercury	EPA 245.1	10036201	NELAP	FL
9519 - 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	EPA 1613B	10120602	NELAP	FL
9516 - 1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	EPA 1613B	10120602	NELAP	FL
9426 - 1,2,3,4,6,7,8-Heptachlorodibenzo-p-	EPA 1613B	10120602	NELAP	FL

TestAmerica Laboratories Inc Knoxville
 Issue Date: July 1, 2015

Certificate Number: 03079

AI Number: 83979
 Expiration Date: June 30, 2016

Clients and Customers are urged to verify the laboratory's current certification status with the Louisiana Environmental Laboratory Accreditation Program.

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
(BZ-126)				
8965 - 3,3',4,4'-Tetrachlorobiphenyl (BZ-77)	EPA 1668A	10129405	NELAP	FL
9261 - 3,3',4,5'-Tetrachlorobiphenyl (BZ-79)	EPA 1668A	10129405	NELAP	FL
9260 - 3,3',4,5,5'-Pentachlorobiphenyl (BZ-127)	EPA 1668A	10129405	NELAP	FL
9262 - 3,3',4,5-Tetrachlorobiphenyl (BZ-78)	EPA 1668A	10129405	NELAP	FL
9263 - 3,3',4-Trichlorobiphenyl (BZ-35)	EPA 1668A	10129405	NELAP	FL
9264 - 3,3',5,5'-Tetrachlorobiphenyl (BZ-80)	EPA 1668A	10129405	NELAP	FL
9265 - 3,3',5-Trichlorobiphenyl (BZ-36)	EPA 1668A	10129405	NELAP	FL
8925 - 3,3'-Dichlorobiphenyl (BZ-11)	EPA 1668A	10129405	NELAP	FL
9268 - 3,4',5-Trichlorobiphenyl (BZ-39)	EPA 1668A	10129405	NELAP	FL
8970 - 3,4,4',5-Tetrachlorobiphenyl (BZ-81)	EPA 1668A	10129405	NELAP	FL
9266 - 3,4,4'-Trichlorobiphenyl (BZ-37)	EPA 1668A	10129405	NELAP	FL
9267 - 3,4,5-Trichlorobiphenyl (BZ-38)	EPA 1668A	10129405	NELAP	FL
9271 - 3,5-Dichlorobiphenyl (BZ-14)	EPA 1668A	10129405	NELAP	FL
9272 - 3-Chlorobiphenyl (BZ-2)	EPA 1668A	10129405	NELAP	FL
9273 - 4,4'-Dichlorobiphenyl (BZ-15)	EPA 1668A	10129405	NELAP	FL
9274 - 4-Chlorobiphenyl (BZ-3)	EPA 1668A	10129405	NELAP	FL
8914 - Coelution - Dichlorobiphenyls (BZ-12-+13)	EPA 1668A	10129405	NELAP	FL
8924 - Coelution - Hexachlorobiphenyls (BZ-134 + BZ-143)	EPA 1668A	10129405	NELAP	FL
8937 - Coelution - Pentachlorobiphenyls (BZ-108 + BZ-124)	EPA 1668A	10129405	NELAP	FL
8939 - Coelution - Pentachlorobiphenyls (BZ-83 + BZ-99)	EPA 1668A	10129405	NELAP	FL
8952 - Coelution - Tetrachlorobiphenyls (BZ-40 + BZ-41 + BZ-71)	EPA 1668A	10129405	NELAP	FL
8901 - Sum - Pentachlorobiphenyls (BZ-86 + BZ-87 + BZ 97 + BZ-109 + BZ-119 + BZ-125)	EPA 1668A	10129405	NELAP	FL
100003 - Acid Digestion of waters for Total Recoverable or Dissolved Metals	EPA 3005A	10133207	NELAP	FL
100004 - Acid Digestion of Aqueous samples and Extracts for Total Metals	EPA 3010A	10133605	NELAP	FL
1410 - Continuous Liquid-liquid extraction	EPA 3520C	10139001	NELAP	FL
1406 - Purge and trap for aqueous phase samples	EPA 5030B	10153409	NELAP	FL
1000 - Aluminum	EPA 6010C	10155803	NELAP	FL
1005 - Antimony	EPA 6010C	10155803	NELAP	FL
1010 - Arsenic	EPA 6010C	10155803	NELAP	FL
1015 - Barium	EPA 6010C	10155803	NELAP	FL
1020 - Beryllium	EPA 6010C	10155803	NELAP	FL
1025 - Boron	EPA 6010C	10155803	NELAP	FL
1030 - Cadmium	EPA 6010C	10155803	NELAP	FL
1035 - Calcium	EPA 6010C	10155803	NELAP	FL
1040 - Chromium	EPA 6010C	10155803	NELAP	FL
1050 - Cobalt	EPA 6010C	10155803	NELAP	FL
1055 - Copper	EPA 6010C	10155803	NELAP	FL
1070 - Iron	EPA 6010C	10155803	NELAP	FL
1075 - Lead	EPA 6010C	10155803	NELAP	FL

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
8925 - 3,3'-Dichlorobiphenyl (BZ-11)	EPA 1668A	10129405	NELAP	FL
9268 - 3,4',5-Trichlorobiphenyl (BZ-39)	EPA 1668A	10129405	NELAP	FL
8970 - 3,4,4',5-Tetrachlorobiphenyl (BZ-81)	EPA 1668A	10129405	NELAP	FL
9266 - 3,4,4'-Trichlorobiphenyl (BZ-37)	EPA 1668A	10129405	NELAP	FL
9267 - 3,4,5-Trichlorobiphenyl (BZ-38)	EPA 1668A	10129405	NELAP	FL
9271 - 3,5-Dichlorobiphenyl (BZ-14)	EPA 1668A	10129405	NELAP	FL
9272 - 3-Chlorobiphenyl (BZ-2)	EPA 1668A	10129405	NELAP	FL
9273 - 4,4'-Dichlorobiphenyl (BZ-15)	EPA 1668A	10129405	NELAP	FL
9274 - 4-Chlorobiphenyl (BZ-3)	EPA 1668A	10129405	NELAP	FL
8914 - Coelution - Dichlorobiphenyls (BZ-12-+13)	EPA 1668A	10129405	NELAP	FL
8921 - Coelution - Hexachlorobiphenyls (BZ-129 + BZ-138 + BZ-160 + BZ-163)	EPA 1668A	10129405	NELAP	FL
8924 - Coelution - Hexachlorobiphenyls (BZ-134 + BZ-143)	EPA 1668A	10129405	NELAP	FL
8937 - Coelution - Pentachlorobiphenyls (BZ-108 + BZ-124)	EPA 1668A	10129405	NELAP	FL
8939 - Coelution - Pentachlorobiphenyls (BZ-83 + BZ-99)	EPA 1668A	10129405	NELAP	FL
8941 - Coelution - Pentachlorobiphenyls (BZ-85 + BZ-116 + BZ-117)	EPA 1668A	10129405	NELAP	FL
8952 - Coelution - Tetrachlorobiphenyls (BZ-40 + BZ-41 + BZ-71)	EPA 1668A	10129405	NELAP	FL
8901 - Sum - Pentachlorobiphenyls (BZ-86 + BZ-87 + BZ 97 + BZ-109 + BZ-119 + BZ-125)	EPA 1668A	10129405	NELAP	FL
100007 - Acid Digestion of Sediments, Sludges, and soils	EPA 3050B	10135601	NELAP	LA
100008 - Microwave Assisted Acid Digestion of Sediments, Sludges, Soils, and Oils	EPA 3051A	10136002	NELAP	LA
100009 - Microwave Assisted Acid Digestion of Siliceous and Organically Based Matrices	EPA 3052	10136206	NELAP	LA
1452 - Soxhlet Extraction	EPA 3540C	10140202	NELAP	LA
1428 - Microwave Extraction	EPA 3546	10141205	NELAP	LA
1468 - Ultrasonic Extraction	EPA 3550C	10142004	NELAP	LA
1470 - Waste Dilution	EPA 3580A	10143007	NELAP	LA
2020 - Sulfuric acid/permanganate clean-up	EPA 3665	10148604	NELAP	LA
100017 - Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples	EPA 5035	10154004	NELAP	LA
1408 - Bomb Preparation Method for Solid Waste	EPA 5050	10155007	NELAP	LA
1000 - Aluminum	EPA 6010C	10155803	NELAP	FL
1005 - Antimony	EPA 6010C	10155803	NELAP	FL
1010 - Arsenic	EPA 6010C	10155803	NELAP	FL
1015 - Barium	EPA 6010C	10155803	NELAP	FL
1020 - Beryllium	EPA 6010C	10155803	NELAP	FL
1025 - Boron	EPA 6010C	10155803	NELAP	FL
1030 - Cadmium	EPA 6010C	10155803	NELAP	FL
1035 - Calcium	EPA 6010C	10155803	NELAP	FL
1040 - Chromium	EPA 6010C	10155803	NELAP	FL
1050 - Cobalt	EPA 6010C	10155803	NELAP	FL
1055 - Copper	EPA 6010C	10155803	NELAP	FL

**Attachment D:
TARGET VOLATILE ORGANICS**

TARGET VOLATILE ORGANIC ANALYTES

1,1,1,2-Tetrachloroethane	Carbon tetrachloride
1,1,1-Trichloroethane	Chlorobenzene
1,1,2,2-Tetrachloroethane	Chloroethane
1,1,2-Trichloroethane	Chloroform
1,1-Dichloroethane	Chloromethane
1,1-Dichloroethene	Dibromochloromethane
1,2,4-Trichlorobenzene	Ethylbenzene
1,2-Dibromo-3-chloropropane	Hexachlorobutadiene
1,2-Dichlorobenzene	Isobutyl alcohol
1,2-Dichloroethane	Methylene chloride
1,2-Dichloropropane	Naphthalene
1,3-Dichlorobenzene	Styrene
1,3-Dichloropropylene	Tetrachloroethene
1,4-Dichlorobenzene	Toluene
2-Butanone	Trichloroethene
4-Methyl-2-pentanone	Trichlorofluoromethane
Acetone	Vinyl chloride
Benzene	Xylene (total)
Bromodichloromethane	cis-1,2-Dichloroethene
Bromoform	tert-Butyl methyl ether (MTBE)
Bromomethane	trans-1,2-Dichloroethene
Carbon disulfide	

Attachment E: EXAMPLE CHAIN OF CUSTODY

Appendix B: **RELEVANT MILITARY STANDARD (MIL STD)**

MIL-STD-652D (AR)
4 August 1978

SUPERSEDING
MIL-STD-652C (MU)
30 November 1973

MILITARY STANDARD
PROPELLANTS, SOLID, FOR CANNONS
REQUIREMENTS AND PACKING



FSC: 1376

MIL-STD-652D (AR)
4 August 1978

DEPARTMENT OF DEFENSE
WASHINGTON, D. C. 20301

Propellants, Solid For Cannons, Requirements and Packing, MIL-STD-652D
(AR).

1. This standard is approved for use by all Departments and Agencies of the Department of Defense.
2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document, should be addressed to: Commander, US Army Armament Research & Development Command, ATTN: DRDAR-QAR, Dover, NJ 07801, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

CONTENT

<u>Paragraph</u>	<u>Page</u>
1 SCOPE	1
2 REFERENCED DOCUMENTS	1
3 DEFINITIONS (NOT APPLICABLE)	3
4 GENERAL REQUIREMENTS	3
4.1 Constituent Material	3
4.2 Form and Dimension	3
4.3 Packing	5
4.4 Sampling for Testing	7
5 TESTING and PROCEDURES	10

<u>Figure</u>	<u>Page</u>
1 Curve for Residual Solvent in Cannon Propellant Powder in M1 and M6	14
2 Curve for Total Volatiles in M2 and M5 Smokeless Cannon Powder	15

<u>Table</u>	<u>Page</u>
I MEAN variation and standard deviation of individual dimensions expressed as a percentage of the mean dimension.	4
II Methods from MIL-STD-286 for the Chemical and Physical Properties of the Propellant	10, 11, 12
III Propellant Composition and Chemical Properties	16, 17, 18, 19, 20, 21

MIL-STD-652D (AR)

4 August 1978

1. SCOPE

1.1 This Standard covers the chemical, physical and packing requirements for cannon propellants. The ballistic requirements for the detailed propellants are covered in their detailed specifications.

1.2 Purpose. - The purpose of this Standard is to provide a single publication as a Military Standard containing requirements and tests pertinent to the propellants.

1.3 Classification. - The propellant shall be of the following forms and types as specified:

FORM A	FLAKE
FORM B	SHEET
FORM C	GRAIN

Cylindrical multiple-perforated grain (MP) (Type I)
Cylindrical single-perforated grain (SP) (Type II)

2. REFERENCED DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this Standard to the extent specified herein.

SPECIFICATIONS

MILITARY

MIL-D-98	Diphenylamine
MIL-G-155	Graphite
MIL-P-156	Potassium Nitrate
MIL-B-162	Barium Nitrate
JAN-W-181	Wax, Candelilla
MIL-P-193	Potassium Sulfite (For Ordnance Use)
MIL-D-204	Dinitrotoluene (For Use in Explosives)
MIL-D-218	Dibutylphthalate (For Use in Explosives)
JAN-D-242	Diethylphthalate (For Use in Explosives)
MIL-N-244	Nitrocellulose (For Use in Explosives)
MIL-N-246	Nitroglycerin
MIL-E-255	Ethyl Centralite (Carbamite)
MIL-N-494	Nitroguanidine (Picrite)
MIN-N-3399	2-Nitrodiphenylamine
MIL-R-3065	Rubber, Fabricated Products
MIL-L-18618	Lead Carbonate, Basic Dry (For Ordnance Use)

MIL-STD-652D (AR)
4 August 1978

STANDARDS

MILITARY

MIL-STD-105 -Sampling Procedures and Tables for
Inspection by Attributes (ABC-STD-105)
MIL-STD-286 -Propellants, Solid; Sampling, Exam-
ination and Testing
MIL-STD-417 -Rubber Composition Vulcanized
General Purpose Solid (Symbols and Test)
MIL-STD-1235 -Single and Multilevel Continuous
Sampling Procedures and Tables for
Inspection by Attributes

DRAWINGS

76-4-46 Box, Packing with Metal Liner, M24 for
Smokeless Powder, Assembly and Details
76-4-53 Box, Steel, M2 for Smokeless Powder,
Assembly
76-4-55 Box, Steel M2 for Smokeless Powder Detail
76-4-56 Box, Packing, Metal-Wood, M17 for Smokeless
Powder Assembly
9282946 Marking Diagram and Sealing of Steel
Packing Boxes for Shipment of Propellants
7549033 Container, Metal, Universal M25 for
Propellants and Explosives Assembly and
Detail
3853577 Marking Diagram and Sealing of Container,
Metal, Universal M25 for Shipping of
Propellants
3858848 Marking Diagram and Sealing of Metal Lined
Wooden Packing Boxes for Shipment of
Propellants
138439 Packing Box, MARK 7
138441 Packing Box, MARK 7 Cover Details
9256486 Container, Packing PA54 Wood with Metal
Liner (Modified M24 Box) for Smokeless
Powder

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer).

2.2 Other publications. -The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

CODE OF FEDERAL REGULATIONS, Title 49, Transportation
Parts 100-199

MIL-STD-652D (AR)
4 August 1978

(The Code of Federal Regulations is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Orders should specify "49 CFR 100-199 (latest revision).")

3. DEFINITIONS

3.1 Not applicable

4. GENERAL REQUIREMENTS

4.1 Constituent material. - The constituent materials shall comply with the requirements of the applicable specification as follows:

<u>Constituent Material</u>	<u>Conforming to Specification</u>
Wax, Candelilla	JAN-W-181
Barium Nitrate	MIL-B-162, Class 3
Dibutylphthalate	MIL-D-218
Diethylphthalate	JAN-D-242
Dinitrotoluene	MIL-D-204
Diphenylamine	MIL-D-98
Ethyl Centralite	MIL-E-255, Class 2 or Class 3 (see note)
Graphite	MIL-G-155, Grade III or IV
Nitrocellulose	MIL-N-244, (See Table II)
Nitroglycerin	MIL-N-246, Type I
Nitroguanidine	MIL-N-494, Class to be specified in contract
Potassium Nitrate	MIL-P-156, Class 2 or 3
Potassium Sulfate	MIL-P-193, Type I
2-Nitrodiphenylamine	MIL-N-3399
Lead Carbonate	MIL-L-18618
Cryolite (Technical sodium aluminum fluoride.)	COMMERCIAL GRADE

NOTE: Any class permitted when added in solution (1)

4.2 Form and dimension

4.2.1 Flake propellant shall conform to the requirements listed in the detail propellant specification or drawings (see 4.2.5.2).

4.2.2 Sheet propellant shall conform to the requirements listed in the detail propellant specification or drawing.

4.2.3 Grain

4.2.3.1 Type I. -The grain shall be cylindrical with 7 longitudinal perforations, one in the center of the grain and six at the vertices of a symmetrical hexagon.

4.2.3.2 Type II. -The grain shall be cylindrical with a single longitudinal perforation through the center of the grain.

4.2.3.3 The following requirements regarding grain dimensions shall govern unless authorization for departure is given by the procuring activity concerned prior to manufacture of the propellant.

4.2.3.3.1 Length: Diameter Ratio.

4.2.3.3.1.1 Type I. -The average grain length (L) shall be from 2.10 to 2.50 times the average grain diameter (D).

4.2.3.3.1.2 Type II. -The average grain length (L) shall be from 3.0 to 6.0 times the average grain diameter (D).

4.2.3.3.1.3 The length and diameter of grain shall comply with either the mean variation or the standard deviation uniformity requirements shown in Table I.

TABLE I

Mean variation and standard deviation of individual dimensions expressed as a percentage of the mean dimension.

<u>Acceptance Criterion Dimensions</u>	<u>Percent</u>	<u>Standard</u>
	<u>Mean Variation</u>	<u>Deviation</u> Maximum
Length	6.25	6.25
Diameter (grains 0.2 inch or more in diameter)	3.125	4.75
Diameter (grains less than 0.2 inch in diameter)	6.25	6.25

4.2.3.3.2 Grain diameter. -perforation diameter ratio.

4.2.3.3.2.1 Type I. -The average grain diameter (D) shall be from 5.0 to 15 times the average diameter of the perforation (d).

MIL-STD-652D (AR)
4 August 1978

4.2.3.3.2.2 Type II. -The average grain diameter (D) shall be approximately three times the average diameter of the perforation (d).

4.2.3.3.2.3 Web measurements.

4.2.3.3.2.3.1 Type I. -The difference between the average outer web thickness (W_o) and the average inner web thickness (W_i) shall not exceed 15 percent of the average web thickness (W_a).

4.2.3.3.2.3.2 Type II. -The standard deviation of the web measurements, expressed as a percent of the average web measurement, shall not be greater than 20 percent.

4.2.4 Form. -Determination of the form of the propellant shall be by visual examination.

4.2.5 Dimensions

4.2.5.1 Thirty normal grains of propellant shall be selected at random and tested as specified in paragraph 5. If the sample fails to comply with the requirements, the lot shall be rejected.

4.2.5.2 Flakes. -Thirty flakes shall be examined as specified in method 504.1 of MIL-STD-286 for length or thickness and diameter.

4.2.5.3 Sheets. -The dimensions of the sheets shall be tested as specified in the applicable drawing or item specification.

4.2.6 Total graphite content, when applicable. -The total graphite content shall not exceed 0.55 percent.

4.3 Packing

4.3.1 Level A. -The propellant shall be packed in containers conforming to Drawings 76-4-46, 76-4-53, 76-4-56, 7549033, 9256486, 138439 and marked, sealed and tested in accordance with Drawings, 8858848, 9282946, or 8858577. The net weight of propellant in the container shall not exceed 160 pounds provided the propellant surface is one (1) inch minimum below top surface of the container. The tolerance for the established net weight of any given propellant or propellant lot shall be plus or minus one pound.

MIL-STD-652D (AR)
4 August 1978

4.3.1.1 Immediately prior to packing, containers listed in 4.3.1 shall be subjected to an internal pressure of 1/2 to 1 pound per square inch for the M24 and metal lined containers and 1/2 to 1 psi for 15 seconds for the M2 and MARK 7 containers by a method satisfactory to the contracting officer's representative.

4.3.1.2 When replacing cover gaskets for the M2 Steel Box, Dwg. 76-4-55, solid rubber gaskets as described on Dwg. 138441 for the MK7 Packing Box (Navy) may be used in lieu of Gasket Part No. 76-4-55H. Solid rubber gaskets shall comply with Specification MIL-R-3065 and RN-715 or RS-715 of Standard MIL-STD-417.

4.3.2 Level B. -The propellant shall be packed as specified in 4.3.1 or in fiber drums as described in 4.3.2.1. Fiber drums are approved for truck or trailer on flat car (TOFC) shipment only and for storage not exceeding two years.

4.3.2.1 Fiber drums. -Fiber drums shall comply with DOT Specification 21C, 250 pounds, MINIMUM, Code of Federal Regulations, Title 49, Parts 100-199, and the following additional requirements. Size shall be 15 1/2 + 1/2 inches in diameter by 26 + 1 inches in height, inside dimensions. The drum shall have a 24 gauge steel cover with rubber gasket, lever locking band with provision for sealing wire and wide bottom chime (2 inch minimum formed height). All metal parts shall be hot-dipped galvanized. Top and bottom chime shall be 24 gauge steel and shall be welded. The body shall be wound with a hot melt or thermoplastic adhesive. The bottom shall be a waterproof laminated fiberboard. Body and bottom disc shall also have a laminated aluminum foil barrier. The bottom crimp shall be caulked. The finished drum with closure assembled shall be moistureproof and leak tight. The fiber drums may be reused if the drums comply with the inspection requirements of 4.4.1.3.

4.3.2.2 Alternative fiber drum. -Alternatively, fiber drums shall be constructed as specified in 4.3.2.1 except that a layer of aluminum foil 0.010 thick shall be laminated to the inside of the body and the aluminum foil between the layers of Kraft paper in the body shall not be required.

4.3.2.3 Marking. -Drums shall be marked on the sidewall only with the same information as required for the side of the box by Dwg. 8858848. Alternatively, marking may be placed on a commercial water resistant label, securely and completely adhered to the side wall. The label stock shall

MIL-STD-652D (AR)
4 August 1978

be white, tan or kraft color. All marking shall be with black ink using letters approximately one half inch high.

4.3.3 Palletization. -Level A shipments shall be palletized when specified by the procuring activity. Palletization is not required for Level B shipments.

4.3.4 Calibration. -The amount of propellant selected for use as Master Calibration Lot or Reference Calibration Lot in accordance with TECOM Regulation 702-1 shall be packed in Level A containers, (see 4.3.1).

4.3.5 Solvent type, double base propellants (M2, M5, M9, M10, M26, and M26E1) Solvent type double base propellants shall only be packed in Level A containers, (see 4.3.1).

4.4 Sampling for testing

4.4.1 Sampling plans and procedures for the following classifications of defects shall be in accordance with Standard MIL-STD-105. Standard MIL-STD-1235 may be used if approved by the procuring activity. Also, at the option of the procuring activity, AQL's and sampling plans may be applied to the individual characteristics listed using an AQL of 0.40 percent for each major defect and an AQL of 0.65 percent for each minor defect.

4.4.1.1 Container prior to filling (as applicable) (see drawings 76-4-46, 76-4-53, 76-4-56, 138439, 7549033, and 9256486.

Categories	Defects	Method of Inspection
Critical: None defined.		
Major:	AOL 0.40 percent	
101.	Foreign material, propellant or corrosion.....	Visual
102.	Gasket missing or damaged.....	Visual
103.	Holes in cover or end.....	Visual
104.	Locking device damaged.....	Visual
105.	Bare areas on exterior coating of metal container, the sum of which is in excess of 1/2 square inch.....	Visual
Minor:	AOL 1.50 percent	
201.	Protective finish incomplete.....	Visual
202.	Wood split terminating at edge of board.....	Visual

MIL-STD-652D (AR)
4 August 1978

- 203. Board broken or piece missing...Visual
- 204. Loose boards.....Visual
- 205. Nails or staples protruding or
loose.....Visual
- 206. Split boards insufficiently
nailed.....Visual
- 207. Wood rot.....Visual
- 208. Large dents or damaged seam.....Visual

4.4.1.2 Fiber drums before filling

Categories	Defect	Method of Inspection
------------	--------	-------------------------

Critical: None defined.

- Major: AOL 0.40 percent
- 101. Foreign materialVisual
 - 102. Gasket missing or damaged.....Visual
 - 103. Holes in cover or endVisual
 - 104. Locking device damagedVisual

- Minor: AOL 0.65 percent
- 201. Poor workmanship, such as:
nicks, dents, body bulged or
scratches.....Visual

4.4.1.3 Applicable to reusable fiber drums before filling

Categories	Defect	Method of Inspection
------------	--------	-------------------------

Critical: None defined

- Major: 100% Inspection
- 101. Top chime bent, deformed
or cut.....Visual
 - 102. Bottom chimes collapsed (annular
grove closed or partially
closed) or deformed.....Visual
 - 103. Body bulged, cut or dented.....Visual
 - 104. Gasket in cover missing or
damaged.....Visual
 - 105. Cover bent, creased or deformed
in gasket area or around edge...Visual
 - 106. Locking ring damaged so as
to prevent closing.....Visual

MIL-STD-652D (AR)
4 August 1978

- Minor: AOL 1.50 percent
- 201. Outer body surface seriously scuffed or metal scratched through galvanized surface.....Visual
 - 202. Nicks or dents in chimes or cover not affecting function....Visual
 - 203. Locking rings bent or deformed..Visual

4.4.1.4 Sealed container (as applicable) (see drawings 7549033, 138439, 76-4-46, 76-4-53, 76-4-56 and 9256486)

Categories	Defect	Method of Inspection
------------	--------	----------------------

Critical: None defined

- Major: AOL 0.65 percent
- 101. Holes in container.....Visual
 - 102. Damaged seams.....Visual
 - 103. Damaged locking devices.....Visual
 - 104. Gasket missing or incomplete...Visual

- Minor: AOL 1.50 percent
- 201. Metallic seal missing, unsealed or improperly positioned.....Visual
 - 202. Hardware improperly engaged....Visual
 - 203. Marking misleading or unidentifiable.....Visual
 - 204. Excess dents.....Visual

4.4.1.5 Sealed fiber drums

Categories	Defect	Method of Inspection
------------	--------	----------------------

- Major: AOL 1.00 percent
- 101. Locking device damaged or improperly closed.....Visual
 - 102. Holes or breaks in cover or body.....Visual
 - 103. Damage to coating or cover....Visual

- Minor: AOL 1.00 percent
- 201. Marking misleading or unidentifiable.....Visual
 - 202. Exterior torn or delaminated...Visual

4.4.2 Sampling for chemical and physical testing. Ten (10) containers shall be selected at random from each lot of propellant (or lesser quantity as determined for actual

MIL-STD-652D (AR)
4 August 1978

need). One and one half (1 1/2) pounds of propellant shall be removed from each container and mixed to form a composite sample of 15 pounds. Five (5) pounds of the sample shall be forwarded to Commander ARRADCOM, ATTN: DRDAR-LCE-MP, Dover, New Jersey 07801, for the 65.5 degree centigrade (°C) surveillance test. The remained ten pounds shall be used for the chemical and physical test. All samples shall be packed in air tight containers and shall be marked to show the propellant designation, lot number, manufacturer, date of sampling, contract number, and number of pounds in the lot. If the sample fails to comply with the requirements the lot shall be rejected.

4.4.3 Sampling for Ballistic Testing. Ten (10) containers (or as required by item specification) shall be selected for ballistic testing at each temperature specified in the applicable item specification. The total sample size at each temperature shall consist of the weight in pounds specified on the applicable assembly drawing multiplied times the sample size (10) times the factor 1.3. The samples shall be selected from individual containers, packaged separately and shipped to the Proving Ground, if specified by the basic propellant specification. Duplicate sampling of containers shall be accomplished if necessary to prepare the required number of samples.

5. TESTING and PROCEDURES

5.1 The chemical and physical properties shall be determined as specified in Table II and conform to the requirements specified in Table III.

5.2 The composition shall be calculated on total volatiles and added ingredient free basis when required.

Methods from MIL-STD-236 for the chemical and physical properties of the propellant.

TABLE II

Properties	Methods Either/or
Nitrocellulose	209.2
	209.3
	209.6
	209.7
Nitroglycerin(1)	208.1
	208.3
	208.4
	208.5

MIL-STD-652D (AR)
4 August 1978

Nitroguanidine (2)	213.1
	213.2
Ethyl Centralite	202.2
	208.3
	208.4
	208.5
Barium Nitrate	304.1
	316.1
Potassium Nitrate	310.4
	316.1
Potassium Sulfate	310.4
	316.1
Diphenylamine	201.1
	201.4
	208.4
	208.5
	217.3
	226.2
Dinitrotoluene	205.1
	205.2
	205.3
	208.4
	208.5
	226.2
Dibutylphthalate	204.1
	204.2
	208.3
	208.4
	208.5
	222.1
	226.2
Diethylphthalate	204.2
	208.3
	208.4
	208.5
	222.1
	226.2
2-Nitrodiphenylamine	208.4
	208.5
	218.1
	218.4
	226.2

MIL-STD-652D (AR)
4 August 1978

Graphite Content (Glaze)	308.1
Cryolite	307.1 316.1
Surveillance Test	407.1
Candelilla Wax	228.1
Dimensions of Grains	504.1 504.5
Residual or Volatile Solvent	103.4 103.5
Total Volatiles	103.1 103.3 103.5
Moisture (3)	102.1 103.1 103.5
Hygroscopicity	503.2
Compressibility	505.1
Lead Carbonate	311.1 311.5 316.1

(1) Except that pentane methylene chloride azeotrope (Two volumes of technical grade pentane to one volume of methylene chloride) shall be used as the solvent for extraction of triple base propellant.

(2) Except that pentane methylene chloride azeotrope shall be used as the solvent for extraction.

(3) Method 103.1 is used for M8 Sheet propellant.

5.3 Heat tests shall be conducted in accordance with Method 404.1, Standard MIL-STD-286. For single base propellants, the test shall be conducted at 134.5 degrees Centigrade. For M1, M6 and M14, the color of the methyl violet test paper shall not change to a salmon pink color in less than 40 minutes and shall not explode in less than 5 hours. For M10, the color of the methyl violet test paper shall not change to salmon pink color in less than 60 minutes and shall not explode in less than 5 hours. For double or triple base

MIL-STD-652D (AR)
4 August 1978

propellants, the test shall be conducted at 120 degrees Centigrade. The propellant shall not change the color of the methyl violet test paper to a salmon pink color in less than 40 minutes.

Custodian:
ARMY-AR

Preparing Activity:
ARMY-AR

Project Number:
1376-A132

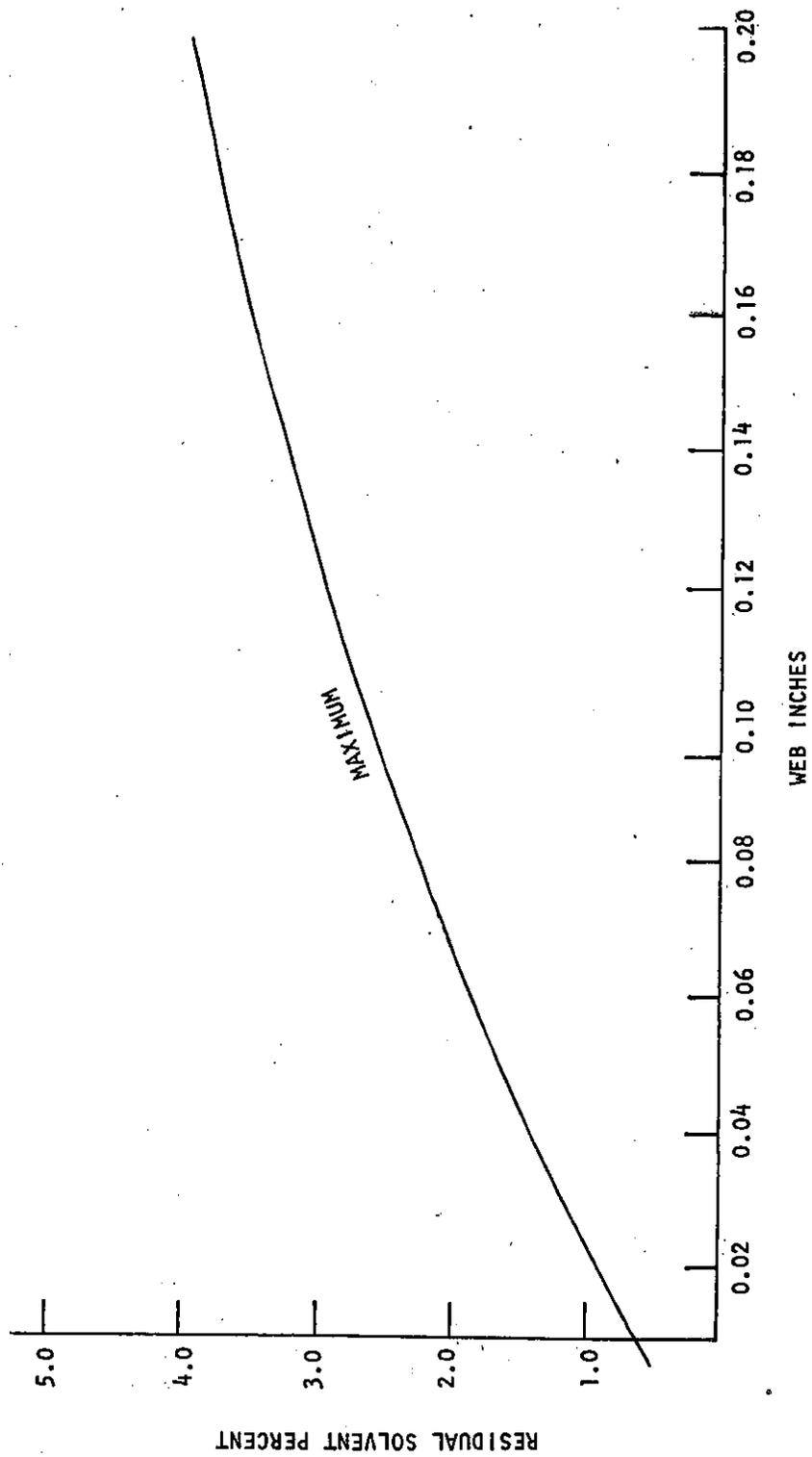


FIGURE 1 - CURVE FOR RESIDUAL SOLVENT IN CANNON PROPELLANT POWDER, M1 AND M6 - VOLATILE SOLVENT = TOTAL VOLATILES - TOTAL MOISTURE

MIL-STD-652D (AR)
4 August 1978

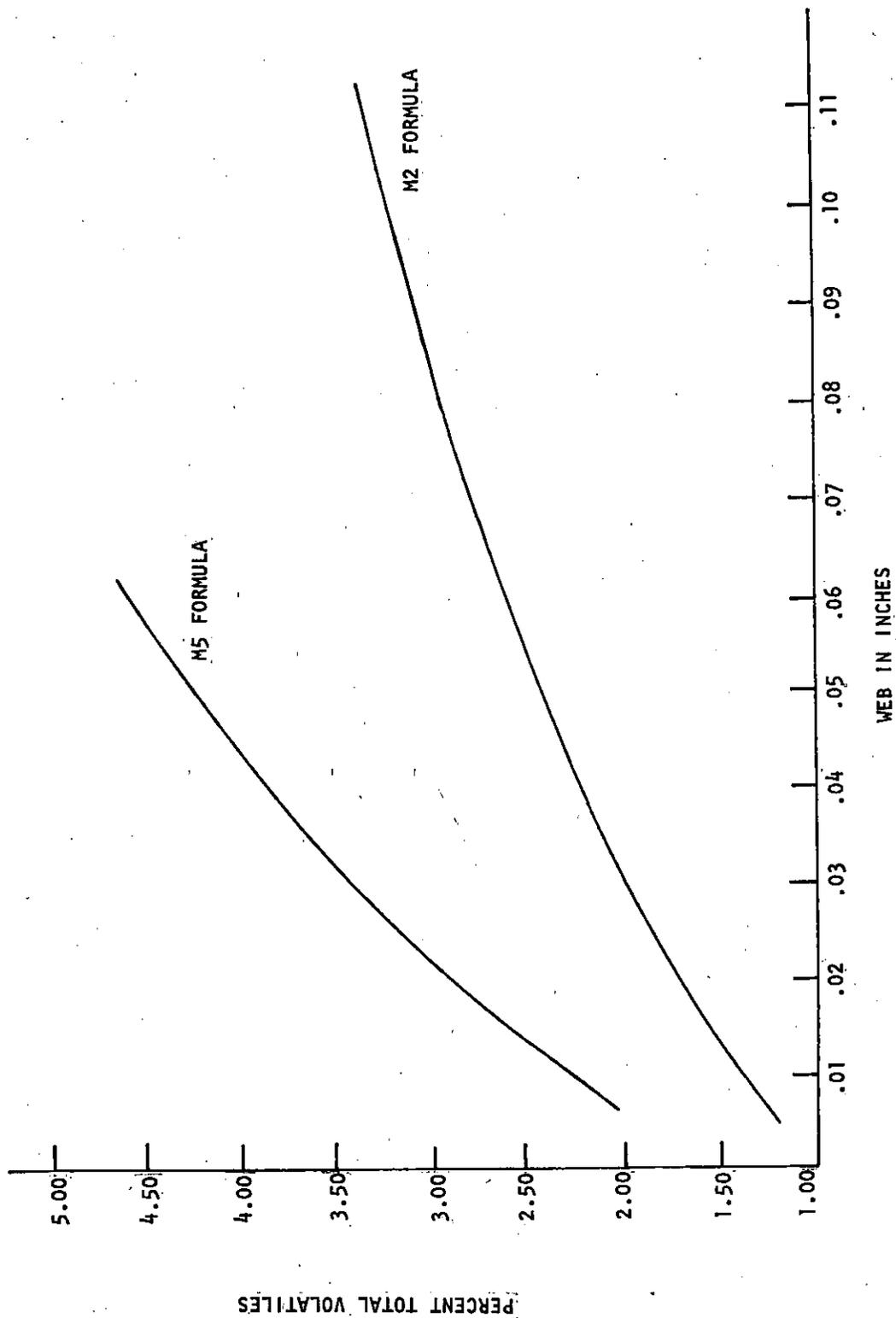


FIGURE 2 - CURVES FOR TOTAL VOLATILES IN M2 AND M5 SMOKELESS CANNON POWDER

TABLE III

MIL-STD-652D (AR)
4 August 1978

PROPELLANT COMPOSITIONS AND CHEMICAL PROPERTIES

PROPELLANT	PERCENT						
	M1	M2	M5	M6	M8	M8E1 ¹	
Nitrocellulose	85.00 ± 2.00	77.45 ± 2.00	81.95 ± 2.00	87.00 ± 2.00	52.15 ± 1.50	52.15 ± 1.50	
Type Grade	I C	II C	II C	I C	II C	II C	
Nitroglycerin	---	19.50 ± 1.00	15.00 ± 1.00	---	43.00 ± 1.50	43.00 ± 1.50	
Nitroguanidine	---	---	---	---	---	---	
Ethyl Centralite	---	0.60 ± 0.15	0.60 ± 0.15	---	0.60 ± 0.15	0.60 ± 0.15	
Barium Nitrate	---	1.40 ± 0.25	1.40 ± 0.25	---	---	---	
Potassium Nitrate	---	0.75 ± 0.25	0.75 ± 0.25	---	1.25 ± 0.25	1.25 ± 0.25	
Potassium Sulfate	**1.00 ± 0.30	---	---	*1.00 ± 0.30	---	---	
Lead Carbonate	**1.00 ± 0.20	---	---	---	---	---	
Diphenylamine	*1.00 ± 0.20 - 0.10	---	---	*1.00 ± 0.20 - 0.10	---	---	
Dinitrotoluene	10.00 ± 2.00	---	---	10.00 ± 2.00	---	---	

* ADDED BASIS ** WHEN SPECIFIED, ADDED BASIS

TABLE III (CONTINUED)
PROPELLANT COMPOSITIONS AND CHEMICAL PROPERTIES

MIL-STD-652D (AR)
4 August 1978

PROPELLANT	M1	M2	M5	M6	M8	M8E1 ¹
Dibutylphthalate	5.00 ± 1.00	---	---	3.00 ± 1.00	---	---
Diethylphthalate	---	---	---	---	3.00 ± 0.50	3.00 ± 0.50
2-Nitrodiphenylamine	---	---	---	---	---	---
Graphite	---	0.30 ± 0.10	0.30 ± 0.10	---	---	---
Cryolite	---	---	---	---	---	---
Total Volatiles, Maximum (Max)	FIGURE 1	FIGURE 2	FIGURE 2	FIGURE 1	---	---
Moisture	0.6 ± 0.2	0.70 Max	0.70 Max.	0.6 ± 0.2	0.40 Max	0.40 Max
Compressibility, Minimum (Min)	30	---	---	30	---	---
Graphite, Glaze*	---	**0.15 Max	**0.15 Max	---	---	---
Candelilla Wax (Added Basis)	---	---	---	---	---	0.2 Nominal

1) For information only

NOTE: The compressibility requirement does not apply to Type II Grain of M1 Propellant

MIL-STD-652D (AR)
4 August 1978TABLE III (CONTINUED)
PROPELLANT COMPOSITIONS AND CHEMICAL PROPERTIES

PROPELLANT	M9	M10	M14 ¹	M15 ¹	M17 ¹
Nitrocellulose	57.75 ± 1.50	98.00 ± 1.50	90.00 ± 2.00	20.00 ± 1.30	22.00 ± 1.30
Type	II	I	I	I	I
Grade	C	C	C	C	C
Nitroglycerin	40.00 ± 1.50	---	---	19.00 ± 1.00	21.50 ± 1.00
Nitroguanidine	---	---	---	54.70 ± 1.00	54.70 ± 1.00
Ethyl Centralite	0.75 ± 0.10	---	---	6.00 ± 0.30	1.50 ± 0.10
Barium Nitrate	---	---	---	---	---
Potassium Nitrate	1.50 ± 0.50	---	---	---	---
Potassium Sulfate	---	1.00 ± 0.30	---	---	---
Diphenylamine	---	1.00 ± 0.30	*1.00 ± 0.10	---	---
Dinitrotoluene	---	---	8.00 ± 2.00	---	---
Dibutylphthalate	---	---	2.00 ± 1.00	---	---
Diethylphthalate	---	---	---	---	---

MIL-STD-652D (AR)
4 August 1978

TABLE III (CONTINUED)
PROPELLANT COMPOSITIONS AND CHEMICAL PROPERTIES

PROPELLANT	M9	M10	M14 ¹	M15 ¹	M17 ¹
2-Nitrodiphenylamine	---	---	---	---	---
Graphite	---	---	---	---	---
Cryolite	---	---	---	0.30 ± 0.10	0.30 ± 0.10
Total Volatiles, max.	---	Type I - 3.20 Type II - 2.30	---	---	---
	0.50		1.25	0.30	0.30
Moisture	---	0.50 to 1.20 ²	0.60 ± 0.20	---	---
Graphite, Glaze, max. (When Applicable)*	0.40	---	---	---	0.15
Carbon Black, Max. (When Applicable)*	---	0.10	---	---	---

1) For Information Only
2) Moisture content of M10 (Form A) propellants to be as specified in item specification.
* Added

TABLE III (CONTINUED)
PROPELLANT COMPOSITIONS AND CHEMICAL PROPERTIES

MIL-STD-652D (AR)
4 August 1978

PROPELLANT	M26	M26A1	M30	M30A1	M30A2	M31	M31E1
Nitrocellulose	67.25 + 1.80	68.70 + 1.80	28.00 + 1.30	28.00 + 1.30	27.00 + 1.30	20.00 + 1.30	20.00 + 1.30
Type	I	I	I	I	I	I	I
Grade	C	C	A	A	A	A	A
Nitroglycerin	25.00 + 1.00	25.00 + 1.00	22.50 + 1.00	22.50 + 1.00	22.50 + 1.00	19.00 + 1.00	19.00 + 1.00
Nitroguanidine	---	---	47.70 + 1.00	47.00 + 1.00	46.25 + 1.00	54.70 + 1.00	54.00 + 1.00
N-Ethyl Centralite	6.00 + 0.50	6.00 + 0.50	1.50 + 0.10	1.50 + 0.10	1.50 + 0.10	---	---
Barium Nitrate	0.75 + 0.20	---	---	---	---	---	---
Potassium Nitrate	0.70 + 0.25	---	---	---	2.75 + 0.25	---	---
Potassium Sulfate	---	---	---	1.00 + 0.30	---	---	1.00 + 0.30
Diphenylamine	---	---	---	---	---	---	---
Dinitrotoluene	---	---	---	---	---	---	---
Dibutylphthalate	---	---	---	---	---	4.50 + 0.30	4.50 + 0.30

TABLE III (CONTINUED)
PROPELLANT COMPOSITIONS AND CHEMICAL PROPERTIES

MIL-STD-652D (AR)
4 August 1978

PROPELLANT	M26	M26A1	M30	M30A1	M30A2	M31	M31E1
Diethylphthalate	---	---	---	---	---	---	---
2- Nitrodiphenylamine	---	---	---	---	---	1.50 + 0.30	1.50 + 0.30
Graphite	0.30 + 0.10	0.30 + 0.10	---	---	---	---	---
Cryolite	---	---	0.30 + 0.10	---	---	0.30 + 0.10	---
Total Volatiles, Max.	Type I - 2.00 Type II - 1.50	Type I - 2.00 Type II - 1.50	0.50	0.50	0.50	0.30	0.30
Moisture, Max.	0.70	0.50	---	---	---	---	---
Graphite, Glaze, Max.	0.15	0.15	0.2	0.15	0.15	0.15	0.15

21

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS: This form is provided to solicit beneficial comments which may improve this document and enhance its use. DoD contractors, government activities, manufacturers, vendors, or other prospective users of the document are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity. A response will be provided to the submitter, when name and address is provided, within 30 days indicating that the 1426 was received and when any appropriate action on it will be completed.

NOTE: This form shall not be used to submit requests for waivers, deviations or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

DOCUMENT IDENTIFIER (Number) AND TITLE

PROPELLANTS SOLID FOR CANNONS REQUIREMENTS AND PACKING MIL-STD-652D

NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER

VENDOR USER MANUFACTURER

1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? IS ANY PART OF IT TOO RIGID, RESTRICTIVE, LOOSE OR AMBIGUOUS? PLEASE EXPLAIN BELOW.

A. GIVE PARAGRAPH NUMBER AND WORDING

B. RECOMMENDED WORDING CHANGE

C. REASON FOR RECOMMENDED CHANGE(S)

2. REMARKS

SUBMITTED BY (Printed or typed name and address — Optional)

TELEPHONE NO.

DATE

DD FORM 1426
1 OCT 76

EDITION OF 1 JAN 72 WILL BE USED UNTIL EXHAUSTED.

Appendix C: EXAMPLE CONTINUOUS MONITORING SYSTEMS PERFORMANCE EVALUATION TEST FORMS

CMS PET CHECKLIST
THERMOCOUPLE AND TEMPERATURE TRANSMITTER
TAG NUMBER _____

INSTALLATION CHECK		
TASK	DATE COMPLETED	COMMENTS
Check the physical mounting for signs of corrosion on mounting hardware, and ensure that mounting bolts are tight.		
Ensure that conduit, including flex, is connected properly and is in good condition.		
Verify that all thermocouple, transmitter, and control system connections are made properly, are clean, and are in good repair.		
Make sure that all electrical wiring conforms to appropriate plant and manufacturer recommended practices.		
OPERATIONAL CHECK		
TASK	DATE COMPLETED	COMMENTS
Review the transmitter display for error indications and conduct repairs or maintenance as needed.		
CALIBRATION CHECK		
TASK	DATE COMPLETED	COMMENTS
Replace the thermocouple if necessary.		
Verify manufacturer's calibration of transmitter.		

*Note: Installation and operational checks should be conducted prior to instrument calibration.

ADDITIONAL CALIBRATION SHEETS ATTACHED?

YES: _____

NO: _____

COMPLETED BY: _____

CMS PET CHECKLIST
DIFFERENTIAL PRESSURE TRANSMITTER
TAG NUMBER _____

INSTALLATION CHECK		
TASK	DATE COMPLETED	COMMENTS
Inspect the transmitter, making sure that is clean and undamaged and that no process leaks are evident.		
Check the physical mounting, orientation, and operating environment of the transmitter and make sure that they conform to appropriate manufacturer specifications.		
Check the transmitter's terminal housing, confirming that it contains no moisture and shows no evidence of corrosion.		
Verify that all transmitter and control system connections are made properly, are clean, and are in good repair.		
Make sure that all electrical wiring conforms to appropriate plant and manufacturer recommended practices.		
OPERATIONAL CHECK		
TASK	DATE COMPLETED	COMMENTS
Review the transmitter display for error indications and conduct repairs or maintenance as needed.		
CALIBRATION CHECK		
TASK	DATE COMPLETED	COMMENTS
Verify manufacturer's calibration of transmitter.		

*Note: Installation and operational checks should be conducted prior to instrument calibration.

ADDITIONAL CALIBRATION SHEETS ATTACHED?

YES: _____

NO: _____

COMPLETED BY: _____

CMS PET CHECKLIST
STACK GAS FLOW RATE – DIFFERENTIAL PRESSURE TRANSMITTER
TAG NUMBER _____

INSTALLATION CHECK		
TASK	DATE COMPLETED	COMMENTS
Inspect the transmitter, making sure that is clean and undamaged and that no process leaks are evident.		
Check the physical mounting, orientation, and operating environment of the transmitter and make sure that they conform to appropriate manufacturer specifications.		
Check the transmitter's terminal housing, confirming that it contains no moisture and shows no evidence of corrosion.		
Verify that all transmitter and control system connections are made properly, are clean, and are in good repair.		
Make sure that all electrical wiring conforms to appropriate plant and manufacturer recommended practices.		
OPERATIONAL CHECK		
TASK	DATE COMPLETED	COMMENTS
Review the transmitter display for error indications and conduct repairs or maintenance as needed.		
CALIBRATION CHECK		
TASK	DATE COMPLETED	COMMENTS
Verify manufacturer's calibration of transmitter.		

*Note: Installation and operational checks should be conducted prior to instrument calibration.

ADDITIONAL CALIBRATION SHEETS ATTACHED?

YES: _____

NO: _____

COMPLETED BY: _____

CMS PET CHECKLIST
STACK GAS CARBON MONOXIDE CONCENTRATION – NON-DISPERSIVE INFRARED ANALYZER
TAG NUMBER _____

INSTALLATION CHECK		
TASK	DATE COMPLETED	COMMENTS
Examine the physical mounting and operating environment of the CEMS and confirm that it is consistent with appropriate manufacturer specifications.		
Ensure that all filters are clean and free from residue buildup.		
Perform a leak test on the sample and purge lines following plant or manufacturer recommended procedures.		
Confirm that the calibration gases are properly connected to the unit, the supply lines are pressurized, and regulators are set to the proper pressure.		
Make sure that the flow rate of sample gas to the analyzer is within the range recommended by the manufacturer.		
Make sure that all electrical wiring conforms to plant or manufacturer recommended practices.		
OPERATIONAL CHECK		
TASK	DATE COMPLETED	COMMENTS
Conduct a relative accuracy test audit.		
Conduct a seven-day calibration drift test.		
Conduct a response time test.		
CALIBRATION CHECK		
TASK	DATE COMPLETED	COMMENTS
Purge the analyzer with calibration gas. Adjust the analyzer as necessary until readings are within an acceptable difference of the calibration gas value. Analyzer should be calibrated at the zero, low, and high span levels.		

*Note: Installation and operational checks should be conducted prior to instrument calibration.

ADDITIONAL CALIBRATION SHEETS ATTACHED?

YES: _____

NO: _____

COMPLETED BY: _____

CMS PET CHECKLIST
STACK GAS OXIDES OF NITROGEN CONCENTRATION – CHEMILUMINESCENCE ANALYZER
TAG NUMBER _____

INSTALLATION CHECK		
TASK	DATE COMPLETED	COMMENTS
Examine the physical mounting and operating environment of the CEMS and confirm that it is consistent with appropriate manufacturer specifications.		
Ensure that all filters are clean and free from residue buildup.		
Perform a leak test on the sample and purge lines following plant or manufacturer recommended procedures.		
Confirm that the calibration gases are properly connected to the unit, the supply lines are pressurized, and regulators are set to the proper pressure.		
Make sure that the flow rate of sample gas to the analyzer is within the range recommended by the manufacturer.		
Make sure that all electrical wiring conforms to plant or manufacturer recommended practices.		
OPERATIONAL CHECK		
TASK	DATE COMPLETED	COMMENTS
Conduct a relative accuracy test audit.		
Conduct a seven-day calibration drift test.		
CALIBRATION CHECK		
TASK	DATE COMPLETED	COMMENTS
Purge the analyzer with calibration gas. Adjust the analyzer as necessary until readings are within an acceptable difference of the calibration gas value. Analyzer should be calibrated at the zero and high span levels.		

*Note: Installation and operational checks should be conducted prior to instrument calibration.

ADDITIONAL CALIBRATION SHEETS ATTACHED?

YES: _____

NO: _____

COMPLETED BY: _____

CMS PET CHECKLIST
STACK GAS TOTAL HYDROCARBONS CONCENTRATION – FLAME IONIZATION DETECTOR ANALYZER
TAG NUMBER _____

INSTALLATION CHECK		
TASK	DATE COMPLETED	COMMENTS
Examine the physical mounting and operating environment of the CEMS and confirm that it is consistent with appropriate manufacturer specifications.		
Ensure that all filters are clean and free from residue buildup.		
Perform a leak test on the sample and purge lines following plant or manufacturer recommended procedures.		
Confirm that the calibration gases are properly connected to the unit, the supply lines are pressurized, and regulators are set to the proper pressure.		
Make sure that the flow rate of sample gas to the analyzer is within the range recommended by the manufacturer.		
Make sure that all electrical wiring conforms to plant or manufacturer recommended practices.		
OPERATIONAL CHECK		
TASK	DATE COMPLETED	COMMENTS
Conduct a seven-day calibration drift test.		
Conduct a response time test.		
CALIBRATION CHECK		
TASK	DATE COMPLETED	COMMENTS
Purge the analyzer with calibration gas. Adjust the analyzer as necessary until readings are within an acceptable difference of the calibration gas value. Analyzer should be calibrated at the zero and high span levels.		

*Note: Installation and operational checks should be conducted prior to instrument calibration.

ADDITIONAL CALIBRATION SHEETS ATTACHED?

YES: _____

NO: _____

COMPLETED BY: _____

CMS PET CHECKLIST
STACK GAS OXYGEN CONCENTRATION – PARAMAGNETIC ANALYZER
TAG NUMBER _____

INSTALLATION CHECK		
TASK	DATE COMPLETED	COMMENTS
Examine the physical mounting and operating environment of the CEMS and confirm that it is consistent with appropriate manufacturer specifications.		
Ensure that all filters are clean and free from residue buildup.		
Perform a leak test on the sample and purge lines following plant or manufacturer recommended procedures.		
Confirm that the calibration gases are properly connected to the unit, the supply lines are pressurized, and regulators are set to the proper pressure.		
Make sure that the flow rate of sample gas to the analyzer is within the range recommended by the manufacturer.		
Make sure that all electrical wiring conforms to plant or manufacturer recommended practices.		
OPERATIONAL CHECK		
TASK	DATE COMPLETED	COMMENTS
Conduct a relative accuracy test audit.		
Conduct a seven-day calibration drift test.		
Conduct a response time test.		
CALIBRATION CHECK		
TASK	DATE COMPLETED	COMMENTS
Purge the analyzer with calibration gas. Adjust the analyzer as necessary until readings are within an acceptable difference of the calibration gas value. Analyzer should be calibrated at the zero and span levels.		

*Note: Installation and operational checks should be conducted prior to instrument calibration.

ADDITIONAL CALIBRATION SHEETS ATTACHED?

YES: _____

NO: _____

COMPLETED BY: _____