
USACE / NAVFAC / AFCEA / NASA UFGS-02 53 13 (May 2010)

Preparing Activity: USACE Superseding
UFGS-02 53 13 (April 2006)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2013

SECTION TABLE OF CONTENTS

DIVISION 02 - EXISTING CONDITIONS

SECTION 02 53 13

REMEDIATION OF CONTAMINATED SOILS AND SLUDGES BY INCINERATION

05/10

PART 1 GENERAL

- 1.1 MEASUREMENT AND PAYMENT
 - 1.1.1 Metering
 - 1.1.2 Utilities
- 1.2 REFERENCES
- 1.3 SYSTEM DESCRIPTION
 - 1.3.1 Design Requirements
 - 1.3.2 Performance Requirements
 - 1.3.3 Site Specific Treatability Studies
 - 1.3.4 Auxiliary Fuel System
 - 1.3.4.1 Capacity
 - 1.3.4.2 Feed Capability
 - 1.3.4.3 Secondary Containment
- 1.4 SEQUENCING AND SCHEDULING
 - 1.4.1 Mobilization
 - 1.4.2 Startup Operations
 - 1.4.3 Trial Burn and Interim Operations
 - 1.4.4 Production Operations
 - 1.4.5 Demobilization
- 1.5 OTHER SUBMITTALS REQUIREMENTS
- 1.6 SUBMITTALS
- 1.7 QUALITY ASSURANCE
 - 1.7.1 Emission Criteria
 - 1.7.2 Slagging Control
 - 1.7.3 Air Supply and Pollution Control systems
 - 1.7.3.1 Combustion Air
 - 1.7.3.2 Induced Draft Fan
 - 1.7.3.3 Fugitive Emissions Control
 - 1.7.3.4 Quench
 - 1.7.3.5 Stack Emissions Control
 - 1.7.3.6 Water and Liquid Waste
 - 1.7.4 Process Residuals
 - 1.7.4.1 Liquid Wastes
 - 1.7.4.2 Solids
- 1.8 ENVIRONMENTAL REQUIREMENTS

- 1.8.1 Existing Conditions
- 1.8.2 Erection

PART 2 PRODUCTS

- 2.1 MATERIALS AND EQUIPMENT
 - 2.1.1 Source of Material
 - 2.1.2 Equipment
 - 2.1.3 Instrumentation and Controls
 - 2.1.4 Control Room
 - 2.1.5 Redundancies and Safety Procedures
 - 2.1.6 Data
 - 2.1.6.1 Copies
 - 2.1.6.2 Software Packages
 - 2.1.7 Instrumentation, Sensors, Recorders, and Sampling
 - 2.1.7.1 Instrumentation
 - 2.1.7.2 Stack Emissions Monitoring
 - 2.1.7.3 Stack Sampling
- 2.2 ALARM EQUIPMENT
 - 2.2.1 Interlocks and Alarms
 - 2.2.1.1 Interlocks
 - 2.2.1.2 Visible Alarms
 - 2.2.1.3 Audible Alarms
 - 2.2.1.4 Remote Alarms
- 2.3 CONTAMINATED MATERIAL FEED SYSTEM
 - 2.3.1 Support Equipment
 - 2.3.2 Capacity
 - 2.3.3 Metering
 - 2.3.4 Conveyors
- 2.4 TREATED MATERIAL AND ASH SYSTEMS
 - 2.4.1 Capacity
 - 2.4.2 Segregation of Materials
 - 2.4.3 Rehydration

PART 3 EXECUTION

- 3.1 LAYOUT
 - 3.1.1 Excavation and Stockpiling
 - 3.1.2 Fuel System
- 3.2 INSTALLATION/ERECTION/REMOVAL
- 3.3 SAMPLING, MONITORING AND INSPECTIONS
 - 3.3.1 Additional Sampling
 - 3.3.2 Minimum Sampling Frequency
 - 3.3.2.1 Contaminated Material
 - 3.3.2.2 Treated Material
 - 3.3.2.3 Fly Ash
 - 3.3.3 Contaminated Material Sampling
 - 3.3.4 Treated Material and Fly Ash Sampling
 - 3.3.5 Stack Sampling
 - 3.3.6 Monitoring
 - 3.3.7 Visual Inspections
 - 3.3.8 Interlocks, Automatic Cut-Offs and Alarms
- 3.4 DATA
- 3.5 STARTUP OPERATIONS
- 3.6 UNCONTAMINATED MATERIAL OPERATION
 - 3.6.1 Material Handling Demonstration
 - 3.6.2 Instrumentation Calibration
 - 3.6.3 Control Interlock Demonstration
 - 3.6.4 Hot Check

- 3.6.5 24-Hour Continuous Operation
- 3.7 CONTAMINATED MATERIAL OPERATION
 - 3.7.1 Shakedown
 - 3.7.2 72 Consecutive Hours of Operation
 - 3.7.3 Reporting
- 3.8 MINI-BURN
 - 3.8.1 Operating Conditions
 - 3.8.2 Reporting
- 3.9 PRETRIAL BURN
 - 3.9.1 Pretrial Burn Results
 - 3.9.2 Pretrial Burn Operations
 - 3.9.3 Initial Trial Burn Attempt
 - 3.9.4 Time Extension
- 3.10 TRIAL BURN
 - 3.10.1 Schedule
 - 3.10.2 Operating Conditions
 - 3.10.3 Trial Burn Report
 - 3.10.3.1 Quantitative Analysis of the Materials
 - 3.10.3.2 Quantitative Analysis of the Stack Gases
 - 3.10.3.3 Material and Energy Balances
 - 3.10.3.4 Fugitive Emissions
 - 3.10.3.5 Continuous Measurement and Recording
 - 3.10.3.6 Other Requirements
- 3.11 TRIAL BURN APPROVAL
 - 3.11.1 Failure
 - 3.11.2 Second and Third Trial Burns
 - 3.11.3 Successful Trial Burns
 - 3.11.4 Default
 - 3.11.5 Multiple Incineration Units
- 3.12 INTERIM OPERATIONS
 - 3.12.1 Mass Feed Rate
 - 3.12.2 Primary Chamber
 - 3.12.3 Secondary Combustion Chamber
 - 3.12.4 Air Pollution Control System
 - 3.12.5 Sampling and Analysis
- 3.13 PRODUCTION OPERATIONS
 - 3.13.1 Schedule
 - 3.13.2 Requirements
 - 3.13.2.1 Startup and Shutdown
 - 3.13.2.2 Changes
 - 3.13.2.3 Performance
- 3.14 DEMOBILIZATION

ATTACHMENTS:

[_____]

-- End of Section Table of Contents --

USACE / NAVFAC / AFCEA / NASA UFGS-02 53 13 (May 2010)

Preparing Activity: USACE Superseding
UFGS-02 53 13 (April 2006)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2013

SECTION 02 53 13

REMEDIATION OF CONTAMINATED SOILS AND SLUDGES BY INCINERATION 05/10

NOTE: This guide specification covers the requirements for onsite incineration of non-radioactive materials contaminated by hazardous or toxic organic wastes.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

PART 1 GENERAL

NOTE: This performance specification does not specify the capacity of the incinerator. The Contractor determines the capacity of a transportable incineration system (TIS) required to meet the schedule. The Contractor should be allowed to use an existing, proven incinerator that has a permit for similar wastes.

Disposal of process residuals is not included in this section. Additional treatment of the treated material and/or the fly ash is frequently required to satisfy the toxicity characteristic leachate procedure (TCLP) for metals.

Management of project records is not included in this section. Refer to the appropriate section.

1.1 MEASUREMENT AND PAYMENT

NOTE: The unit price for incineration should be based on site surveys before and after excavation/removal for in-situ volume when soils are being treated. For liquids and sludges, the unit of measure should be weight or volume, depending on the characteristics of the material. Materials requiring retreatment shall be segregated from treated materials.

The amount of material to be treated shall be verified by in-place measurement.

1.1.1 Metering

NOTE: Payment should be based on surveyed in-situ volume because of the variation of moisture content of the soils or sludges. Include this paragraph when required for process control of the treatment system.

Provisions shall be made for weighing the daily production of treated material and fly ash with an accuracy of plus or minus 2 percent.

1.1.2 Utilities

NOTE: The utilities requirements for the incineration system should be identified in the Contractor's design. The following information could be used as a check: the amount required for a 12,000 - 18,000 kg (15 - 20 ton) per hour incinerator is 5 - 35 liters per second (75 - 600 gpm) of water, 1200 - 2500 kw of electricity and 30 - 60 cubic meters per minute (1000 - 2000 scfm) of natural gas. The Contractor should verify the adequacy of the existing utilities and be responsible for the required agreements with the utility companies for usage and any required changes.

Points of connection are normally shown on the drawings. Occasionally names, addresses, and telephone numbers of the utility companies are shown on the drawings. Delete the following paragraphs if the information is shown elsewhere.

Provide fuel and utilities at locations shown on the drawings. Verify availability and locations of utilities and compensate the utility company for connection and usage. Submit peak and average system requirements for

electricity, water, waste water disposal, natural gas and other fuels.

- a. Electricity: The power [utility] [company] is [____], phone number [____].
- b. Water: The water [utility] [company] is [____], phone number [____].
- c. Natural Gas: The natural gas [utility] [company] is [____], phone number [____].
- d. Sewer: The sewer [utility] [company] for disposal of [domestic waste only] [domestic waste and treated wastewater] is [____], phone number [____].

1.2 REFERENCES

NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E122 (2009; E 2011) Calculating Sample Size to Estimate, With a Specified Tolerable Error, the Average for Characteristic of a Lot or Process

ASTM E953/E953M (2008) Fusibility of Refuse-Derived Fuel (RDF) Ash

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 30 (2012; Errata 2011; Errata 2011) Flammable and Combustible Liquids Code

NFPA 31 (2011) Standard for the Installation of Oil-Burning Equipment

NFPA 54	(2012) National Fuel Gas Code
NFPA 58	(2011; TIA 10-1; Errata 10-1; TIA 11-2; TIA 11-3; Errata 11-2; Errata 12-3) Liquefied Petroleum Gas Code
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)	
NIST SP 250	(1991) Calibration Services Users Guide
U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)	
EPA 450/4-80/023R	(1985) Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations)
EPA 625/6-89/019	(1989) Handbook: Guidance on Setting Permit Conditions and Reporting Trial Burn Results: Volume II of the Hazardous Waste Incineration Guidance Series
EPA 625/6-89/021	(1989) Handbook Hazardous Waste Incineration Measurement Guidance Manual: Volume III of the Hazardous Waste Incineration Guidance Series
EPA 625/6-89/023	(1990) Handbook: Quality Assurance/Quality Control (QA/QC) Procedures For Hazardous Waste Incineration
U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)	
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
40 CFR 270	EPA Administered Permit Programs: The Hazardous Waste Permit Program
40 CFR 60	Standards of Performance for New Stationary Sources
40 CFR 61	National Emission Standards for Hazardous Air Pollutants
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions

1.3 SYSTEM DESCRIPTION

Provide and operate a transportable incineration system (TIS) to transfer organic compounds from contaminated materials to an air stream for destruction. The system shall consist of a process or series of processes

designed to remove organic contaminants from the contaminated materials by heating the soil or sludge matrix. The incineration system shall consist of a combination of the following: feed system, primary chamber, secondary combustion chamber, cyclones, scrubbers, precipitators, quench chamber, fabric filters, treated material removal system, fly ash removal system, and ancillary equipment. The primary heating chamber volatilizes and may initiate combustion of organic compounds. Oxidation of organic vapors to carbon dioxide and water shall be completed in the secondary combustion chamber, or afterburner, at the specified temperature, which is greater than the temperature of the primary chamber. Systems that do not destroy the organic contaminants are not acceptable.

1.3.1 Design Requirements

Design the incineration system in accordance with 40 CFR 264 Section .343. When CFR requirements conflict with those specified, the more stringent requirement shall apply unless otherwise approved. Proposed systems that differ from the specified system shall have well documented equivalent or better operational and performance capabilities. Modifications to the system required to treat the contaminated materials onsite shall be the Contractor's responsibility.

1.3.2 Performance Requirements

NOTE: List the contaminants that will be used to determine the effectiveness of the incineration process and the cleanup criteria applicable to each.

Maximum contaminant concentrations allowed in thermally treated materials shall be as follows:

ORGANIC CONTAMINANT	TREATMENT CRITERIA (mg/kg)
[_____]	[_____]

1.3.3 Site Specific Treatability Studies

NOTE: Coordinate list of applicable treatability studies. Treatability studies performed on the site materials should be documented in this paragraph or furnished as an attachment to this section of the specifications. Summarize the results in this paragraph. The treatability study should determine the ash fusion temperature of the feed materials in accordance with ASTM E953/E953M.

[_____].

1.3.4 Auxiliary Fuel System

NOTE: Contaminated soils and sludges normally will not support combustion without continuous

supplemental fuel. Most of the heat value is consumed in evaporation of the soil moisture. The treatability study should provide an indication of the fuel value of the contaminated material. The fuel value of the contaminated material with the lowest concentrations of organic contamination will be near zero.

1.3.4.1 Capacity

An auxiliary fuel system shall provide fuel capacity necessary to support uninterrupted operation of the system for the thermal destruction of organic contaminants.

1.3.4.2 Feed Capability

The auxiliary fuel system shall have direct feed capability to the thermal destruction system with meters, pressure gages and controls to maintain proper operating conditions.

1.3.4.3 Secondary Containment

Auxiliary fuel storage tanks shall be provided with secondary containment required by paragraph 2-3.4 Control of Spillage from Aboveground Tanks of NFPA 30.

1.4 SEQUENCING AND SCHEDULING

NOTE: Verify that objectives have been identified in PART 3.

Documentation of accomplishment of the objectives of each phase of operation shall be done prior to approval to begin the next phase of operation. Submit incineration system schedule including dates and durations for system mobilization, start-up, trial burn, interim operation, production burn, and demobilization prior to beginning site activities.

1.4.1 Mobilization

Permits and permit equivalents shall be obtained prior to mobilization. Mobilization shall include transportation of the equipment to the site, equipment erection and installation, but not operation. Submit a Mobilization Plan with specific procedures and requirements for onsite placement of the incineration system and its subsystems.

1.4.2 Startup Operations

Startup operations shall be in accordance with the approved Startup Plan and shall include the material handling demonstration, instrumentation calibration, hot check, continuous 24 hour operation, control interlock demonstration, uncontaminated material operation, shakedown, and mini-burn.

1.4.3 Trial Burn and Interim Operations

NOTE: If EPA will not allow interim operations, add

a statement to that effect.

[Pretrial and trial burns] [Trial burns] shall be in accordance with 40 CFR 264, Subpart O and [40 CFR 270 Section .62] [40 CFR 761 Section .70], incorporating the requirements of EPA 625/6-89/023, EPA 625/6-89/021 and EPA 625/6-89/019, as applicable.

1.4.4 Production Operations

Submit specific detailed procedures, based on the trial burn results, for continued operation of the system; include adjustments for variation in the contaminated material feed. Operation, after approval of the trial burn shall comply with the specified requirements as well as the conditions of the permit to incinerate.

1.4.5 Demobilization

Demobilization shall be in accordance with 40 CFR 264, Section .351. Demobilization shall be considered complete when the incinerator and related equipment have been removed from the site and the site has been restored in accordance with the contract requirements.

1.5 OTHER SUBMITTALS REQUIREMENTS

The following shall be submitted:

- a. Drawings showing dimensions of the equipment and layout/footprint of the incineration system and subsystems, including materials handling/storage requirements and location of components and onsite improvements. Drawings showing dimensions, layout, location of barriers, capacities, and placement of the stockpiles. Drawings shall be to the approved scale.
- b. Flow diagram for process equipment associated with the incineration system and data, including, but not limited to: contaminated material stream flows, direction of material flow, including range of flow rate and range of composition, identified by lines and arrows denoting the direction and destination of the flow; material, mass and energy balances for the entire incineration system; subsystem equipment, operating capacity and operating conditions; pumps, valves and other in-line devices; sizes of conveying devices (pipe, tubing conveyors, feeders, etc.); number of parallel components or lines.
- c. Piping and instrumentation diagrams (P&ID) indicating: process equipment; instrumentation; piping and valves; stacks, vents and dampers; control equipment, inerting requirements/methods/systems, (including sensors, process controllers, control operators, valves, interlocks, alarms, and contaminated material feed cut-off systems); labels and other necessary information to correlate to the process flow diagram. The P&ID shall include pumps, valves and other in-line devices; sizes of conveying and/or feeding devices; and number of parallel components or lines.
- d. Documentation of an operating systems (safety) review by a qualified process hazards and operability (HAZOP) specialist with essentially the same materials handling process units. Review shall have included all process units that can expose an operator to unsafe or hazardous conditions, including but not limited to the equipment most likely to

incur hot or chemically reactive material flow stoppages such as hoppers which require physical access by an operator to relieve. An engineered approach which might eliminate operator access should have been thoroughly evaluated as an alternative and is preferable to an operator fix. This process systems safety evaluation shall extend to issues of temporary bypass of operating controls such as alarms and AFCO during upset operating conditions, and should emphasize that if more than one interlocked control is to be bypassed simultaneously, however temporarily, that it is done with foresight, not hindsight.

- e. Plan identifying instruments requiring calibration and describing the required calibration procedure, tolerances and schedule. The plan shall describe in detail control system functions and specific procedures proposed to demonstrate each function and for testing the system with formats and procedures for reporting. Detailed operating procedures and parameters for the material handling demonstration, instrument calibration, hot check, 24 hour operation, shakedown, 72 hour operation and miniburn shall be included. Detailed descriptions of the sampling and analysis to be performed. A format for reporting the data shall be identified.
- f. Information on function, design capacity, and expected operational capacity for the following equipment in the incinerator system: feed preparation equipment, feed/treated materials conveying equipment, thermal treatment equipment (primary chamber, blowers, air pollution control equipment). Equipment specifications identifying manufacturer and model number, materials of construction, interior and exterior dimensions, design limitations, and normal operating conditions. Operating capacity and operating conditions for subsystem equipment; pumps, valves and other in-line devices; sizes of conveying devices (pipe, tubing conveyors, feeders, etc.); number of parallel components or lines. Possession of a pre-existing national permit should be stated and a copy provided as a stand alone document, supporting the claim.
- g. Backup and redundancy analysis containing a failure mode analysis and an emergency manual that indicates responses to be taken under the following circumstances. Sudden loss of integrity of refractory lining; puffing or sudden occurrence of fugitive emissions; failure of temperature monitoring control mechanism; primary or secondary burner and/or air port clogging or failure; sample port interference or clogging; electrical power failure (primary or secondary); scrubber water flow or scrubber water makeup flow out of range; scrubber water temperature or scrubber water makeup temperature out of range; excessive solids deposition in the air pollution control system; loss of quench water; increase in gas temperature after quench zone; and demister operation failure; kiln drive train/roller bearing failure; out of compliance kiln/afterburner O₂, purge and relight procedures.. An emergency procedure shall be provided for each failure mode identified in the analysis.

1.6 SUBMITTALS

NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project.

The Guide Specification technical editors have designated those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item, if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for [Contractor Quality Control approval.] [information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Layout[; G][; G, [____]]
Detailed Process Flow Diagram[; G][; G, [____]]
Piping and Instrumentation Diagrams[; G][; G, [____]]

SD-03 Product Data

Safety Review[; G][; G, [____]]
Incineration and Noise Pollution Control; [____], [____]
Sequencing and Scheduling[; G][; G, [____]]
Mobilization[; G][; G, [____]]
Startup Plan[; G][; G, [____]]
Trial Burn[; G][; G, [____]]
Production Operations[; G][; G, [____]]
Demobilization[; G][; G, [____]]
Equipment[; G][; G, [____]]
Instrumentation and Controls[; G][; G, [____]]
Utilities
Incineration and Noise Pollution Control
Redundancies and Safety Procedures
Daily Operating Data
Software Packages

SD-06 Test Reports

Test Results
 Startup Operations[; G][; G, [____]]
 Trial Burn[; G][; G, [____]]

1.7 QUALITY ASSURANCE

NOTE: The designer is responsible for contacting the local, state, and regional authorities for the appropriate regulatory levels. Some noise regulations vary with the time of day.

The Incineration and Noise Pollution Control system shall conform to applicable federal (OSHA), state, regional, and local regulations regarding incineration and noise pollution control. Provide a noise analysis predicting the noise generated by the system at a distance of 30 m 100 feet for the following Hertz octave band frequencies: 31.5, 63, 125, 250, 500, 1000, 2000, 4000, and 8000. Noise levels of [____] decibels at [any] of the following Hertz octave band frequencies: [31.5], [63], [125], [250], [500], [1000], [2000], [4000], and [8000] at the site perimeter, shall not be exceeded. Submit an analysis of the equipment operation noise generated prior to mobilization with tolerances and procedures for field verification.

1.7.1 Emission Criteria

NOTE: 40 CFR 761 applies when the contaminated material to be treated contains polychlorinated biphenyls (PCBs) in excess of 50 mg/kg.

The system shall be designed to prevent exceeding ambient air quality standards, prevention of significant deterioration (PSD) increments as defined in 40 CFR 61 and to minimize health risks associated with incineration system emissions, as shown in TABLE 1.

TABLE 1 EXHAUST GAS CRITERIA		
COMPONENT	CRITERIA	
	STATE	FEDERAL
combustion efficiency (minumum percent)	[____]	[40 CFR 264 Subpart O] [40 CFR 761 Section .70] [____]
organic compounds	[____]	[40 CFR 264 Subpart O] [40 CFR 761 Section .70] [____]
O2 (minimum)	[*] [____]	[____]
CO	[**] [____]	[____]

HCl	[_____]	[40 CFR 264 Subpart O] [_____]
NOx	[_____]	[_____]
SOx	[_____]	[_____]
metals	[_____]	[40 CFR 266 Section .106] [_____]
particulates	[_____]	[40 CFR 264 Subpart O]
* [3 percent excess O2 at 2 seconds retention in the secondary combustion chamber and 1200 degrees C plus or minus 100 degrees C] [2 percent excess O2 at 1.5 seconds retention in the secondary combustion chamber and 1600 degrees C plus or minus 100 degrees C].		
** Stack gas CO concentration 100 ppmv or less corrected to 7 percent oxygen concentration based on a one hour rolling average.		

1.7.2 Slagging Control

NOTE: The treatability study should determine the softening temperature of the feed materials in accordance with ASTM E953/E953M.

Slagging shall be minimized by operating the primary chamber at [100] [_____] degrees C [180] [_____] degrees F less than the softening temperature of the feed materials, as determined by ASTM E953/E953M.

1.7.3 Air Supply and Pollution Control systems

1.7.3.1 Combustion Air

Forced draft (FD) blowers or fans shall be used to provide combustion air for the burners.

1.7.3.2 Induced Draft Fan

The air pollution control system shall include an exhaust stack and induced draft (ID) blowers or fans meeting the requirements of EPA 450/4-80/023R. The ID blowers or fans shall be used to maintain negative pressure throughout the system.

1.7.3.3 Fugitive Emissions Control

Combustion zone emissions shall be controlled by sealing the zone and maintaining a negative zone pressure. All processing shall cease if visible dust emissions occur from any of the process equipment. Alternate means that have been demonstrated to provide equivalent fugitive emissions control may be implemented with the approval of the Contracting Officer.

1.7.3.4 Quench

Quench shall be provided for exhaust gas between the exit of the secondary

combustion chamber and the air pollution control system.

1.7.3.5 Stack Emissions Control

The air pollution control system shall control gaseous, solid and aerosol type emissions to meet the performance requirements.

1.7.3.6 Water and Liquid Waste

The air pollution control system shall be designed to minimize water consumption and liquid waste generation. Liquids in the air pollution control system shall be recirculated to the maximum extent practicable prior to wasting to the liquid waste system.

1.7.4 Process Residuals

NOTE: Verify that disposal criteria for each effluent stream have been established and that all process residual streams are covered.

Additional treatment of the treated material and/or the fly ash is frequently required to satisfy the TCLP for metals. Section 02 55 00 SOLIDIFICATION/STABILIZATION (S/S) OF CONTAMINATED MATERIAL and/or Section 02 81 00 TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS are usually required.

Sampling, analyses, and data quality management are included in Section 01 35 45.00 10 CHEMICAL DATA QUALITY CONTROL.

1.7.4.1 Liquid Wastes

Residual liquid wastes from the air pollution control system and liquids collected from the stockpile shall be sampled, treated and discharged as allowed by the permits and as specified in the contract documents.

1.7.4.2 Solids

Solids separated from the air pollution control system and/or the liquid waste treatment system shall be sampled and treated as fly ash and handled as allowed by the permits and as specified.

1.8 ENVIRONMENTAL REQUIREMENTS

1.8.1 Existing Conditions

NOTE: Include site and soil characterization data and reference other sections that contain the data.

Generalized characteristics and location of the contaminated materials are as indicated on the drawings and described in Sections [____] [____].

1.8.2 Erection

Erection and/or installation shall be performed with minimal damage to the existing site environment.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 Source of Material

NOTE: Site materials that exceed the trial burn concentration may be blended with materials of lesser concentration. Economical operation should not be discouraged.

Use, from any area of the site, contaminated materials which can be shown to be both physically and chemically representative of site materials to be incinerated under this Contract. The Contractor [may] [shall] spike the materials with the POHCs and/or other compounds to demonstrate the desired production burn operating conditions.

2.1.2 Equipment

Use the area indicated on the drawings for primary and related equipment such as an auxiliary generator; dewatering equipment; preliminary treatment equipment; air emission controls and monitoring equipment; contaminated material conveyance, preparation and loading equipment; and fuel tanks.

2.1.3 Instrumentation and Controls

Instrumentation and control systems shall be in accordance with [40 CFR 264 Subpart O] [and] [40 CFR 761 Section .70]. Continuous emission monitors shall be in accordance with the appropriate Performance Specifications of Appendix B and evaluated in accordance with the requirements of Appendix F of 40 CFR 60, and in accordance with EPA 450/4-80/023R. Systems shall be adequately protected from damage from onsite activity. Submit detailed manufacturer's data on the overall controls, sensors, process controllers, control operators, valves, alarms, interlocks and contaminated material feed cut-off systems. Submit data describing in detail the equipment used to monitor stack emissions, including the stack sampling probe, filters, gas transport tubing, sampling pump, moisture removal system, analyzer's calibration system, and data recorder.

2.1.4 Control Room

NOTE: The designer should consult the military installation regarding the usage of radio communications. Closed circuit TV requirements should be deleted if provided by another section.

Provide a fully enclosed control room with system controls, instrument readouts, and data recording devices. The control room shall be heated and air conditioned permitting year round occupancy, and shall meet instrumentation and control equipment manufacturer's operating

specifications. If the control room is located in the exclusion zone, personnel shall use appropriate protective clothing and equipment. A radio or a hard wired intercommunication system with two hard wire telephonic communication channels between the control room and incineration system operating area shall be provided to allow control room operators to communicate with system operators and Government personnel. Radio communications devices shall be furnished by the Contractor for use by Government personnel. Closed circuit television monitoring of the site shall be provided with the observation screen in the control room. A closed circuit view (only) monitor shall be installed in the CO trailer, with readout of the operations screen, ICAP, and other control system parameters including instantaneous, trend, and totalized data.

2.1.5 Redundancies and Safety Procedures

Provide fully redundant backup capability within each subsystem to safely terminate system operations from the control room and at the incineration system. Duplexing or redundancies within the instrumentation and control systems shall be adequate to provide uninterrupted continuous monitoring of the emissions and to demonstrate operation in accordance with the permitted operating conditions. Prior to calibration of any sensor, control shall be switched over to the parallel sensor.

2.1.6 Data

Monitored parameters and excursion alarms shall be displayed locally and displayed and recorded in the control room. Process data (material flow, supplemental fuel, air and oxygen, temperature, pressure) and emissions data shall be maintained in the control room and recorded on magnetic media in the approved micro computer compatible digital format. Flow information shall include rate monitoring, integration and totalizing. Submit a [Detailed Process Flow Diagram](#) as specified.

2.1.6.1 Copies

Maintain hard copies of recorded data and summaries of recorded data in the control room. The copies shall be available upon request.

2.1.6.2 Software Packages

Submit instructions for use of software packages necessary to evaluate the operating data from the control system and daily operating data on magnetic media. Provide a complete set of software packages necessary to evaluate the operating data from the control system and [daily operating data](#) to the Government on diskettes and/or CDs. Personnel designated by the Contracting Officer shall be trained in the use of the software and the procedures used to analyze the operating data. Data evaluation shall include trend analysis and plots of the data. Daily and weekly maxima, average and minima for the operating parameters shall be included. The operating parameters/limits will include those determined as "Trial Burn" set point conditions. Submit an operating record in accordance with [40 CFR 264](#), Sections .73 and .74.

2.1.7 Instrumentation, Sensors, Recorders, and Sampling

NOTES: Contact the appropriate Federal and state regulatory agencies to determine the extent of monitoring required.

2.1.7.1 Instrumentation

Instrumentation and equipment, including sensors, local indicators, connecting devices, recorders, analyzers and components necessary to monitor and control the safe and efficient operation of the incineration system shall be provided. Submit [Piping and Instrumentation Diagrams](#) as specified.

2.1.7.2 Stack Emissions Monitoring

NOTE: Continuous monitors for total hydrocarbon (THC), principal organic hazardous constituents (POHCs), products of incomplete combustion (PICs), opacity and particulates are costly, subject to interference and unreliable at the appropriate detection levels and should be included only if required by the regulators. 40 CFR 761 applies when the contaminated material to be treated contains polychlorinated biphenyls (PCBs) in excess of 50 mg/kg. 40 CFR 264, Subpart O applies in the absence of significant PCB contamination.

Provide continuous monitoring in accordance with [40 CFR 264](#) Section .347, Subpart O, with verification sampling as indicated in TABLE 2. Digital data shall be recorded at intervals not exceeding one minute. Calibration of sensors shall be with standards traceable to NIST and in conformance with [NIST SP 250](#).

TABLE 2 STACK EMISSIONS MONITORING SCHEDULE	
REQUIREMENT	PARAMETER
Continuous monitoring and recording with excursion interlock	flow, velocity, stack gas temperature, [O2], [CO2], CO, [HCl], [NOx], [total hydrocarbon (THC)]
Continuous monitoring and recording without excursion interlock	[NOx] [,] [SO2]
Other monitoring instrumentation required for compliance	[_____]

2.1.7.3 Stack Sampling

Provide equipment for collecting discrete and composite samples and stack sampling ports. Stack sampling ports with adequate access for personnel and equipment shall be provided at each location required by [40 CFR 60](#). See TABLE 3 below.

TABLE 3 STACK EMISSIONS SAMPLING SCHEDULE		
STACK SAMPLING	PARAMETER	FREQUENCY

TABLE 3 STACK EMISSIONS SAMPLING SCHEDULE		
[Trial burn] [Interim operations] [Permitted operation]	total hydrocarbon (THC)	[hourly] [daily] [weekly] [monthly]
[Trial burn] [Interim operations] [Permitted operation]	principal organic hazardous constituents (POHC)	[monthly] [quarterly] [semi-annually]
[Trial burn] [Interim operations] [Permitted operation]	products of incomplete combustion (PICs)	[hourly] [daily] [weekly] [monthly]
[Trial burn] [Interim operations] [Permitted operation]	opacity	[hourly] [daily] [weekly] [monthly]
[Trial burn] [Interim operations] [Permitted operation]	particulates	[hourly] [daily] [weekly] [monthly]
[Trial burn] [Interim operations] [Permitted operation]	metals	[hourly] [daily] [weekly] [monthly]

2.2 ALARM EQUIPMENT

2.2.1 Interlocks and Alarms

2.2.1.1 Interlocks

Provide contaminated material automatic feed cut-off (AFCO) interlocks to control and/or cut-off contaminated material feed for emissions and other excursions. Cut-offs and/or alarms shall be activated when operating conditions deviate from the established limits and/or to secure the system for safety reasons. See TABLE 4 below.

TABLE 4 CONTAMINATED MATERIAL ALARMS AND AUTOMATIC FEED CUT-OFF (AFCO) CONDITIONS		
PARAMETER	ALARM REQUIREMENT	OPERATING LIMIT

TABLE 4 CONTAMINATED MATERIAL ALARMS AND AUTOMATIC FEED CUT-OFF (AFCO) CONDITIONS		
[Scrubber pH,] [Air pollution control system pressure or differential pressure,] Combustion air flow, fuel flow, total mass feed rate	[visible, audible, and AFCO] [remote] [_____]	outside the range [demonstrated during the mini-burn] [or] [proposed for the trial burn].
Primary chamber exit temperature	[visible, audible, and AFCO] [remote] [_____]	outside the range [demonstrated during the mini-burn] [or] [proposed for the trial burn].
Primary chamber pressure	[visible, audible, and AFCO] [remote] [_____]	greater than [0.0 kPa (0.00 in. H2O)] [the pressure range demonstrated during the mini-burn] [or] [the pressure range proposed for the trial burn,].
Secondary combustion chamber exit temperature	[visible, audible, and AFCO] [remote] [_____]	below [1,100 degrees C] [950 degrees C] [the range demonstrated during the mini-burn] [or] [the range proposed for trial burn].
Stack flow material	[visible, audible, and AFCO] [remote] [_____]	*greater than [the range demonstrated during the mini-burn] or [the range proposed for the trial burn,].
[_____]	[_____]	[_____]
Other conditions required by the trial burn permit	[visible,] [audible,] [remote] [and] [AFCO] [_____]	as determined to be necessary to achieve the performance standards of 40 CFR 264, Section .343, Subpart O. 40 CFR 761 applies when the contaminated material to be treated contains polychlorinated biphenyls (PCBs) in excess of 50 mg/kg.
*Based on minimum retention time in the secondary combustion chamber.		

2.2.1.2 Visible Alarms

Provide visible alarms consisting of lights on the main control panel, flashing symbols on the screen of the microprocessor controller in the control room and, for each interlock that stops the contaminated material feed system, lights at the equipment location.

2.2.1.3 Audible Alarms

Audible alarm activation shall be provided for each interlock that stops the feed to the thermal processing unit.

2.2.1.4 Remote Alarms

NOTE: Auto dialers should be included only if requested by the field office or required by regulators.

Auto dialing to the indicated remote location shall be provided for each interlock that stops the contaminated material feed to the thermal processing unit.

2.3 CONTAMINATED MATERIAL FEED SYSTEM

2.3.1 Support Equipment

NOTE: Consider the need for enclosure of the feed system. The designer needs to address rocks, construction debris, trees, stumps, drums, barrels, tramp metals, etc. Materials may be required to be shredded and incinerated or separated from the feed material, decontaminated and disposed on or offsite. The allowable sizes for separation needs to be specified.

Material handling and contaminated material feed systems shall be enclosed in a temporary structure with induced draft control of emissions and shall be capable of shredding, conveying, pumping, and/or screw feeding of contaminated materials, separately or in combination, to the primary chamber. Preliminary treatment shall include crushing or grinding and screening as required to produce material compatible with the incinerator.

2.3.2 Capacity

Capacity of the contaminated material feed system shall be consistent with the capacity of the incinerator and the remedial action schedule.

2.3.3 Metering

The contaminated material feed system shall be capable of weighing the contaminated materials (liquid and solid) introduced into the primary chamber with an accuracy of plus or minus 2 percent of true weight.

2.3.4 Conveyors

NOTE: Include this paragraph if the estimated potential for release of volatile organic compounds is in excess of 0.22 kg (0.5 pounds) per hour.

Contaminated material feed conveyors shall be enclosed and vented to the air pollution control system.

2.4 TREATED MATERIAL AND ASH SYSTEMS

The treated material and fly ash handling systems shall be capable of removing, handling and storing residues resulting from thermal treatment.

2.4.1 Capacity

Capacity of treated material and fly ash removal, handling and storage systems shall be consistent with the incineration system capacity and the remedial action schedule.

2.4.2 Segregation of Materials

Store the treated material and fly ash separately. Treated material and fly ash handling systems shall be capable of segregating and separately storing a minimum of 72 hours production. This will allow time to receive the results of sampling and analyses and determine the need for additional treatment prior to disposal. Provision for additional storage time due to late Friday sampling, coincident weekend plus federal/state holiday on the Monday should be addressed.

2.4.3 Rehydration

Treated material and fly ash handling systems shall include provisions for rehydration of material leaving the primary chamber of the incineration system prior to storage to reduce the fugitive emissions and to confine the materials to the proper storage area. If treated process water is to be used in rehydration, the water should be routinely sampled and analyzed to verify that the water is acceptable for such purpose and in accordance with direction from the Contracting Officer.

PART 3 EXECUTION

3.1 LAYOUT

NOTE: Coordinate the drawings to allow optimum access to the work area.

Layout of the materials processing area and facility limitations are as indicated on the drawings. The size of the materials processing area shall not be increased without approval of the Contracting Officer. Costs associated with any area increase shall be borne by the Contractor, including costs of construction, demolition and site restoration.

3.1.1 Excavation and Stockpiling

NOTE: Section 02 61 13 EXCAVATION AND HANDLING OF
CONTAMINATED MATERIAL covers the construction of
stockpile areas. Complete segregation of stockpiles
is recommended for highly contaminated materials.

The clearing and grubbing, as well as excavation, shall be performed in accordance with Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL. Stockpile storage areas for segregated temporary storage of feed oversize, feed materials, treated materials, fly ash and [_____] shall be constructed. [One] [_____] composite surface background sample shall be taken from the stockpile areas prior to their construction to document the level of contamination present at the onset of construction [_____]. Contamination under stockpile areas resulting from remedial action activities shall be cleaned up to [action] [background] levels at the Contractor's expense. The area provided for stockpiling shall be used for segregated temporary storage of untreated contaminated materials, treated materials, and fly ash. The area provided for stockpiling shall be used for segregated temporary storage of untreated contaminated materials[and treated materials.] [, treated materials and fly ash.]. Contaminated materials [and treated materials] [, treated materials and fly ash] shall not be intermixed or mixed. Treated materials and fly ash shall be segregated until each has been characterized for additional treatment and/or disposal. Drainage from stockpiles shall be collected, characterized and treated as required for disposal. Provision for control of moisture levels in excavated soils should be discussed and permission obtained from the CO if retreated/flyash materials are considered for controlling/handling characteristics.

3.1.2 Fuel System

Fuel system installation and testing shall comply with the applicable requirements of NFPA 30 and NFPA 31, NFPA 54 or NFPA 58, as appropriate to the type of fuel.

3.2 INSTALLATION/ERECTION/REMOVAL

Design the incineration system to allow easy installation and removal of the system from the site with minimum site restoration.

3.3 SAMPLING, MONITORING AND INSPECTIONS

NOTE: Verify that Section 01 35 45.00 10 CHEMICAL
DATA QUALITY CONTROL includes appropriate sample
preservation and analytical methods for contaminated
and treated materials, off-gas and fly ash.

Sampling frequency requirements and composite
sampling techniques are specific for each project
and are negotiated with the regulatory agency.
Typically, treated materials from each day are
stockpiled separately. Therefore, testing is
normally done on a daily basis with varying
requirements for composite sampling.

Sample preservation and analytical methods shall be in accordance with Section 01 35 45.00 10 CHEMICAL DATA QUALITY CONTROL. Sample collection shall be in conformance with ASTM E122. Contaminated material feed, treated material and fly ash shall be sampled and analyzed as allowed by the permits and as specified.

3.3.1 Additional Sampling

Upon request of the State or Federal EPA, the Contracting Officer may require that the Contractor conduct additional sampling of the contaminated material feed, of the treated material and/or of the fly ash to demonstrate that the operating conditions achieve the performance standards of [40 CFR 264, Subpart O] [40 CFR 761, Section .70].

3.3.2 Minimum Sampling Frequency

NOTE: Section 01 35 45.00 10 CHEMICAL DATA QUALITY CONTROL should contain the appropriate sample preservation and analytical requirements.

Sampling and analyses shall be performed in accordance with the applicable sample preservation and analytical requirements.

3.3.2.1 Contaminated Material

Heat content	[_____]	[hourly] [daily] [weekly]
Total organic content	[_____]	[hourly] [daily] [weekly]
Volatile organics	[_____]	[hourly] [daily] [weekly]
Semi-volatile organics	[_____]	[hourly] [daily] [weekly]
Nitroaromatics (energetics)	[_____]	[hourly] [daily] [weekly]
Chlorinated organics (RCLs)	[_____]	[hourly] [daily] [weekly]
Polychlorinated biphenyls (PCBs)	[_____]	[hourly] [daily] [weekly]
Principal organic hazardous	[_____]	[hourly] [daily] [weekly]
Constituents (POHCs)	[_____]	[hourly] [daily] [weekly]
TCLP metals	[_____]	[hourly] [daily] [weekly]

Heat content	[_____]	[hourly] [daily] [weekly]
Metals	[_____]	[hourly] [daily] [weekly]

3.3.2.2 Treated Material

Total organic content	[_____]	[hourly] [daily] [weekly]
Volatile organics	[_____]	[hourly] [daily] [weekly]
Semi-volatile organics	[_____]	[hourly] [daily] [weekly]
Nitroaromatics (energetics)	[_____]	[hourly] [daily] [weekly]
Chlorinated organics (RCLs)	[_____]	[hourly] [daily] [weekly]
Polychlorinated biphenyls (PCBs)	[_____]	[hourly] [daily] [weekly]
TCLP metals	[_____]	[hourly] [daily] [weekly]
Metals	[_____]	[hourly] [daily] [weekly]

3.3.2.3 Fly Ash

Total organic content	[_____]	[hourly] [daily] [weekly]
Volatile organics	[_____]	[hourly] [daily] [weekly]
Semi-volatile organics	[_____]	[hourly] [daily] [weekly]
Nitroaromatics (energetics)	[_____]	[hourly] [daily] [weekly]
Chlorinated organics (RCLs)	[_____]	[hourly] [daily] [weekly]
Polychlorinated biphenyls (PCBs)	[_____]	[hourly] [daily] [weekly]
TCLP metals	[_____]	[hourly] [daily] [weekly]
Metals	[_____]	[hourly] [daily] [weekly]

3.3.3 Contaminated Material Sampling

NOTE: When contaminated materials contain energetic compounds (TNT, RDX, etc.) in excess of 10 weight percent, the feed materials should be blended with non-explosive material to lower the concentration of energetics to less than 10 weight percent prior to feeding to the incinerator.

Contaminated material shall be sampled and analyzed by the methods required by the Sampling and Analysis Plan specified in Section 01 35 45.00 10 CHEMICAL DATA QUALITY CONTROL.

3.3.4 Treated Material and Fly Ash Sampling

NOTE: 40 CFR 761 applies when PCBs are present at greater than 50 mg/kg. 40 CFR 264 and the state regulations apply when no PCBs are found. Most states do not have specific requirements.

Verify that Section 02 55 00
SOLIDIFICATION/STABILIZATION (S/S) OF CONTAMINATED
MATERIAL is included for treated materials that
cannot pass TCLP (or SPLP).

Treated material and fly ash residues shall be sampled and analyzed as allowed by the permits, and as specified.

3.3.5 Stack Sampling

NOTE: Tier I and II analyses should be completed during design. The specification should require the Contractor to perform any required tier III analysis.

Stack samples shall be taken in accordance with 40 CFR 60, Appendix A, and as specified.

3.3.6 Monitoring

NOTE: EPA 625/6-89/019 and EPA 625/6-89/021
describe the monitoring requirements.

Monitoring of the operating parameters shall be conducted as required in the final production operating conditions and Subpart O of 40 CFR 264 Section .347 during incineration of contaminated materials.

3.3.7 Visual Inspections

The incinerator and associated equipment (pumps, valves, conveyors, pipes, etc.) shall be subjected to thorough visual inspections for improperly/inadequately secured covers/devices, leaks, spills, fugitive

emissions, or mechanical failure as indicated in TABLE 5.

TABLE 5 VISUAL INSPECTION SCHEDULE	
Phase of Operation	Minimum Inspection Frequency
Start-up	Once per 8-hours of operation
Material handling Demonstration	Hourly
Hot check	Once per 8-hours of operation
24 hour operation	[Hourly] [Once per 8-hours of operation]
Shakedown	[Hourly] [Once per 8-hours of operation]
72 hour operation	[Hourly] [Once per 8-hours of operation]
Mini-burn	Once per 8-hours of operation
Pretrial burn	Once per 8-hours of operation
Trial burn	[Once per 8-hours of operation]
[Interim operations]	[Once per 8-hours of operation]
Production	Daily

3.3.8 Interlocks, Automatic Cut-Offs and Alarms

Interlocks, automatic feed contaminated material cut-off (AFCO) and associated alarms shall be tested at least weekly to verify operability.

3.4 DATA

Data from sampling, inspections and tests shall be recorded and the records placed in the operating log as required by 40 CFR 264 Section .73, the applicable permits, and as specified. The field log book shall describe calibration procedures conducted and results obtained. Logs shall be maintained throughout the duration of operations and shall be made available for inspection upon request by Contracting Officer and/or EPA personnel.

3.5 STARTUP OPERATIONS

NOTE: A mini-burn is not always required.

Uncontaminated material startup shall include material handling systems demonstration with uncontaminated material, instrumentation calibration, control interlock demonstration, and 24 hour operation. Contaminated material startup shall include shakedown, 72 hour operation [mini-burn,] [pretrial burn,] and trial burn. Startup operations shall demonstrate that the incineration system will process material at the proposed feed rate and the air pollution control system will attain the required throughput rates while meeting all environmental and remediation standards. Notify the Contracting Officer 48 hours prior to starting any of the tests. Submit Reports containing the results of startup, including the mini-burn.

3.6 UNCONTAMINATED MATERIAL OPERATION

3.6.1 Material Handling Demonstration

Demonstrate the throughput performance of the incineration system. The demonstration shall start upon approval of the Contracting Officer. The feed systems, the treated material and fly ash handling systems shall operate continuously at the proposed maximum feed rate a minimum of [85] [_____] percent availability for 24 hours without a malfunction or shutdown related to the systems. This demonstration shall be completed prior to the 24-hour continuous operation test.

3.6.2 Instrumentation Calibration

Instrumentation calibration shall ensure that compliance-related instrumentation functions will be performed reliably and accurately. Instrumentation and control system calibrations will be witnessed by the Contracting Officer or the designated representative.

3.6.3 Control Interlock Demonstration

Control system interlocks and alarms shall be demonstrated to be programmed correctly and fully functional following calibration of the instrumentation. Each alarm point shall respond properly. Alarms, interlocks, and emergency responses (activation of combustion gas bypass system or an emergency system shut down) shall be demonstrated. Operating conditions which trigger system alarms may be artificially induced in the field, or the control set points may be altered to invoke the desired response alarm. Appropriate control system responses (including interlocks, alarms, bypass activation and/or emergency shut downs) to each of the specified stimuli shall be demonstrated. With the approval and concurrence of the Contracting Officer, non-critical AFCO may be simulated electronically to prevent a nuisance condition (for example response induced dust emissions in the treated materials train) being initiated.

3.6.4 Hot Check

The hot check shall ensure that all mechanical, thermal and air pollution control systems operate at proposed trial burn conditions to the specified level. Feed rate and exhaust gas flow rates shall be maintained within [75] [80] [85] [_____] percent of the conditions proposed for the trial burn. Minimum temperature shall be maintained equal to the proposed trial

burn temperature. Monitoring of the process parameters and variables shall be maintained throughout the materials handling demonstration. This demonstration shall be conducted with clean materials similar to the contaminated materials. The contaminated material feed preparation and the contaminated and treated material handling systems shall demonstrate on-line availability and performance with uncontaminated materials and shall be considered successfully completed when the following operations have been achieved. The hot check and the 24-hour continuous operation test shall be completed to the satisfaction of the Contracting Officer before any operation with contaminated material.

3.6.5 24-Hour Continuous Operation

Continuous operation using uncontaminated materials under the conditions proposed in the Trial Burn Plan for 24 hours without a malfunction or shut down related to the contaminated material feed, treated material and fly ash handling systems with all continuous emissions monitoring systems 100 percent functional throughout the 24-hour operational period.

3.7 CONTAMINATED MATERIAL OPERATION

3.7.1 Shakedown

The introduction of contaminated feed begins the 720 hours of operating time (40 CFR 270, Section .62) to bring the incinerator to a point of operational readiness to conduct a trial burn. The shakedown shall ensure that all standard operating conditions are adjusted to provide coordinated operation over the proposed range of feed rates. Shakedown of the systems with contaminated soils shall include the 72 consecutive hours of operations.

3.7.2 72 Consecutive Hours of Operation

72 consecutive hours of operation shall be provided at a minimum of 85 percent of the maximum feed rate with 85 percent availability with all air pollution control equipment and continuous emissions monitoring systems functioning throughout the 72 hour operations. This run with contaminated materials shall be accomplished before the completion of start-up operations.

3.7.3 Reporting

In order to proceed expeditiously to the next step, an interim letter-report will be acceptable with the results formally reported in the Startup Report.

3.8 MINI-BURN

NOTE: A mini-burn is not always required.

The mini-burn shall occur within the 720-hour operation and shall be conducted using [contaminated material from the site] [contrived material] as feed. The contaminated feed materials shall be identical to [contaminated material from the site] [contrived spiked/surrogate material] that will be used in the trial burn. The mini-burn shall begin upon approval by the Contracting Officer. At the request of the Contractor, the Contracting Officer may waive the requirement for the mini-burn.

3.8.1 Operating Conditions

The operating conditions for the mini-burn shall be either those conditions approved for startup operations or those conditions proposed for the trial burn. Conditions outside the stated ranges shall be submitted to the Contracting Officer for approval.

3.8.2 Reporting

Results of the mini burn shall be documented in the Startup Report in the shortest possible time after completion of the mini-burn. An interim letter-report with the results of the mini-burn testing may be acceptable, where approved. The mini-burn will be witnessed by the Contracting Officer.

3.9 PRETRIAL BURN

The data recording, and reporting requirements of the Trial Burn Plan shall be conducted throughout the 720-hour pretrial burn operation. Frequency of sampling and analyses may be reduced from the Trial Burn Plan requirements in accordance with the approved sampling and analysis plan prior to starting the trial burn.

3.9.1 Pretrial Burn Results

Test results shall be made available when they are received by the Contractor. Approved pretrial burn operating conditions and interlock limits shall be modified only upon written authorization of the Contracting Officer or his designated representative.

3.9.2 Pretrial Burn Operations

The 720-hour operating period shall commence with the introduction of contaminated materials to the incinerator and end at the conclusion of the trial burn, regardless of the number of hours remaining at the conclusion of the trial burn.

3.9.3 Initial Trial Burn Attempt

The initial trial burn attempt shall be completed before the end of the 720-hour period.

3.9.4 Time Extension

Extension of the pretrial burn operations period shall be limited to no more than 720 additional hours, during which time a successful trial burn shall be completed. Pretrial burn operations, as defined by this section, shall not be extended beyond the initial 720-hour period without written authorization. Any request for extension beyond the initial 720-hour period shall include written justification and an analysis of each problem with the proposed solution.

3.10 TRIAL BURN

**NOTE: See 40 CFR 264 Section .340 for exemptions
from a trial burn. Coordinate specification
requirements with the regulators. Incinerators with
existing permits for similar contaminant**

concentrations may not need a full trial burn.

A trial burn shall be conducted in accordance with EPA 625/6-89/019 and the approved Trial Burn Plan. Trial burn operations conclude the shake down period of 720 hours of operations with contaminated site materials. Submit a Trial Burn Plan listing the proposed operating conditions to be continuously monitored and recorded, including detailed descriptions of the pretrial burn schedule, operating conditions, and sampling and analyses. Submit a Report containing the results of the trial burn.

3.10.1 Schedule

Written notification of the anticipated date of the full trial burn shall be furnished to the Contracting Officer at least 10 days prior to the projected start date. Trial burn operations shall begin upon receipt of written approval of the Trial Burn Plan and written notification that final shake down activities have been completed and that all systems are ready to conduct a full trial burn. The trial burn may be scheduled after completion of the mini-burn. The initial trial burn attempt shall be completed before the end of the 720 hours of pretrial burn operations. If the trial burn is completed before 720 hours of operations have been completed, the remaining hours of operation shall be forfeited. A successful trial burn shall be completed within one calendar year from the start of the initial 720-hour pretrial burn operation.

3.10.2 Operating Conditions

All systems shall be operated at the conditions specified in the Trial Burn Plan for the duration of the trial burn. A complete trial burn shall be performed under each set of proposed operating conditions. If the primary combustion chamber will be operated in excess air and pyrolytic conditions, a separate complete trial burn shall be required for each condition. The Trial Burn Plan shall detail the methods to be used to detect when any chamber is operating in pyrolytic conditions. Each trial burn shall consist of a minimum of three test runs as required for the stack gas sampling methods.

3.10.3 Trial Burn Report

Trial burn report shall be developed in accordance with 40 CFR 264, Subpart O and [40 CFR 270, Section .62] [40 CFR 761 Section .70]. The trial burn report shall incorporate the provisions of EPA 625/6-89/023 and EPA 625/6-89/021 and EPA 625/6-89/019 requirements, as applicable. The Trial Burn Report shall include results of the trial burn, including sample analysis data, calculations, and conclusions within [60] [90] days of the completion of a trial burn. At a minimum, data collected during each trial burn shall be sufficient to make the following determinations:

3.10.3.1 Quantitative Analysis of the Materials

A quantitative analysis of each contaminated feed, treated material and fly ash stream for each individual run for each parameter stated in the Trial Burn Plan. The analysis shall be based upon 15-minute grab samples from each feed stream, which are separately composited and analyzed for each test run during the trial burn. The quantitative analysis shall include analyses for any surrogate fuel oil or spiking compounds added to the feed.

3.10.3.2 Quantitative Analysis of the Stack Gases

A quantitative analysis shall be made of the stack gases for the concentration and mass emissions of [POHC,] [metals] and particulates. Stack gas velocity and the concentration of O₂, [CO₂,] CO, HCl, [NO_x,] [SO₂,] [and] [THC] shall be continuously monitored and recorded.

3.10.3.3 Material and Energy Balances

The following computations in accordance with 40 CFR 264, Subpart O shall be included: 1) The mass emission rate of particulates; 2) The destruction and removal efficiency (DRE) in accordance with the DRE formula specified in the referenced document; 3) The HCl removal efficiency if the HCl emission rate exceeds 1.8 kg 4 pounds of HCl per hour.

3.10.3.4 Fugitive Emissions

Sources of fugitive emissions and means of control of the emissions shall be identified.

3.10.3.5 Continuous Measurement and Recording

Continuous measurement and recording of operating parameters shall be maintained as stated in the approved Trial Burn Plan.

3.10.3.6 Other Requirements

Other monitoring, sampling, and/or analyses shall be performed as stated in the approved Trial Burn Plan.

3.11 TRIAL BURN APPROVAL

**NOTE: Verify that interim operation will be allowed
by the regulators.**

When acceptable DRE and treated material criteria described in PART 1 of this section are successfully achieved during the trial burn, the system will be approved for production burn operation. Production burn operating conditions shall be established from the demonstrated trial burn performance and test results. Approved production burn operating conditions shall become contract requirements. Submit Reports of inspections or tests, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used shall be identified and test results shall be recorded.

3.11.1 Failure

If acceptable DRE and other operating parameters are not achieved, production burn operations will not be approved. Results of the trial burn shall be analyzed and the causes of deficiencies evaluated. Make physical and operational changes to the incineration system to bring it into compliance with the required operating parameters, DRE and ash criteria.

3.11.2 Second and Third Trial Burns

If the first trial burn attempt fails, each subsequent attempt shall include a separate Trial Burn Report. Second and third trial burns, if

needed, shall be performed at no extra cost to the Government.

3.11.3 Successful Trial Burns

Upon completion of a successful trial burn, the incineration system will be approved for production burn operations contingent on the operating conditions established from the successful trial burn performance and test results.

3.11.4 Default

After failure of the third trial burn attempt or expiration of one calendar year from the initiation of pretrial burn operations, the Contractor will be considered in default of this Contract.

3.11.5 Multiple Incineration Units

Regardless of the similarities, conduct a complete trial burn on each incinerator train and/or each of the air pollution control trains used with a single incinerator. Trains shall be tested simultaneously to the maximum practical extent. For multiple treatment trains that will be operated under different operating conditions or different contaminated material feed rates, each proposed set of conditions shall be demonstrated during the trial burn.

3.12 INTERIM OPERATIONS

**NOTE: Delete this paragraph if EPA will not allow
interim operation. Insert the limitations on
operation during permit review.**

The interim operating period shall commence seven calendar days after completion of the trial burn sampling activities with the issuance of interim operating conditions. The interim operating period shall continue for the total number of calendar days remaining in the period of time allowed for preparation and submittal of the Trial Burn Report and the number of calendar days allowed for review and approval. Loss of potential interim operating time resulting from delays in submittal of an acceptable Trial Burn Report is the responsibility of the Contractor. The interim operating approval shall expire at the end of the period described above and operation shall cease until the final production burn operation approval is issued. Operating conditions during the interim operating period will be determined based upon performance data obtained during the mini-burn with preliminary performance data and preliminary analytical results from trial burn operations. At a minimum, these conditions shall include:

3.12.1 Mass Feed Rate

The total mass feed rate shall be based on the feed rate proved to meet treated material quality standards during the mini-burn.

3.12.2 Primary Chamber

Primary chamber operating conditions proved to meet treatment standards during the mini-burn.

3.12.3 Secondary Combustion Chamber

Secondary combustion chamber operating temperature greater than [950] [1100] degrees C [1,800] [2,000] degrees F with a secondary combustion chamber gas retention time greater than [1.5] [2.0] seconds.

3.12.4 Air Pollution Control System

Air pollution control system operating conditions proved during the mini-burn to ensure compliance with all emissions standards.

3.12.5 Sampling and Analysis

Sampling and analysis requirements during the interim operating period will be identical to those identified in the Trial Burn Report for production operations.

3.13 PRODUCTION OPERATIONS

During the production operations, thermally treat contaminated material feed quantities and types and perform staging, processing, storage, feeding, residue handling, sampling and analysis, and monitoring as required.

3.13.1 Schedule

Production operating period shall commence upon issuance of final production operating conditions and shall continue until the contaminated materials have been successfully treated.

3.13.2 Requirements

Production operating conditions shall be those demonstrated in the trial burn, documented in the approved Trial Burn Report, and approved by the State and Federal Environmental Protection Agencies to ensure compliance with [40 CFR 264, Subpart O] [40 CFR 761, Section .70] regarding rate and composition of the contaminated material feed.

3.13.2.1 Startup and Shutdown

During startup and shutdown, contaminated materials shall not be fed into the primary chamber unless the incinerator operating conditions are within the limits approved for production.

3.13.2.2 Changes

Operation shall cease when variations in contaminated material feed or operating conditions exceed the designated limits.

3.13.2.3 Performance

The system shall effectively and safely prepare, handle, and thermally treat materials from the site designated for thermal treatment to the specified treatment criteria while maintaining the specified destruction efficiencies and in accordance with applicable permits and conditions. The system shall remove off-gas contaminants to the levels specified and treated materials from the operations area for appropriate management and disposal. Submit a [Safety Review](#) of the operating systems, as specified.

3.14 DEMOBILIZATION

Submit the Demobilization Plan detailing specific procedures to be used for decontamination of system components, test methods for verification of decontamination, and the schedule for equipment decontamination and removal from the site. Demobilization shall include disconnection of utilities, decontamination, disassembly, and removal of incineration system equipment, materials handling equipment, structures, and concrete pads related to the incineration system. Demobilization shall be completed in accordance with the approved Demobilization Plan. Demobilization period shall begin after the contaminated materials have been treated in accordance with the requirements of this section.

-- End of Section --