Clean Harbors Colfax, LLC

3763 Highway 471
Colfax, Louisiana, 71417

Revisions to Responses to NOD # 1
RCRA Hazardous Waste
Permit Renewal Application

LAD 981 055 791-OP-RN-1
Agency Interest # 32096
PER20170002

January 2022

Clean Harbors Colfax, LLC
3763 Highway 471
Colfax, LA 71417
318.627.3443
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MAIN FILE

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January 27, 2022

Via FedEx #: 7758 9225 7303

Ms. Yolunda Righteous, Administrator
Louisiana Department of Environmental Quality
Office of Environmental Services/Waste Permits Division
602 North Fifth Street
Baton Rouge, Louisiana 70802

Attn: Ms. Karla Vidrine

Subject: **Supplemental Information-RCRA Part B Permit Renewal Application**
Clean Harbors Colfax, LLC
Agency Interest No.: 32096
TEMPO Activity No.: PER20170002
EPA ID/Permit #: LAD 981 055 791-OP-RN-1

Dear Ms. Righteous:

After recent general discussions with Department personnel, Clean Harbors Colfax, LLC ("the Facility") has revised several sections of the above referenced submittal from September 2, 2021. Specifically, the following sections of the previous submittal have been revised, and five (5) copes are enclosed.

Attachment 7-B	Waste Analysis Plan
Attachment 8-B	Facility Operational Plan
Attachment 9-A	Inspection Plan
Attachment 12-A	Contingency Plan
Attachment 12-B	Training Plan
Attachment 13	Closure Plan (including cost estimates)
Attachment X	Trial Burn Plan

Clean Harbors appreciates the Department's review of this information and looks forward to the final issuance of the renewed RCRA Permit. If additional information is needed concerning this matter, please do not hesitate to contact me at (225) 681-0878 or via e-mail at andrews.paul@cleanharbors.com.

2022 JAN 28 AM 10: 45
DEQ-OES

Sincerely,

Paul Andrews
Senior Environmental Compliance Manager
Clean Harbors Environmental Services, Inc.

Enclosures (5 copies of the revised sections)

"People and Technology Creating a Better Environment"

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ATTACHMENT 7-B

WASTE ANALYSIS PLAN

CLEAN HARBORS COLFAX, LLC

WASTE ANALYSIS PLAN

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WASTE ANALYSIS PLAN

1.0 INTRODUCTION

In accordance with the regulatory requirements set forth in LAC 33:V.1519, Clean Harbors Colfax, LLC (CH Colfax) has developed this Waste Analysis Plan (WAP). As required by LAC 33:V.517.E, CH Colfax has included this WAP as an integral part of the Part II Permit Application for its hazardous waste treatment facility located at 3763 Louisiana 471, Colfax, Louisiana. Implementation of the procedures set forth in this plan will ensure that this facility remains in compliance with all requirements of LAC 33:V.1519. A copy of this plan will be available at the facility at all times. ***Additional details related to the proposed contained burn system will be incorporated into the WAP as needed once the unit is constructed***

The purpose of this Waste Analysis Plan is to document the necessary sampling methodologies, analytical techniques and overall procedures that are undertaken for all hazardous and nonhazardous wastes (hereinafter "wastes") that enter this facility for storage, treatment and disposal. Specifically, the plan delineates the following:

- **Pre-Acceptance Procedures** (Section 2.0) to determine the acceptability of a particular waste stream pursuant to facility permit conditions and operating capabilities prior to any shipment of that waste to the facility.

- **Incoming Waste Evaluation** (Section 3.0) to verify that the delivered waste matches the accompanying manifest, pre-acceptance documentation, and the conditions of the facility permit.

- **Site Generated Waste Evaluation** (Section 4.0) to ensure site generated waste is properly characterized and managed in accordance with applicable regulatory requirements.

- **Process Operations** (Section 5.0) to maintain safe and appropriate methods of storage, treatment, disposal or movement of wastes within the facility.

It is the policy of CH Colfax that wastes handled by this facility will be subjected to these procedures. Strict compliance with this policy will ensure that this facility will be in compliance with applicable permits and regulations and is operated in a safe and environmentally sound manner.

2.0 PRE-ACCEPTANCE PROCEDURES

Pre-acceptance control is the mechanism for deciding to reject or accept a particular type of waste, prior to its shipment to the facility, based on the conditions or limitations of existing permits and regulations, and its compatibility with other wastes being stored, treated and/or disposed at the facility, in compliance with LAC 33:V.1519.A.1. For each new waste stream that is a candidate for delivery to the facility, the following procedures are implemented:

- Each generator who wishes to ship waste to the facility will provide a completed and signed Waste Profile Form, shown on Exhibit B, (or an equivalent form) in compliance with LAC 33:V.1519.B.6. The generator may also supply developed data and existing published or documented data on the waste or wastes generated from similar processes in compliance with LAC 33:V.1519.A.2.

- All wastes received at the facility are considered reactive and will include the waste code D003 (some waste streams may include additional waste codes as shown in the Part A application). The specific types of waste that may be received and thermally treated at the facility include the following: fireworks, smokeless powder, waste shape charges, rocket motors, propellants, power devices, ignitors/detonators, ammunition, etc. Energetic waste families typically received at the facility include the following:

  20 mm HEI Cartridge
  40 mm HEI Cartridge
  Amatol (50% TNT, 50% Ammn. Nitrate)
  Composition B (56/38/6 RDX-TNT-WAX)
  Detonating train
  Diesel and Dunnage
  Double Base (50% nitrocellulose)
  Explosive D (ammonium picrate)
  Flare, Cntermeas., Aircraft, M206
  Fuze, Bomb, Tail, FMU 139A/B
  Fuze, Inertia Tail, Bomb, FMU 54A/B
  GGU-2/A Gas prss Prop. Act. Gen.
  Ground Illum. Signal,Red Star,M158
  HBX (48/31/17/4 RDX-TNT-Al-WAX)
  Impluse BBU-368 Cartridge
  Impluse Cartridge, ARD 446-1
  Impulse Cartridge, MK107 MOD01
  M1 (85% Nitrocellulose)
  M6 (87.7% Nitrocellulose)
  Manufacturer's Waste (65% propell.)
  Mine, Claymore, M18A1
  Propellant, ammonium perc., alum.
  Propellant, ammonium perc., nonal.
  Propellant, Composite (MK-6)
  Propellant, Smokey Sam
  Propellant, M-43
  Propellant, MK-23
  Propellant, PBXN-110

RDX (cyclotrimethylenetrinitramine)
Signal,Illum,Arcrft,Rd Str,AN-M43A2
Smokeless Powder
T45E7 Adapter Booster
TNT (2,4,6-Trinitrotoluene)
Triple Base (M30-28% Nitrocellulose)
Tritonal (79% TNT, 21% Aluminum)
Tritonal with 2.5% Calcium Stearate)

All waste families accepted will include Hazardous Waste Code D003. Some of the waste families will include other waste codes listed in the Part A Application, but these waste codes may vary from shipment to shipment.

- CH Colfax will review and verify the information contained on the Waste Profile Form. In addition, certain information contained on the form will be confirmed through the expertise of facility personnel based on historical knowledge of similar wastes that have been processed at the facility in the past.

- After reviewing all available data, CH Colfax will determine the acceptability of the waste based on (1) the permit conditions for the facility, and (2) the on-site availability of the proper and safe waste management techniques. At this facility, proper and safe waste management techniques involve the detonation of the waste materials on burn pads. If a waste is considered too volatile or too reactive (i.e., such that it could cause a damaging detonation), then that waste would either not be accepted or would only be managed in very small quantities to avoid undesirable results (such as damage to the burn units).

- In compliance with LAC 33:V.1519.A.3 and 1519.B.4, the pre-acceptance evaluation will be repeated when a generator notifies CH Colfax that the process generating the waste has changed, although due to the uniqueness of each waste stream processed at the facility, the likelihood of process changes is considered small. Similarly, the pre-acceptance evaluation may also need to be repeated if the facility has reason to suspect that the waste does not conform to pre-acceptance documentation. Otherwise, the pre-acceptance evaluation will be completed on an annual basis for all wastes that continue to be shipped to the facility to assure the waste characteristics and other information on the Waste Profile Form have not significantly changed.

- Following the pre-acceptance evaluation, the generator will be informed whether or not the waste stream will be acceptable at CH Colfax. The notification will include documentation that the facility has the appropriate permits for the waste the generator is shipping and that the facility will accept said waste.

3.0 INCOMING WASTE EVALUATION

Incoming wastes will arrive in containers, generally ranging from very small boxes to 55-

gallon drums, although other size containers may be utilized in accordance with DOT and ATF shipping requirements. Facility personnel will visually examine the waste containers to evaluate whether the actual type and quantity of waste received matches the representations on the manifest. Due to the reactive nature of the waste managed at the facility, no physical samples of incoming waste will be collected. If necessary, the analyses used to determine acceptability of the waste will be reviewed to ensure that the waste received is consistent with original representations.

Facility personnel who conduct the sampling and analysis will classify the waste as being non-conforming or off-specification if it is significantly different in any characteristics from the information provided on the Waste Profile Form or if it is significantly different in composition or volume from that shown on the manifest.

Waste found to be off specification will be rejected, or it may be re-evaluated for possible acceptance by the facility despite the variance (possibly under an alternate Waste Profile). The re-evaluation will be based on the following criteria:

- Permit authorization,
- Additional testing,
- Discussions with the generator,
- Facility conditions, and
- General Manager's judgment

If it is determined that a waste shipment (or portion thereof) must be rejected, the rejection will occur within 60 days of this determination. In the meantime, the waste will be properly stored in one of the permitted waste storage units on-site. If the waste is determined to be potentially incompatible with other on-site wastes, it will be stored separately in one or more of the permitted waste storage units while awaiting rejection.

Facility personnel will discuss and attempt to resolve with the generator any discrepancy between the actual waste and the information indicated on the manifest. In the case of significant discrepancies, the generator will be asked to provide a written document noting the non-conformance and reasons for the occurrence.

If the load is accepted, the General Manager, or designee, will sign and date the manifest.

An incoming waste report will be prepared for each shipment accepted. The report will note the manifest number, quantity, type, and on-site storage destination of each shipment. The report will be updated each time wastes are moved to different storage magazines or treatment areas. The updated information will consist of the appropriate manifest document number, type and quantity of waste, and previous and new locations.

The use of the incoming waste report constitutes the primary Quality Assurance and Quality Control procedure at the facility. As previously stated, this report is updated each time the waste is managed (e.g., removal from the magazine to the preparation building, removal from the preparation building to the thermal treatment unit, etc.). If at any time a discrepancy or other unusual situation develops, facility personnel will immediately contact the site QA/QC manager to determine an appropriate course of action.

4.0 SITE-GENERATED WASTE EVALUATION

4.1 General. This section addresses waste generated from the thermal treatment process. Specific waste streams include the following:

- Residue remaining from treating characteristic (D003) hazardous waste, and
- Residue remaining from treated listed hazardous waste.

All ash and residue resulting from the thermal treatment process will be stored on-site within a contained area prior to shipment off-site for disposal. Residue from the treatment of characteristic waste will be kept separate from the residue generated in the treatment of listed waste. This waste analysis plan contains methods for evaluating the ash from the treatment of characteristic waste to determine the proper method of handling and disposal. For additional information on the management of the ash residues and other site-generated waste, refer to Exhibit A, Ash Management SOP and Exhibit E, Waste Segregation Plan.

4.2 Waste Characterization - Residues from Treatment of Characteristic Waste. As previously stated, residue from the treatment of characteristic waste will be separated from residue from the treatment of listed waste. Each container will be sampled and analyzed prior to off-site shipment. Sampling will be conducted as follows:

- Three sub-samples will be taken from each container to be shipped. These will be composited after the final sub-sample is obtained and analyzed as a single sample.

- Sub-samples will be collected as follows; Sub-sample No. 1 will be collected from the ash surface near one end of the container, Sub-sample No. 2 will be collected from the middle of the container at mid-depth of the ash, and Sub-sample No. 3 collected from the opposite end of the container near the bottom.

- Sub-samples will be composited for final analysis.

The composite sample will be analyzed to determine if the residue exhibits the characteristic of toxicity for the metals listed in LAC 33:V.4903. Testing will be in accordance with the methods published U.S. Environmental Protection Agency (EPA) *Test Methods for Evaluating Solid Waste*; SW-846; Third Edition. Extraction protocol will comply with SW-846 Method 1310A; analysis for metals will be in accordance with SW-846 methods.

QA/QC documentation to be provided by the contract analytical laboratory will include the following:

- sample documentation;
- documentation of initial and continuing calibration;
- determination and documentation of detection limits;
- analyte identification and quantification;
- matrix spike recoveries;
- performance evaluation samples;
- analytical error determination; and
- total measurement error determination.

Sample containers will be provided by the laboratory and will be used as received. Sample containers will be labelled to provide information on the sample location, date, time, sampling personnel, and the parameters for which the waste is to be analyzed. Strict chain-of-custody will be followed.

Any equipment which is used for sampling will be decontaminated prior to use. Decontamination will involve a detergent wash with a non-phosphate detergent followed by triple rinsing with distilled water. After decontamination, the sampling equipment will be wrapped in aluminum foil if not used immediately.

<u>4.3 Waste Characterization - Residue from the Treatment of Listed Hazardous Waste</u>. The ash residue from the burners used to treat listed hazardous waste will be assigned the waste codes applicable to the waste prior to thermal treatment unless these waste codes can be eliminated under 40 CFR 261.3. Since the facility only thermally treats listed wastes on-site that are listed solely for reactivity, the listed waste codes will not typically apply to the resulting ash (as it will no longer exhibit the characteristic of reactivity). Ash that results from the burn pans designated for listed wastes may still be subject to analysis to determine whether any characteristic waste codes (such as those for metals) apply if those waste codes were present in addition to the listed waste codes on the incoming wastes.

As required under LAC 33:V, Chapter 22, Clean Harbors Colfax, LLC will evaluate these wastes to determine whether land ban disposal restrictions apply, and if so, whether further treatment is required to reach permissible disposal concentrations. In such cases, the subject ash will be analyzed for the constituent(s) specified in Chapter 22 for the applicable waste code. All Sampling protocol and analytical methods, including QA/QC requirements, will be as specified in Section 4.2 above.

This section specifies the parameters for which each waste will be analyzed and the rationale for the selection of these parameters, in compliance with LAC 33:V.1519.B.1.

5.0 PROCESS OPERATIONS

Existing and anticipated process operations at the facility include the following:

- Waste Storage (in magazines)
- Preparation Building
- Thermal Treatment via Open Burn/Open Detonation
- Thermal Treatment via Enclosed Burn System

These units are described in detail in the Part B Permit Application for the facility. A summary of the design and capabilities of each unit is included below.

Waste Storage

The storage magazines are 10 feet by 20 feet in area and 8 feet high with the exception of Magazines 1, 2, 6, and 7 measuring 8 feet by 40 feet in area and 8 feet high. The interior roof, doors, floors, and walls are lined with hardwood panelling. Vents are installed to permit proper ventilation and to prevent the build-up of extreme heat or pressure. The ventilation openings are screened. The openings are turned downward to prevent rainfall from entering. In addition, the screens prevent the entry debris, insects, reptiles, small mammals, or other objects. The magazines are grounded to prevent the occurrence of an accidental fire or explosion from a lightning strike. The doors of the magazines are double locked with 5 tumbler locks that are covered with steel hoods. A covered truck staging area is adjacent to the entrance of three of the storage magazines that are labelled as Nos. 8, 9, and 10. The secondary containment at the truck staging area will contain any spills of liquids that may occur during transfer.

Preparation Building

The Preparation Building is 40 feet wide by 40 feet long with a concrete apron at the entrance. The preparation building is supplied with electric power to operate the drill press and band saw used for preparation activities. All electrical switches, motors, controls, and lights conform to the requirements of Class II, Division 2 of the National Electric Code. A container storage area is located at the rear of the preparation building. This area measures 18 feet wide by 60 feet long in plan (to be increased to 38 feet by 60 feet upon approval from LDEQ) with a 6" high berm to provide secondary containment. Generally, the only hazardous ash will be the minimal amounts of ash collected from the treatment of wastes that include listed waste codes since the treatment process typically removes any characteristically hazardous constituents. Incoming wastes that are not required by ATF to be stored inside the storage magazines may also be stored in the permitted area at the rear of the preparation building.

Thermal Treatment (via Open Burn/Open Detonation)

The thermal treatment area is constructed on a 700-foot by 130-foot reinforced concrete slab (6 inch thick). The thermal treatment units consist of twenty (20) concrete curbed treatment pads atop the slab, each equipped with an interchangeable burner assembly. The burner assemblies consist of a 6-foot by 6-foot square by 20 inches high open steel pans. The open steel pans are constructed of 3/16-inch (minimum) steel thickness. Each of the treatment units is equipped with a retractable roof structure to prevent rainfall accumulation. The facility plans to add a concrete tray staging pad upon approval by LDEQ.

Once the new Enclosed Burn Chamber is operational, certain wastes will still need to be managed via OB/OD including the following:

- Cylinders. The frequency is expected to be weekly or biweekly, depending on inbound volume. Clean Harbors Environmental Services is the largest cylinder disposal company in North America. In 2021, the company managed over 140,000 compressed gas cylinders. Some of these can be managed via recycling, incineration, hydrolysis, etc.; however, to ensure personnel safety and prevent structural damage the only reasonable option for managing some of them is OB/OD. Most cylinders typically consist of approximately one pound of N.E.W., and the incoming volume varies considerably from one year to the next.

  The company has attempted in the past to manage this waste stream via both standard incineration and hydrolysis. However, the energetic properties and inability to remove the material has caused numerous incidents during standard aspiration and/or flushing of the cylinders. Currently there are no other feasible options internally or externally by which to manage this waste stream.

- Rocket Motors (size dependent). Those that can be cut into suitable sizes may be managed in the enclosed unit. However, those that are unable to be cut or are unsafe to be cut will be static fired in the OB/OD unit. The amount of N.E.W. in each rocket motor will vary depending on the size. Each generator determines this information and provides it to the facility on the waste profile.

- Large fireworks. Certain large fireworks (in the form of balls ranging up to 15 inches in diameter) would likely cause damage to the filtration system and would also need to be treated via OB/OD. The N.E.W. for most fireworks is around 20% of the gross weight which has historically amounted to approximately 2,400 pounds (N.E.W.) per quarter on average. This amount will vary from time to time.

- Any newly profiled waste, wastes unlike other waste streams that have been confirmed to be safely manageable through the enclosed unit, or other wastes that are likely to detonate during burning may require treatment via OB/OD at least on a trial basis to ensure that the facility can be reasonably assured that processing via the enclosed unit will not result in damage to the unit or an unacceptable safety risk to personnel.

- There may be other material that presents no issue with the enclosed unit but that might create issues with the pollution abatement system. That is a consideration that will need to be evaluated on a case-by-case basis. The N.E.W will vary.

- The facility anticipates that there may be times when OB/OD would be used during maintenance activities on the Enclosed Burn System. The OB/OD may also be used when conditions cause waste to be unstable and unsuitable or thermal treatment in the enclosed chamber. The need to use OB/OD will be evaluated on a case by case basis for this scenario.

Aside from the cylinders, these other wastes/potential wastes would most likely require OB/OD utilization less frequently than weekly.

Thermal Treatment (via Enclosed Burn System) (To Be Constructed)

CH Colfax expects the following approximate time-line for the unit to become operational once approval by LDEQ is obtained. The facility will attempt to shorten these time frames, but if the current supply chain constraints continue, the time-line could be on the higher end of these estimates.

Initial Design: Complete
Final Design: 6-9 months
Fabrication: 11-19 months
Installation: 3-4 months
Commissioning and Testing: 2-5 months

All incoming waste streams except those described above are expected to be managed within the Enclosed Burn System. Overall, once the new unit is fully operational the facility anticipates that up to 90% of the incoming waste will be treated within the enclosed unit with the remainder requiring OB/OD. There may be some brief periods of time during which may see higher or lower enclosed burn unit utilization, depending on the exact mix of incoming waste types. The facility also anticipates a need to occasionally utilize the OB/OD unit when the enclosed unit has to be taken off-line for maintenance activities, etc.

Subsequent to the thermal treatment process, the remaining ash is collected in accordance with the

Ash Management SOP (Exhibit A). This SOP describes the process in detail, from collection of the residual ash to the ultimate disposal of the ash.

To summarize the on-site waste management process at CH Colfax, the following depicts each step in the process:

1. Waste is evaluated for acceptability through the waste profiling process.

2. Waste arrives on-site

3. The paperwork is reviewed for completeness and correctness.

4. The waste is off-loaded and compared to the information on the manifest

5. A visual examination of the waste is completed.

6. The waste is then either thermally treated or placed into a permitted storage unit for later processing. If needed, the waste is processed through the preparation building prior to thermal treatment.

7. The burn areas are inspected to ensure that the thermal treatment process was complete. If residuals appear not to be completely consumed, those materials will be re-burned to ensure complete destruction.

8. All ash residues are then collected and managed in accordance with the Ash Management SOP. Ultimately, the ash is shipped off-site for disposal.

EXHIBIT A

ASH MANAGEMENT SOP

Clean Harbors Colfax, LLC
Standard Operating Procedure
Ash Management

1.0 Purpose/Scope:

1.1 To ensure the proper management of ash and residues in accordance with the facility's operating permit, applicable hazardous waste management regulations, and company policy.

2.0 Procedure:

2.1 All ash and residue from the burners will be collected and appropriately stored on-site pending off-site disposal.

2.2 Ash collected from all waste burners will be considered nonhazardous as long as no characteristically hazardous waste other than D003 is thermally treated in these burners.

2.3 Each roll off container of ash residue will be sampled and analyzed in accordance with the proper SW-846 method(s) for the parameters listed below if the applicable waste codes applied to the incoming waste streams:

Arsenic (D004)	Barium (D005)
Cadmium (D006)	Chromium (D007)
Lead (D008	Selenium (D010)
Silver (D011)	

2.4 The sampling procedure will be as described in the Waste Analysis Plan:

2.4.1 Three samples will be taken from each roll off to be shipped.
2.4.2 The first sample will be collected from the ash surface near one end of the container; the second sample will be collected from the middle of the container at mid depth of the ash; and the third sample will be collected from the opposite end of the container near the bottom.

2.5 Ash collected from waste burners that included listed wastes will be considered hazardous waste unless excluded under 40 CFR 261.3. Since the listed waste codes only apply based on reactivity, the listed waste codes will not have to apply to the ash since the reactivity characteristic will be removed. This ash may be tested for metals if any of the waste codes for those metals were present in the incoming waste stream(s).

2.6 During the time while ash and residue are being accumulated on-site, the following standards will apply:

2.6.1 The residue resulting from the burners in which only D003 wastes were managed will be accumulated in containers such as a roll off which will be kept closed at all times except when necessary to add waste to or remove waste from the container. It will be assumed that these materials are hazardous until such time that it is determined that it does not exhibit the characteristics of a hazardous waste. Arrangements for off-site shipment will be made in due course, but under no circumstances should those materials which are determined to be hazardous waste be allowed to remain on-site for longer than 90 days.

2.7 Shipments of ash and residue must be accompanied by the appropriate paperwork, generally consisting of a hazardous waste manifest and an LDR form (as needed). Nonhazardous waste shipments may be shipped on a bill of lading or manifest.

2.8 Records of all shipments must be maintained in the operating record for the facility. In the case of hazardous waste shipments, complete information regarding the amount generated and other information related to the off-site management of the material must be included in the facility's annual hazardous waste report.

3.0 SOP Management:

This SOP should be reviewed annually for consistency with the facility's permit, applicable regulations, and company policy. Any changes to this policy or deviations from the policy should immediately be conveyed to the management of the facility and the compliance manager.

EXHIBIT B

WASTE PROFILE SHEET

CleanHarbors

WASTE MATERIAL PROFILE SHEET

Clean Harbors Profile No.

A. GENERAL INFORMATION

GENERATOR EPA ID #/REGISTRATION # GENERATOR NAME:

GENERATOR CODE (Assigned by Clean Harbors) CITY STATE/PROVINCE ZIP/POSTAL CODE

ADDRESS PHONE:

CUSTOMER CODE (Assigned by Clean Harbors) CUSTOMER NAME:

ADDRESS CITY STATE/PROVINCE ZIP/POSTAL CODE

B. WASTE DESCRIPTION

WASTE DESCRIPTION:

PROCESS GENERATING WASTE:

IS THIS WASTE CONTAINED IN SMALL PACKAGING CONTAINED WITHIN A LARGER SHIPPING CONTAINER ?

C. PHYSICAL PROPERTIES (at 25C or 77F)

PHYSICAL STATE	NUMBER OF PHASES/LAYERS	VISCOSITY (If liquid present)	COLOR
SOLID WITHOUT FREE LIQUID POWDER MONOLITHIC SOLID LIQUID WITH NO SOLIDS LIQUID/SOLID MIXTURE % FREE LIQUID % SETTLED SOLID % TOTAL SUSPENDED SOLID SLUDGE GAS/AEROSOL	1 2 3 % BY VOLUME (Approx.) TOP 0.00 MIDDLE 0.00 BOTTOM 0.00	1 - 100 (e.g. Water) 101 - 500 (e.g. Motor Oil) 501 - 10,000 (e.g. Molasses) > 10,000	

ODOR	BOILING POINT °F (°C)	MELTING POINT °F (°C)	TOTAL ORGANIC CARBON
NONE MILD STRONG Describe:	<= 95 (<=35) 95 - 100 (35-38) 101 - 129 (38-54) >= 130 (>54)	< 140 (<60) 140-200 (60-93) > 200 (>93)	<= 1% 1-9% >= 10%

FLASH POINT °F (°C)	pH	SPECIFIC GRAVITY	ASH	BTU/LB (MJ/kg)
< 73 (<23) 73 - 100 (23-38) 101 -140 (38-60) 141 -200 (60-93) > 200 (>93)	<= 2 2.1 - 6.9 7 (Neutral) 7.1 - 12.4 >= 12.5	< 0.8 (e.g. Gasoline) 0.8-1.0 (e.g. Ethanol) 1.0 (e.g. Water) 1.0-1.2 (e.g. Antifreeze) > 1.2 (e.g. Methylene Chloride)	< 0.1 0.1 - 1.0 1.1 - 5.0 5.1 - 20.0 > 20 Unknown	< 2,000 (<4.6) 2,000-5,000 (4.6-11.6) 5,000-10,000 (11.6-23.2) > 10,000 (>23.2) Actual:

D. COMPOSITION (List the complete composition of the waste, include any inert components and/or debris. Ranges for individual components are acceptable. If a trade name is used, please supply an MSDS. Please do not use abbreviations.)

CHEMICAL	MIN	--	MAX	UOM

DOES THIS WASTE CONTAIN ANY HEAVY GAUGE METAL DEBRIS OR OTHER LARGE OBJECTS (EX., METAL PLATE OR PIPING >1/4" THICK OR >12" LONG, METAL REINFORCED HOSE >12" LONG, METAL WIRE >12" LONG, METAL VALVES, PIPE FITTINGS, CONCRETE REINFORCING BAR OR PIECES OF CONCRETE >3")? YES NO

If yes, describe, including dimensions:

DOES THIS WASTE CONTAIN ANY METALS IN POWDERED OR OTHER FINELY DIVIDED FORM? YES NO

DOES THIS WASTE CONTAIN OR HAS IT CONTACTED ANY OF THE FOLLOWING; ANIMAL WASTES, HUMAN BLOOD, BLOOD PRODUCTS, BODY FLUIDS, MICROBIOLOGICAL WASTE, PATHOLOGICAL WASTE, HUMAN OR ANIMAL DERIVED SERUMS OR PROTEINS OR ANY OTHER POTENTIALLY INFECTIOUS MATERIAL? YES NO

I acknowledge that this waste material is neither infectious nor does it contain any organism known to be a threat to human health. This certification is based on my knowledge of the material. Select the answer below that applies:

The waste was never exposed to potentially infectious material. YES NO

Chemical disinfection or some other form of sterilization has been applied to the waste. YES NO

I ACKNOWLEDGE THAT THIS PROFILE MEETS THE CLEAN HARBORS BATTERY PACKAGING REQUIREMENTS. YES NO

I ACKNOWLEDGE THAT MY FRIABLE ASBESTOS WASTE IS DOUBLE BAGGED AND WETTED. YES NO

SPECIFY THE SOURCE CODE ASSOCIATED WITH THE WASTE. SPECIFY THE FORM CODE ASSOCIATED WITH THE WASTE.

CleanHarbors Clean Harbors Profile No.

E. CONSTITUENTS

Are these values based on testing or knowledge? Knowledge Testing

If constituent concentrations are based on analytical testing, analysis must be provided. Please attach document(s) using the link on the Submit tab.

Please indicate which constituents below apply. Concentrations must be entered when applicable to assist in accurate review and expedited approval of your waste profile. Please note that the total regulated metals and other constituents sections require answers.

RCRA	REGULATED METALS	REGULATORY LEVEL (mg/l)	TCLP mg/l	TOTAL	UOM	NOT APPLICABLE
D004	ARSENIC	5.0				
D005	BARIUM	100.0				
D006	CADMIUM	1.0				
D007	CHROMIUM	5.0				
D008	LEAD	5.0				
D009	MERCURY	0.2				
D010	SELENIUM	1.0				
D011	SILVER	5.0				

RCRA	VOLATILE COMPOUNDS	REGULATORY LEVEL (mg/l)
D018	BENZENE	0.5
D019	CARBON TETRACHLORIDE	0.5
D021	CHLOROBENZENE	100.0
D022	CHLOROFORM	6.0
D028	1,2-DICHLOROETHANE	0.5
D029	1,1-DICHLOROETHYLENE	0.7
D035	METHYL ETHYL KETONE	200.0
D039	TETRACHLOROETHYLENE	0.7
D040	TRICHLOROETHYLENE	0.5
D043	VINYL CHLORIDE	0.2
	SEMI-VOLATILE COMPOUNDS	
D023	o-CRESOL	200.0
D024	m-CRESOL	200.0
D025	p-CRESOL	200.0
D026	CRESOL (TOTAL)	200.0
D027	1,4-DICHLOROBENZENE	7.5
D030	2,4-DINITROTOLUENE	0.13
D032	HEXACHLOROBENZENE	0.13
D033	HEXACHLOROBUTADIENE	0.5
D034	HEXACHLOROETHANE	3.0
D036	NITROBENZENE	2.0
D037	PENTACHLOROPHENOL	100.0
D038	PYRIDINE	5.0
D041	2,4,5-TRICHLOROPHENOL	400.0
D042	2,4,6-TRICHLOROPHENOL	2.0
	PESTICIDES AND HERBICIDES	
D012	ENDRIN	0.02
D013	LINDANE	0.4
D014	METHOXYCHLOR	10.0
D015	TOXAPHENE	0.5
D016	2,4-D	10.0
D017	2,4,5-TP (SILVEX)	1.0
D020	CHLORDANE	0.03
D031	HEPTACHLOR (AND ITS EPOXIDE)	0.008

OTHER CONSTITUENTS	MAX	UOM	NOT APPLICABLE
BROMINE			
CHLORINE			
FLUORINE			
IODINE			
SULFUR			
POTASSIUM			
SODIUM			
AMMONIA			
CYANIDE AMENABLE			
CYANIDE REACTIVE			
CYANIDE TOTAL			
SULFIDE REACTIVE			

HOCs

NONE

< 1000 PPM

>= 1000 PPM

PCBs

NONE

< 50 PPM

>=50 PPM

IF PCBS ARE PRESENT, IS THE WASTE REGULATED BY TSCA 40 CFR 761?

YES NO

ADDITIONAL HAZARDS

DOES THIS WASTE HAVE ANY UNDISCLOSED HAZARDS OR PRIOR INCIDENTS ASSOCIATED WITH IT, WHICH COULD AFFECT THE WAY IT SHOULD BE HANDLED?

YES NO (If yes, explain)

CHOOSE ALL THAT APPLY

DEA REGULATED SUBSTANCES	EXPLOSIVE	FUMING	OSHA REGULATED CARCINOGENS
POLYMERIZABLE	RADIOACTIVE	REACTIVE MATERIAL	NONE OF THE ABOVE

CleanHarbors

Clean Harbors Profile No.

F. REGULATORY STATUS

YES NO USEPA HAZARDOUS WASTE?

YES NO DO ANY STATE WASTE CODES APPLY?

Texas Waste Code

YES NO DO ANY CANADIAN PROVINCIAL WASTE CODES APPLY?

YES NO IS THIS WASTE PROHIBITED FROM LAND DISPOSAL WITHOUT FURTHER TREATMENT PER 40 CFR PART 268?

LDR CATEGORY:
VARIANCE INFO:

YES NO IS THIS A UNIVERSAL WASTE?

YES NO IS THE GENERATOR OF THE WASTE CLASSIFIED AS CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR (CESQG)?

YES NO IS THIS MATERIAL GOING TO BE MANAGED AS A RCRA EXEMPT COMMERCIAL PRODUCT, WHICH IS FUEL (40 CFR 261.2 (C)(2)(II))?

YES NO DOES TREATMENT OF THIS WASTE GENERATE A F006 OR F019 SLUDGE?

YES NO IS THIS WASTE STREAM SUBJECT TO THE INORGANIC METAL BEARING WASTE PROHIBITION FOUND AT 40 CFR 268.3(C)?

YES NO DOES THIS WASTE CONTAIN VOC'S IN CONCENTRATIONS >=500 PPM?

YES NO DOES THE WASTE CONTAIN GREATER THAN 20% OF ORGANIC CONSTITUENTS WITH A VAPOR PRESSURE >= .3KPA (.044 PSIA)?

YES NO DOES THIS WASTE CONTAIN AN ORGANIC CONSTITUENT WHICH IN ITS PURE FORM HAS A VAPOR PRESSURE > 77 KPA (11.2 PSIA)?

YES NO IS THIS CERCLA REGULATED (SUPERFUND) WASTE ?

YES NO IS THE WASTE SUBJECT TO ONE OF THE FOLLOWING NESHAP RULES?

Hazardous Organic NESHAP (HON) rule (subpart G) Pharmaceuticals production (subpart GGG)

YES NO IF THIS IS A US EPA HAZARDOUS WASTE, DOES THIS WASTE STREAM CONTAIN BENZENE?

YES NO Does the waste stream come from a facility with one of the SIC codes listed under benzene NESHAP or is this waste regulated under the benzene NESHAP rules because the original source of the waste is from a chemical manufacturing, coke by-product recovery, or petroleum refinery process?

YES NO Is the generating source of this waste stream a facility with Total Annual Benzene (TAB) >10 Mg/year?

What is the TAB quantity for your facility? Megagram/year (1 Mg = 2,200 lbs)

The basis for this determination is: Knowledge of the Waste Or Test Data Knowledge Testing

Describe the knowledge :

G. DOT/TDG INFORMATION

DOT/TDG PROPER SHIPPING NAME:

H. TRANSPORTATION REQUIREMENTS

ESTIMATED SHIPMENT FREQUENCY ONE TIME WEEKLY MONTHLY QUARTERLY YEARLY OTHER

☑ CONTAINERIZED

0-0 CONTAINERS/SHIPMENT

STORAGE CAPACITY:
CONTAINER TYPE:
CUBIC YARD BOX PALLET
TOTE TANK DRUM
OTHER:
DRUM SIZE:

BULK LIQUID

GALLONS/SHIPMENT: *0 Min -0 Max* GAL.

BULK SOLID

SHIPMENT UOM: TON YARD

TONS/YARDS/SHIPMENT: *0 Min - 0 Max*

I. SPECIAL REQUEST

COMMENTS OR REQUESTS:

GENERATOR'S CERTIFICATION

I certify that I am authorized to execute this document as an authorized agent. I hereby certify that all information submitted in this and attached documents is correct to the best of my knowledge.I also certify that any samples submitted are representative of the actual waste.If Clean Harbors discovers a discrepancy during the approval process, Generator grants Clean Harbors the authority to amend the profile, as Clean Harbors deems necessary, to reflect the discrepancy.

AUTHORIZED SIGNATURE NAME (PRINT) TITLE DATE

EXHIBIT C

LDR FORM

CLEAN HARBORS ENVIRONMENTAL SERVICES, INC.
LAND DISPOSAL RESTRICTION FORM LDR-1 MANIFEST NO________________

THE HAZARDOUS WASTES IDENTIFIED ON THE HAZARDOUS WASTE MANIFEST IDENTIFIED ABOVE AND BEARING THE EPA HAZARDOUS WASTE CODES LISTED BELOW ARE RESTRICTED WASTES WHICH ARE PROHIBITED FROM LAND DISPOSAL WITHOUT FURTHER TREATMENT UNDER THE LAND DISPOSAL RESTRICTIONS, 40 CFR PART 268 .7 (a)(2), AND RCRA SECTION 3004(D). IN ACCORDANCE WITH 40 CFR 268.7(a), THE EPA WASTE CODE, WASTE SUBCATEGORY, AND TREATABILITY GROUPS, AS APPLICABLE, ARE INCLUDED BELOW.

INSTRUCTIONS -- COMPLETE ALL SECTIONS. REFER TO PAGE 3 OF THIS FORM FOR KEY TERMS/DEFINITIONS.

Column 1 - Line Item: Enter the manifest line item number (e.g., 11a) that corresponds to the waste code(s).
Column 2 - Waste Codes/Subcategory: Check off all applicable waste codes. For D001 through D043, also check applicable subcategory; for F001 through F005, check applicable constituents.
Column 3 - Wastewater/Non-wastewater: Check off "WW" for wastewater and "Non-WW" for non-wastewaters.
Column 4 - LDR Handling Code: Circle the appropriate handling code, as follows:

1 = The waste is a characteristic hazardous waste D001, D002, D003, D004-D011, or D018-43 which is intended for treatment/disposal in a CWA system, CWA-equivalent system, or Class I SDWA system. Underlying Hazardous Constituents (UHC's) are NOT required to be identified.

1A = The waste is a characteristic hazardous waste D001 High TOC Ignitable Liquids Subcategory (i.e., greater than or equal to 10% TOC). Pursuant to 40 CFR 268.40, the waste must be treated using organic recovery (RORGS) or combustion (CMBST) technology. UHC's are NOT required to be identified.

2 = The waste is a characteristic hazardous waste D001 (other than High TOC Ignitable Liquids), D002, D003 Explosive, Water Reactive or Other Reactive subcategory, D004-D011, D012-17 non-wastewater, or D018-43 which is intended for treatment/disposal in a non-CWA system, non-CWA-equivalent system, or non-Class I SDWA system located in the United States. All UHC's which are reasonably expected to be present must be identified, except for D001 waste that is intended to be treated using organic recovery (RORGS) or combustion (CMBST) technologies. Identify UHC's by completing Sections I and IV of CHI Form LDR-1 Addendum and attach completed Addendum to this form.

3 = The waste is a characteristic (i.e., D-code) or listed (i.e., F-, K-, U-, or P-code) hazardous waste which is intended for export and treatment/disposal at a facility located outside the United States. LDR treatment standards do not apply to hazardous waste treated/disposed in a foreign country, and per USEPA guidance, the identification of UHC's (if applicable) is not required for hazardous waste that is intended to be exported. Note however that if the exported waste is subsequently returned for treatment/disposal in the United States, all applicable LDR regulations would apply and a revised LDR notification would be required.

4 = The waste meets the definition of hazardous debris pursuant to 40 CFR 268.2(h) and is intended for treatment/ disposal in compliance with the alternate debris treatment technologies of 40 CFR 268.45. In accordance with the requirements of 40 CFR 268.7(a)(2) : the contaminants subject to treatment (CSTT's) must be identified as part of this notification. Identify CSTT's by completing Section III and IV of the CHI Form LDR-1 Addendum and attach completed Addendum to this form. These constituents are being treated to comply with 40 CFR 268.45.

5 = The waste is a characteristic waste D003 Reactive Sulfide, Reactive Cyanide, or Unexploded Ordnance subcategory, a characteristic waste D012- 17 wastewater, or a listed (i.e., F-, K-, U-, or P-code) hazardous waste. UHC's are NOT required to be identified.

6 = The waste is a lab pack that is intended for incineration using the alternative lab pack treatment standard under 40 CFR 268.42(c). UHC's are NOT required to be identified; however, the generator must complete and attach the lab pack certification statement on CHI Form LDR-LP. Note that in accordance with 40 CFR Part 268 Appendix IV, lab packs which contain waste codes D009, F019, K003, K004, K005, K006, K062, K071, K100, K106, P010, P011, P012, P076, P078, U134, and U151 are not eligible for alternative lab pack treatment standard.

*** **NOTE: IF THE WASTE IS A SOIL CONTAMINATED WITH A LISTED OR CHARACTERISTIC WASTE AND THE GENERATOR WANTS TO USE THE ALTERNATE TREATMENT STANDARD FOR SOILS, CONTACT CORPORATE COMPLIANCE FOR THE APPROPRIATE LDR NOTIFICATION FORM.**

SECTION I. CHARACTERISTIC WASTES D001 THROUGH D043

COLUMN 1: LINE ITEM SEE MANIFEST	COLUMN 2: WASTE CODE / SUBCATEGORY	COLUMN 3: WASTEWATER/ NON-WASTEWATER	COLUMN 4: HANDLING CODE
________	[ ] D001 Ignitables, except High TOC subcategory	[ ] WW [ ] Non-WW	1 2 3 4 6
________	[ ] D001 High TOC Ignitable Liquids Subcategory (Greater than or equal to 10% TOC)	[ ] Non-WW only	1A 3 6
________	[ ] D002 Corrosives	[ ] WW [ ] Non-WW	1 2 3 4 6
________	[ ] D003		
	[ ] Reactive Sulfide, per 261.23 (a)(5)	[ ] WW [ ] Non-WW	1 3 4 5 6
	[ ] Reactive Cyanide, per 261.23(a)(5)	[ ] WW [ ] Non-WW	1 3 4 5 6
	[ ] Explosive, per 261.23(a)(6), (7) & (8)	[ ] WW [ ] Non-WW	1 2 3 4 6
	[ ] Water Reactive, per 261.23(a)(2), (3) & (4)	[ ] Non-WW only	1 2 3 4 6
	[ ] Other Reactive, per 261.23(a)(1)	[ ] WW [ ] Non-WW	1 2 3 4 6
	[ ] Unexploded Ordnance, Emergency Response	[ ] WW [ ] Non-WW	1 3 4 5 6
________	[ ] D004 Arsenic	[ ] WW [ ] Non-WW	1 2 3 4 6
________	[ ] D005 Barium	[ ] WW [ ] Non-WW	1 2 3 4 6
________	[ ] D006		
	[ ] Cadmium	[ ] WW [ ] Non-WW	1 2 3 4 6
	[ ] Cadmium Containing Batteries	[ ] Non-WW only	2 3 6
________	[ ] D007 Chromium	[ ] WW [ ] Non-WW	1 2 3 4 6
________	[ ] D008		
	[ ] Lead	[ ] WW [ ] Non-WW	1 2 3 4 6
	[ ] Lead Acid Batteries	[ ] Non-WW only	2 3 6

CLEAN HARBORS ENVIRONMENTAL SERVICES, INC.
LAND DISPOSAL RESTRICTION FORM LDR-1

MANIFEST NO________________

SECTION I. CHARACTERISTIC WASTES D001-43 (CONTINUED)

COLUMN 1: LINE ITEM SEE MANIFEST	COLUMN 2: WASTE CODE / SUBCATEGORY	COLUMN 3: WASTEWATER/ NON-WASTEWATER	COLUMN 4: HANDLING CODE
______	[ ] D009		
	[ ] Low Mercury, less than 260 mg/kg Mercury	[ ] WW [ ] Non-WW	1 2 3 4
	[ ] High Mercury Organic Subcategory	[ ] Non-WW only	2 3 4
	[ ] High Mercury Inorganic Subcategory	[ ] Non-WW only	2 3 4
______	[ ] D010 Selenium	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D011 Silver	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D012 Endrin	[ ] WW [ ] Non-WW	2 3 4 5 6
______	[ ] D013 Lindane	[ ] WW [ ] Non-WW	2 3 4 5 6
______	[ ] D014 Methoxychlor	[ ] WW [ ] Non-WW	2 3 4 5 6
______	[ ] D015 Toxaphene	[ ] WW [ ] Non-WW	2 3 4 5 6
______	[ ] D016 2,4-D	[ ] WW [ ] Non-WW	2 3 4 5 6
______	[ ] D017 2,4,5-TP (Silvex)	[ ] WW [ ] Non-WW	2 3 4 5 6
______	[ ] D018 Benzene	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D019 Carbon tetrachloride	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D020 Chlordane	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D021 Chlorobenzene	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D022 Chloroform	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D023 o-Cresol	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D024 m-Cresol	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D025 p-Cresol	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D026 Cresol	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D027 1,4-Dichlorobenzene	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D028 1,2-Dichloroethane	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D029 1,1-Dichloroethylene	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D030 2,4-Dinitrotoluene	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D031 Heptachlor (and its epoxide)	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D032 Hexachlorobenzene	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D033 Hexachlorobutadiene	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D034 Hexachloroethane	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D035 Methyl ethyl ketone	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D036 Nitrobenzene	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D037 Pentachlorophenol	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D038 Pyridine	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D039 Tetrachloroethylene	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D040 Trichloroethylene	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D041 2,4,5-Trichlorophenol	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D042 2,4,6-Trichlorophenol	[ ] WW [ ] Non-WW	1 2 3 4 6
______	[ ] D043 Vinyl Chloride	[ ] WW [ ] Non-WW	1 2 3 4 6

SECTION II. SPENT SOLVENT WASTES F001 THROUGH F005

COLUMN 1: LINE ITEM SEE MANIFEST	COLUMN 2: WASTE CODE / SUBCATEGORY	COLUMN 3: WASTEWATER/ NON-WASTEWATER	COLUMN 4: HANDLING CODE
______	[ ] F001 [ ] F002 [ ] F003 [ ] F004 [ ] F005	[ ] WW [ ] Non-WW	3 4 5 6

______ [ ] 1. ALL F001-F005
______ [ ] 2. Acetone
______ [ ] 3. Benzene
______ [ ] 4. n-Butyl alcohol
______ [ ] 5. Carbon disulfide
______ [ ] 6. Carbon tetrachloride
______ [ ] 7. Chlorobenzene
______ [ ] 8. o-Cresol
______ [ ] 9. m-Cresol (difficult to distinguish from p-cresol)
______ [ ] 10. p-Cresol (difficult to distinguish from m-cresol)
______ [ ] 11. Cresol - mixed isomers (sum of o-, m- and p-cresol)

______ [ ] 12. Cyclohexanone
______ [ ] 13. o-Dichlorobenzene
______ [ ] 14. 2-Ethoxyethanol (F005 only)
______ [ ] 15. Ethyl acetate
______ [ ] 16. Ethyl benzene
______ [ ] 17. Ethyl ether
______ [ ] 18. Isobutyl alcohol
______ [ ] 19. Methanol
______ [ ] 20. Methylene chloride
______ [ ] 21. Methyl ethyl ketone
______ [ ] 22. Methyl isobutyl ketone
______ [ ] 23. Nitrobenzene
______ [ ] 24. 2-Nitropropane (F005 only)

______ [ ] 25. Pyridine
______ [ ] 26. Tetrachloroethylene
______ [ ] 27. Toluene
______ [ ] 28. 1,1,1-Trichloroethane
______ [ ] 29. 1,1,2-Trichloroethane
______ [ ] 30. Trichloroethylene
______ [ ] 31. 1,1,2-Trichloro-1,2,2-trifluoroethane
______ [ ] 32. Trichloromonofluoromethane
______ [ ] 33. Xylene - mixed isomers (sum of o-, m-, and p-xylene)

CLEAN HARBORS ENVIRONMENTAL SERVICES, INC.
LAND DISPOSAL RESTRICTION FORM LDR-1

MANIFEST NO______________________

SECTION III. CALIFORNIA LIST WASTES

COLUMN 1: LINE ITEM SEE MANIFEST	COLUMN 2: WASTE CODE / SUBCATEGORY	COLUMN 3: WASTEWATER/ NON-WASTEWATER	COLUMN 4: HANDLING CODE
________	Hazardous waste containing one or more of the following California List constituents:	[ ] WW [ ] Non-WW	1 2 3 4 6

[ ] ALL CALIFORNIA LIST CONSTITUENTS
[ ] Liquids with nickel greater than or equal to 134 mg/l
[ ] Liquids with thallium greater than or equal to 130 mg/l
[ ] Liquids with PCB's > or = 50 ppm
[ ] Waste containing HOC's > or = 1,000 mg/kg

SECTION IV. OTHER LISTED WASTES (F006-12, F019-F028, F037-38, F039, K-, U-, AND P-CODES)

COLUMN 1: LINE ITEM SEE MANIFEST	COLUMN 2: WASTE CODE / SUBCATEGORY	COLUMN 3: WASTEWATER/ NON-WASTEWATER	COLUMN 4: HANDLING CODE
____	______________________	[ ] WW [ ] Non-WW	3 4 5 6
____	______________________	[ ] WW [ ] Non-WW	3 4 5 6
____	______________________	[ ] WW [ ] Non-WW	3 4 5 6
____	______________________	[ ] WW [ ] Non-WW	3 4 5 6
____	______________________	[ ] WW [ ] Non-WW	3 4 5 6

[ ] CHECK HERE IF ADDITIONAL LISTED WASTE CODES ARE PRESENT. COMPLETE AND ATTACH LDR-1 CONTINUATION SHEET.
[ ] CHECK HERE IF WASTE CODE F039 (MULTISOURCE LEACHATE) IS PRESENT. IDENTIFY F039 CONSTITUENTS BY COMPLETING SECTIONS II AND IV OF CHI FORM LDR-1 ADDENDUM AND ATTACH COMPLETED ADDENDUM TO THIS FORM.

SECTION V. CONTACT NAME AND DATE

Print Name: ______________________________ Date:______________________________

KEY TERMS/DEFINITIONS

CLASS I SDWA SYSTEM means a Class I deep well facility regulated under the Safe Drinking Water Act (SDWA).

CWA SYSTEM means a centralized wastewater treatment facility discharging under a Clean Water Act (CWA) permit. For example, a CWA facility would treat organic or inorganic aqueous wastes and discharge the treated effluent to the local sewer system. Examples of CWA treatment systems owned and operated by Clean Harbors include the wastewater treatment operations at Baltimore (including the CES system), Bristol, Chicago, Cincinnati and Cleveland.

CWA-EQUIVALENT SYSTEM means a "zero discharge system" that engages in "CWA-equivalent" treatment before land disposal. Zero-discharge facilities treat hazardous wastes using "CWA-equivalent" treatment methods, but do not discharge the treatment effluent to a sewer or water body (e.g., spray irrigation land farm). "CWA-equivalent" treatment methods means biological treatment for organics, alkaline chlorination, or ferrous sulfate precipitation for cyanide, precipitation/ sedimentation for metals, reduction of hexavalent chromium, or other treatment technology that can be demonstrated to perform equally or greater than these technologies.

HIGH TOC IGNITABLE LIQUIDS SUBCATEGORY means an ignitable liquid hazardous waste (waste code D001) which contains greater than or equal to 10% total organic carbon (TOC). Pursuant to 40 CFR 268.40, such wastes must be treated using organic recovery (RORGS) or combustion (CMBST) technology. Examples of RORGS technologies include the CES unit at Clean Harbors of Baltimore. Examples of CMBST technologies include hazardous waste fuel blending and subsequent reuse at a cement kiln, or destruction at a RCRA incinerator.

WASTEWATERS are wastes that contain less than 1% by weight total organic carbon (TOC) and less than 1% by weight total suspended solids (TSS). [See 40 CFR 268.2(f)]

CLEAN HARBORS ENVIRONMENTAL SERVICES, INC.
CONTINUATION SHEET FOR USE WITH
LAND DISPOSAL RESTRICTION NOTIFICATION FORM LDR-1

MANIFEST NO________________

SECTION IV. OTHER LISTED WASTES (F006-12, F019-F028, F037-38, F039, K-, U-, AND P-CODES)
CONTINUED FROM PAGE 3 OF FORM LDR-1

COLUMN 1: LINE ITEM SEE MANIFEST	COLUMN 2: WASTE CODE / SUBCATEGORY	COLUMN 3: WASTEWATER/ NON-WASTEWATER	COLUMN 4: HANDLING CODE
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6
______	______________________________	[ ] WW [ ] Non-WW	3 4 5 6

SECTION I. WASTE CODES ELIGIBLE FOR ALTERNATIVE TREATMENT STANDARD

[ ] Check here if the lab pack contains only those hazardous wastes codes which are NOT listed in 40 CFR Appendix IV (see Key Terms below), and which is intended for incineration in accordance with the alternative treatment standard in 40 CFR 268.42(c). If checked, complete the lab pack certification statement in Section II.

[ ] Check here if the lab pack contains one or more hazardous waste codes identified in 40 CFR Part 268 Appendix IV (see Key Terms below). If checked, the lab pack IS NOT eligible for the alternative lab pack treatment standard.

SECTION II. GENERATOR CERTIFICATION AND SIGNATURE (REQUIRED)

I CERTIFY UNDER PENALTY OF LAW THAT I PERSONALLY HAVE EXAMINED AND AM FAMILIAR WITH THE WASTE AND THAT THE LAB PACK CONTAINS ONLY WASTES THAT HAVE NOT BEEN EXCLUDED UNDER APPENDIX IV TO 40 CFR PART 268 AND THAT THIS LABPACK WILL BE SENT TO A COMBUSTION FACILITY IN COMPLIANCE WITH THE ALTERNATIVE TREATMENT STANDARDS FOR LABPACKS AT 40 CFR 268.42(c). I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING A FALSE CERTIFICATION, INCLUDING THE POSSIBILITY OF FINE OR IMPRISONMENT.

Authorized Signature: ______________________________

Date: ____________________

KEY TERMS/DEFINITIONS

LAB PACK means waste materials classed as US DOT Class or Division 3, 4.1, 4.2, 4.3, 5.1, 6.1, 8, or 9. Outer packaging must be either open head steel, aluminum, fiber, plastic or plywood drum, meeting at least packing group III performance levels. Each outer packaging must contain only one class of hazardous material. Inner containers may be glass not exceeding 1 gallon capacity, or metal or plastic not exceeding 5.3 gallons capacity. Gross weight of the container may not exceed 452 pounds. Inner packagings containing liquids must have sufficient absorbent material to absorb all liquid contents. [See 49 CFR 172.13]

PART 268 APPENDIX IV means the following waste codes identified in 40 CFR 268 Appendix IV which are not eligible for treatment using the alternative lab pack treatment standard in 40 CFR 268.42(c): D009, F019, K003, K004, K005, K006, K062, K071, K100, K106, P010, P011, P012, P076, P078, U134, and U151.

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SECTION I. UNDERLYING HAZARDOUS CONSTITUENTS (UHC'S)

[ ] Check here if one or more of the constituents listed in Section IV below are reasonably expected to be present as an "Underlying Hazardous Constituent" in the waste. Then in Section IV, check off each constituent. Note that per the definition of UHC in 40 CFR 268.2, fluoride, selenium, sulfides, vanadium and zinc are NOT regulated as UHC's.

[ ] Check here if NONE of the UHC constituents listed in Section IV are expected to be present in the waste.

SECTION II. MULTI-SOURCE LEACHATE (WASTE CODE F039)

[ ] Check here if one or more of the constituents listed in Section IV are present as a constituent in the multi-source leachate (F039) waste. Then in Section IV below, check off each constituent. Note that constituents which are identified by an asterisk (*) are NOT regulated as F039 constituents.

[ ] Check here if NONE of the F039 constituents listed in Section IV are present in the waste.

SECTION III. HAZARDOUS DEBRIS CONTAMINANTS SUBJECT TO TREATMENT (CSTT)

[ ] Check here if one or more of the constituents listed in Section IV is a CSTT for hazardous debris that is intended for treatment using the alternate treatment technologies in 40 CFR 268.45. To identify CSTT's, refer to the "Regulated Hazardous Constituent" column in the Treatment Standard Table in 40 CFR 268.40. Then, in Section IV below, check off the constituents that appear for each waste code used to identify the debris.

[ ] Check here if the entry in the "Regulated Hazardous Constituent" column in the Treatment Standard Table in 40 CFR 268.40 is "Not Applicable" , i.e. D001, D002, and D003 (non-cyanides subcategories only).

SECTION IV. LIST OF CONSTITUENTS - INCLUDE MANIFEST LINE ITEM

34._____ [ ] Acenaphthylene
35._____ [ ] Acenaphthene
36._____ [ ] Acetone
37._____ [ ] Acetonitrile
38._____ [ ] Acetophenone
39._____ [ ] 2-Acetylaminofluorene
40._____ [ ] Acrolein
41._____ [ ] Acrylamide (*)
42._____ [ ] Acrylonitrile
251.____ [ ] Aldicarb sulfone (*)
43._____ [ ] Aldrin
44._____ [ ] 4-Aminobiphenyl
45._____ [ ] Aniline
46._____ [ ] Anthracene
47._____ [ ] Antimony
48._____ [ ] Aramite
49._____ [ ] Arsenic
50._____ [ ] alpha-BHC
51._____ [ ] beta-BHC
52._____ [ ] delta-BHC
53._____ [ ] gamma-BHC
252.____ [ ] Barban (*)
54._____ [ ] Barium
253.____ [ ] Bendiocarb (*)
255.____ [ ] Benomyl (*)
55._____ [ ] Benzene
56._____ [ ] Benz(a)anthracene
57._____ [ ] Benzal chloride (*)
58._____ [ ] Benzo(b)fluoranthene (difficult to distinguish from Benzo(k)fluoranthene)
59._____ [ ] Benzo(k)fluoranthene (difficult to distinguish from Benzo(b)fluoranthene)
60._____ [ ] Benzo(g,h,i)perylene
61._____ [ ] Benzo(a)pyrene
62._____ [ ] Berylium
63._____ [ ] Bromodichloromethane
64._____ [ ] Bromomethane (Methyl bromide)
65._____ [ ] 4-Bromophenyl phenyl ether
66._____ [ ] n-Butyl alcohol
256.____ [ ] Butylate (*)
67._____ [ ] Butyl benzyl phthalate
68._____ [ ] 2-sec-Butyl-4,6-dinitrophenol (Dinoseb)
69._____ [ ] Cadmium
257.____ [ ] Carbaryl (*)
258.____ [ ] Carbendazim (*)
259.____ [ ] Carbofuran (*)
260.____ [ ] Carbofuran phenol (*)
70. _____ [ ] Carbon disulfide
71. _____ [ ] Carbon tetrachloride
261. _____ [ ] Carbosulfan (*)
72. _____ [ ] Chlordane (alpha and gamma isomers)
73. _____ [ ] p-Chloroaniline
74. _____ [ ] Chlorobenzene
75. _____ [ ] Chlorobenzilate
76. _____ [ ] 2-Chloro-1,3-butadiene
77. _____ [ ] Chlorodibromomethane
78. _____ [ ] Chloroethane
79. _____ [ ] bis(2-Chloroethoxy)methane
80. _____ [ ] bis(2-Chloroethyl)ether
81. _____ [ ] Chloroform
82. _____ [ ] bis(2-Chloroisopropyl)ether
83. _____ [ ] p-Chloro-m-cresol
84. _____ [ ] 2-Chloroethyl vinyl ether (*)
85. _____ [ ] Chloromethane (Methyl Chloride)
86. _____ [ ] 2-Chloronaphthalene
87. _____ [ ] 2-Chlorophenol
88. _____ [ ] 3-Chloropropylene
89. _____ [ ] Chromium (Total)
90. _____ [ ] Chrysene
91. _____ [ ] o-Cresol
92. _____ [ ] m-Cresol (difficult to distinguish from p-Cresol)
93. _____ [ ] p-Cresol (difficult to distinguish from o-Cresol)
262. _____ [ ] m-Cumenyl methylcarbamate (*)
94. _____ [ ] Cyanides (Total)
95. _____ [ ] Cyanides (Amenable)
263. _____ [ ] Cycloate (*)
96. _____ [ ] Cyclohexanone
97. _____ [ ] 1,2-Dibromo-3-chloropropane
98. _____ [ ] 1,2-Dibromoethane (Ethylene dibromide)
99. _____ [ ] Dibromomethane
100. _____ [ ] 2,4-Dichlorophenoxyacetic acid (2,4-D)
101. _____ [ ] o,p'-DDD
102. _____ [ ] p,p'-DDD
103. _____ [ ] o,p'-DDE
104. _____ [ ] p,p'-DDE
105. _____ [ ] o,p'-DDT
106. _____ [ ] p,p'-DDT
107. _____ [ ] Dibenz(a,h)anthracene
108. _____ [ ] Dibenzo(a,e)pyrene
109. _____ [ ] m-Dichlorobenzene
110. _____ [ ] o-Dichlorobenzene
111. _____ [ ] p-Dichlorobenzene

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112. _____ [ ] Dichlorodifluoromethane
113. _____ [ ] 1,1-Dichloroethane
114. _____ [ ] 1,2-Dichloroethane
115. _____ [ ] 1,1-Dichloroethylene
116. _____ [ ] trans-1,2-Dichloroethylene
117. _____ [ ] 2,4-Dichlorophenol
118. _____ [ ] 2,6-Dichlorophenol
119. _____ [ ] 1,2-Dichloropropane
120. _____ [ ] cis-1,3-Dichloropropylene
121. _____ [ ] trans-1,3-Dichloropropylene
122. _____ [ ] Dieldrin
123. _____ [ ] Diethyl phthalate
124. _____ [ ] 2,4-Dimethyl phenol
125. _____ [ ] Dimethyl phthalate
126. _____ [ ] Di-n-butyl phthalate
127. _____ [ ] 1,4-Dinitrobenzene
128. _____ [ ] 4,6-Dinitro-o-cresol
129. _____ [ ] 2,4-Dinitrophenol
130. _____ [ ] 2,4-Dinitrotoluene
131. _____ [ ] 2,6-Dinitrotoluene
132. _____ [ ] Di-n-octyl phthalate
133. _____ [ ] p-Dimethylaminoazobenzene (*)
134. _____ [ ] Di-n-propylnitrosoamine
135. _____ [ ] 1,4-Dioxane (*)
136. _____ [ ] Diphenylamine (difficult to distinguish from diphenylnitrosamine)
137. _____ [ ] Diphenylnitrosamine (difficult to distinguish from diphenylamine)
138. _____ [ ] 1,2-Diphenylhydrazine
139. _____ [ ] Disulfoton
266. _____ [ ] Dithiocarbamates (Total) (*)
140. _____ [ ] Endosulfan I
141. _____ [ ] Endosulfan II
142. _____ [ ] Endosulfan sulfate
143. _____ [ ] Endrin
144. _____ [ ] Endrin aldehyde
267. _____ [ ] EPTC (*)
145. _____ [ ] Ethyl acetate
146. _____ [ ] Ethyl cyanide (propanenitrile)
147. _____ [ ] Ethyl benzene
148. _____ [ ] Ethyl ether
149. _____ [ ] bis(2-Ethylhexyl)phthalate
150. _____ [ ] Ethyl methacrylate
151. _____ [ ] Ethylene oxide
152. _____ [ ] Famphur
153. _____ [ ] Fluoranthene
154. _____ [ ] Fluorene
155. _____ [ ] Fluoride
268. _____ [ ] Formetanate hydrochloride (*)
156. _____ [ ] Heptachlor
157. _____ [ ] Heptachlor epoxide
158. _____ [ ] Hexachlorobenzene
159. _____ [ ] Hexachlorobutadiene
160. _____ [ ] Hexachlorocylopentadiene
161. _____ [ ] HxCDDs (All hexachlorodibenzo-p-dioxins)
162. _____ [ ] HxCDFs (All hexachlorodibenzo-furans)
163. _____ [ ] Hexachloroethane
164. _____ [ ] Hexachloropropylene
165. _____ [ ] Indeno (1,2,3-c,d)pyrene
270. _____ [ ] 3-Iodo-2-propynyl n-butylcarbamate (*)
166. _____ [ ] Iodomethane
167. _____ [ ] Isobutyl alcohol
168. _____ [ ] Isodrin
169. _____ [ ] Isosafrole
170. _____ [ ] Kepone
171. _____ [ ] Lead
172. _____ [ ] Mercury--Nonwastewater from Retort
173. _____ [ ] Mercury--All others
174. _____ [ ] Methacrylonitrile
175. _____ [ ] Methanol
176. _____ [ ] Methapyrilene
272. _____ [ ] Methiocarb (*)
273. _____ [ ] Methomyl (*)
177. _____ [ ] Methoxychlor
178. _____ [ ] 3-Methylcholanthrene
179. _____ [ ] 4,4-Methylene-bis(2-chloroaniline)
180. _____ [ ] Methylene chloride
181. _____ [ ] Methyl ethyl ketone
182. _____ [ ] Methyl isobutyl ketone
183. _____ [ ] Methyl methacrylate
184. _____ [ ] Methyl methansulfonate
185. _____ [ ] Methyl parathion
274. _____ [ ] Metolcarb (*)
275. _____ [ ] Mexacarbate (*)
276. _____ [ ] Molinate (*)
186. _____ [ ] Naphthalene
187. _____ [ ] 2-Naphthylamine
188. _____ [ ] Nickel
189. _____ [ ] o-Nitroaniline (*)
190. _____ [ ] p-Nitroaniline
191. _____ [ ] Nitrobenzene
192. _____ [ ] 5-Nitro-o-toluidine
193. _____ [ ] o-Nitrophenol (*)
194. _____ [ ] p-Nitrophenol
195. _____ [ ] N-Nitrosodiethylamine
196. _____ [ ] N-Nitrosodimethylamine
197. _____ [ ] N-Nitroso-di-n-butylamine
198. _____ [ ] N-Nitrosomethylethylamine
199. _____ [ ] N-Nitrosomorpholine
200. _____ [ ] N-Nitrosopiperidine
201. _____ [ ] N-Nitrosopyrrolidine
277. _____ [ ] Oxamyl (*)
202. _____ [ ] Parathion
203. _____ [ ] Total PCBs (sum of all PCB isomers, or all Arochlors)
278. _____ [ ] Pebulate (*)
204. _____ [ ] Pentachlorobenzene
205. _____ [ ] PeCDDs (All pentachlorodibenzo- p-dioxins)
206. _____ [ ] PeCDFs (All pentachlorodibenzofurans)
207. _____ [ ] Pentachloroethane (*)
208. _____ [ ] Pentachloronitrobenzene
209. _____ [ ] Pentachlorophenol
210. _____ [ ] Phenacetin
211. _____ [ ] Phenanthrene
212. _____ [ ] Phenol
213. _____ [ ] Phorate
214. _____ [ ] Phthalic acid (*)
215. _____ [ ] Phthalic anhydride
280. _____ [ ] Physostigmine (*)
281. _____ [ ] Physostigmine salicylate (*)
282. _____ [ ] Promecarb (*)
216. _____ [ ] Pronamide
283. _____ [ ] Propham (*)
284. _____ [ ] Propoxur (*)
285. _____ [ ] Prosulfocarb (*)
217. _____ [ ] Pyrene
218. _____ [ ] Pyridine
219. _____ [ ] Safrole
220. _____ [ ] Selenium
221. _____ [ ] Silver
222. _____ [ ] Silvex (2,4,5-TP)
223. _____ [ ] Sulfide
224. _____ [ ] 2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)
225. _____ [ ] 1,2,4,5-Tetrachlorobenzene
226. _____ [ ] TCDDs (All tetrachlorodibenzo- p-dioxins)
227. _____ [ ] TCDFs (All tetrachlorodibenzofurans)
228. _____ [ ] 1,1,1,2-Tetrachloroethane
229. _____ [ ] 1,1,2,2-Tetrachloroethane
230. _____ [ ] Tetrachloroethylene

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231. _____ [ ] 2,3,4,6-Tetrachlorophenol
232. _____ [ ] Thallium
286. _____ [ ] Thiodicarb (*)
287. _____ [ ] Thiophanate-methyl (*)
233. _____ [ ] Toluene
234. _____ [ ] Toxaphene
289. _____ [ ] Triallate (*)
235. _____ [ ] Tribromomethane (Bromoform)
236. _____ [ ] 1,2,4-Trichlorobenzene
237. _____ [ ] 1,1,1-Trichloroethane
238. _____ [ ] 1,1,2-Trichloroethane
239. _____ [ ] Trichloroethylene
240. _____ [ ] Trichloromonofluoromethane
241. _____ [ ] 2,4,5-Trichlorophenol
242. _____ [ ] 2,4,6-Trichlorophenol
243. _____ [ ] 1,2,3-Trichloropropane
244. _____ [ ] 1,1,2-Trichloro-1,2,2-trifluoroethane
290. _____ [ ] Triethylamine (*)
245. _____ [ ] tris-(2,3-Dibromopropyl)phosphate
246. _____ [ ] Vanadium (*)
291. _____ [ ] Vernolate (*)
247. _____ [ ] Vinyl chloride
248. _____ [ ] Xylenes--mixed isomers (sum of o-, m-, and p-xylene concentrations)
249. _____ [ ] Zinc (*)

KEY TERMS/DEFINITIONS

CONTAMINANTS SUBJECT TO TREATMENT (CSTT) are the specific constituents listed by waste code number in the Treatment Standard Table in §268.40. CSTT's must be identified for all hazardous debris wastes that are intended for treatment using one of the hazardous debris alternate treatment technologies described in §268.45.

REASONABLY EXPECTED TO BE PRESENT means that the generator is relying on knowledge of the raw materials used, the process, and potential reaction products, or on the results of a one-time analysis for the entire list of UHC's that may be present in the untreated hazardous waste. If a one-time analysis of the entire list of UHC's is conducted, subsequent analyses are required for only those pollutants which would reasonably be expected to be present in the waste as generated, based on the previous sampling and analysis results.

UNDERLYING HAZARDOUS CONSTITUENT (UHC) means any constituent listed in §268.48 Table UTS - Universal Treatment Standards (except fluoride, selenium, sulfides, vanadium and zinc) which can reasonably be expected to be present at the point of generation of the hazardous waste, at a concentration above the constituent-specific UTS treatment standard. [See 40 CFR 268.2]

EXHIBIT D

WAP CERTIFICATION

WASTE ANALYSIS PLAN
(DATED JANUARY 2022)

for

CLEAN HARBORS COLFAX, LLC.
Colfax, Louisiana

EPA ID#: LAD 981 055 791

Certification:

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

John C. Arbuthnot, P.E.
Louisiana Registration No. 17688
Director of Facility Closures
Clean Harbors Environmental Services, Inc.

STATE OF LOUISIANA
1/27/2022
JOHN C. ARBUTHNOT
License No. 17688
PROFESSIONAL ENGINEER
IN
ENVIRONMENTAL ENGINEERING

Date: 1/27/2022

EXHIBIT E

WASTE SEGREGATION PLAN

CleanHarbors
ENVIRONMENTAL SERVICES, INC.

CLEAN HARBORS COLFAX, LLC

STANDARD OPERATING PROCEDURE

Title: Waste/Container Segregation Policy and Explosive/Reactive Residuals Management Plan

I. PURPOSE

To establish a site policy for the segregation of containers and packaging from the reactives/explosives that are thermally treated.

II. RESPONSIBILITY

Facility Management – Provide employees with materials and equipment to properly and safely perform this procedure.

Operations Supervision – Provide initial training for employees and enforce procedures; ensure that procedures are updated; provide employees with training and/or additional training as changes occur; and ensure that only technically qualified employees are performing the tasks described herein.

Compliance Personnel – Provide assistance to management and operations to ensure that procedures are in compliance with all applicable environmental regulations and internal company policies.

Employees – Comply with procedures/training, and promptly report any potentially non-compliant situations to facility management.

III. Procedures to Identify, Segregate, and Properly Manage Ancillary Wastes

Uncontaminated Packaging Materials - Packaging materials such as drums and boxes that are not contaminated with reactive waste will not be placed in the burn tray. These materials will be segregated for re-use when practical or disposal as site-generated waste. This procedure will help to minimize the potential for reactives-contaminated packaging becoming commingled with uncontaminated materials. It will also prevent the inadvertent highway shipment of reactives-contaminated packaging following the de-containerization of waste shipments prior to thermal treatment. Any markings that would identify the original waste generator will be painted or otherwise obliterated prior to placement in bulk shipping containers for off-site shipment.

Contaminated Packaging Materials - Packaging materials that are, or appear to be, contaminated with reactive waste and packaging that is inherently associated with the waste (i.e., that which cannot be safely and feasibly separated) will be thermally treated along with the reactive wastes. This determination will be made by on-site personnel by way of a visual inspection.

Other Waste Items - Under no circumstances are random objects such as water bottles, food wrappings and other non-reactive solid wastes to be intentionally thermally treated. These materials must be managed as site-generated waste or office waste, as appropriate. Site-generated reactive wastes such as PPE, brushes from equipment, etc., may be thermally treated on-site *only* if they are profiled and properly tracked as site-generated hazardous waste carrying, at a minimum, EPA Waste Code D003. This tracking includes the issuance of WIN tracking numbers and internal profiles such that the disposition of these wastes can be properly reported on the Annual Hazardous Waste Report and the Annual Air Report.

Potential Ancillary Waste Streams Related to Incoming Waste Streams –

The following waste streams historically represent the vast majority of incoming shipments for thermal treatment. Based on the waste composition and the type of packaging, the potential for ancillary waste that can be shipped off-site will vary as described below:

Waste Stream	Type of Packaging	Potential to Generate Ancillary Waste for Off-Site Shipment	Comments
Fireworks	Metal or fiber drums or cardboard boxes	High	Depends on the condition of the fireworks and whether or not the packaging contains liquids.
Smokeless Powder	Metal or fiber drums	Moderate	Depends on whether or not the powder is bagged; Not practical to remove all residues from bags.
Waste Shape Charges	Cardboard boxes only	High	No residue remains in containers ~95% of the time.
Rocket Motors	Wooden containers/crates or fiber cases	High	Very little residue likely.
Propellants	Fiber drums, wood containers, metal drums	Low	Residue frequently remains in the containers.
Power Devices	Cardboard or wooden boxes	High	Very little residue likely.
Ignitors/Detonators	Cardboard boxes only	High	No residue remains in containers ~95% of the time.
Ammunition	Fiber drums or cardboard containers	Moderate	50-50 chance of remaining residues in the containers.
Other Wastes	Various	Moderate	50-50 chance of remaining residues in the containers.

IV. Procedures to Divert Ancillary Waste Streams Off-Site

Ancillary waste streams that may be generated on-site and shipped off-site include packaging material (such as boxes that previously contained fireworks) that, upon visual inspection, have been determined not to be contaminated with explosives residues. These materials will be accumulated on-site in either bulk or non-bulk containers. Once the container(s) are full, they will be shipped off-site to an appropriately permitted facility for disposal or recycling.

V. Procedures to Safely Inspect and Decontaminate Ancillary Waste Streams

On-site personnel will visually inspect each empty container for evidence of explosives residue. Each employee will be trained to recognize, by way of visual inspection, any evidence of explosives residue that may be present in the shipping containers. If an employee is unsure whether or not explosives residue remains in the container, a second employee may be summoned for confirmation as deemed necessary to make the correct determination. In the event that explosives residues are present in metal containers, the decontamination process will consist of placing the containers on a burn tray and applying diesel fuel to both the interior and the exterior of the containers. The containers will then be remotely ignited in order to thermally remove the explosives residues from the containers. Following this process, the containers will be removed and crushed prior to placement in a roll-off box. Subsequently, the roll-off box of recyclable metal will be shipped off-site to an approved metals recycler.

Other types of containers (such as plastic drums) may be decontaminated if needed by rinsing with water or other appropriate cleaning solution if this process can be completed safely. These containers, once determined to be RCRA empty and able to be safely shipped, may be shipped off-site for disposal.

VI. Historical Generation of Ancillary Waste Streams

For the three-year period of 2014 through 2016, the facility generated the following totals of recyclable steel:

2016	29 containers (~40 cubic yards each)
2015	29 containers (~40 cubic yards each)
2014	24 containers (~40 cubic yards each)

VII. Approximate Annual Volumes of Ancillary Waste Streams and Reporting Requirements

The implementation of this plan will potentially divert certain ancillary waste materials that have been determined not to be contaminated with explosives residues. The annual volume is impossible to estimate. Many external factors can impact the volume. For example, if in a particular year, the facility receives an unusually significant proportion of damaged waste fireworks—which tend to arrive with larger amounts of explosives-contaminated packaging—then a larger proportion of the packaging would be thermally treated on-site. If, in another year, most of the fireworks shipped to the facility were undamaged and simply obsolete, a more significant proportion of the packaging would be uncontaminated and thus off-site disposal or recycling may be a feasible option. In summary, this plan may result in a higher overall volume of ancillary waste streams being shipped off-site since the facility will implement a more concerted effort to ensure that only those packaging components visually determined to contain explosives residue are thermally treated on-site. Since this procedure was informally adopted in late 2016, an average of 80 cubic yards per week of uncontaminated residuals have been generated and shipped off-site.

Upon issuance of the modified Air Permit, the facility will submit a report to LDEQ each year (by March 31) that includes the following:

- The type and volume of waste segregated from explosive/reactive wastes in the preceding calendar year; and
- The type and volume of materials inherently associated with explosive/reactive waste thermally treated in the preceding calendar year. This report shall also include a general description of those waste streams and their associated waste profile numbers.

ATTACHMENT 8-B

FACILITY OPERATIONAL PLAN

CLEAN HARBORS COLFAX, LLC

FACILITY OPERATIONAL PLAN

All wastes treated at the facility are classified as reactive. No other wastes will be accepted, stored or treated on-site without prior authorization from LDEQ. Based on the requirements of the facility's RCRA Hazardous Waste Permit, the net explosive weight that can be treated annually is limited to 561,700 pounds, and no more than 55,950 pounds net explosive weight will be on-site at one time, in magazines, undergoing preparation, awaiting unloading, or awaiting ignition. Please note that this number assumes the maximum permitted amounts in storage plus an additional amount that might be present inside transport vehicles awaiting off-loading to be thermally treated (without being placed into storage prior to treatment). The specific waste codes acceptable at the facility are included in the Part I/A application.

The wastes received will be thermally treated to reduce the hazard of final disposal by eliminating the reactive properties of the wastes. The wastes are shipped from off-site sources. In accordance with requirements of the Waste Analysis Plan, the incoming wastes and associated shipping documents are checked to determine acceptability. Incompatible wastes are placed in separate, approved storage magazines until they can be thermally treated on-site. The wastes may be taken from the storage units to the preparation building to modify the waste containers to facilitate thermal treatment. Removal of the liners or outer cores from the wastes is often necessary to achieve a thermally treatable material (since the outer core is often made of non-ignitable material).

From the preparation building, the wastes are removed to the burning areas and placed in the open burners or in the contained burn chamber once it is operational. The residue remaining after treatment is collected (using forklifts, shovels, or other appropriate mechanical means), containerized, and placed in temporary storage until it is shipped off-site for proper disposal. The facility stores and thermally treats wastes but does not dispose of wastes on-site. The capacity is based on the limitations of the air permit and those limits described in the Part I/A application. The wastes accepted at the facility are thermally treated by an open burning process currently; however, upon approval of the pending permit renewal application, the proposed contained burn chamber will be constructed. Once operational, the facility anticipates that up to 90% of the incoming wastes will be managed via the contained burn chamber.

The wastes are shipped to the facility in DOT approved containers in accordance with the requirements of the DOT, the EPA, the ATF, and the LDEQ. Incompatible wastes are stored and treated separately. Waste containers are constructed of materials such as cardboard, plastic, metal, glass, and wood. Cone-shaped charges have an outer case constructed of glass, steel, or aluminum. The inner cone, or liner, is made of copper.

Preparation procedures include opening the charge cases to render them less explosive, perforating the cases to facilitate combustion, or shortening the cases to expedite handling and thermal treatment. Perforating and shortening is accomplished using a drill press and a band saw that are remotely operated to minimize exposure of facility personnel. The drill bit and saw blade are automatically cooled by water to prevent accidental combustion of the reactive wastes by sparks or heat. The wastes and containers are placed in the open burner and ignited. The maximum temperature obtained during the thermal treatment process is approximately 2,400 degrees Fahrenheit in a non-controlled air feed environment such as open trough burning. The facility burn process reduces the reactive compounds to a non-reactive condition.

After the burn is completed, the burner is allowed to cool. Residue remaining from the thermal treatment is collected, placed in a container and staged in a 90-day accumulation area prior to shipment off-site for disposal.

After each batch of waste is burned, the burner and the ground surface adjacent to the burners and the preparation building are visually examined for evidence of spilled wastes. Spills are collected immediately and burned.

The facility treats reactive wastes and provides storage for such wastes until they can be treated. Prior to treatment, wastes are stored in DOT approved containers and secured in storage magazines meeting ATF standards. The facility does not have on-site disposal or long-term (greater than one year) storage units for hazardous wastes.

The wastes stored and treated at the facility are delivered by trucks from off-site sources. The waste vehicles proceed from LA Highway 471 to the facility office/checkpoint located in the administrative area. Incoming waste shipments are accepted only if they are accompanied by a manifest. The facility will notify the administrative authority of unmanifested off-site shipments in accordance with LAC 33:V.1516.

The facility will visually check the incoming waste load against the shipping manifest to determine acceptability and accuracy. The facility will attempt to resolve any identified inaccuracies on the waste manifests or associated paperwork with the transporter or waste generator. If significant discrepancies cannot be resolved, the facility will notify the administrative authority in accordance with the requirements of LAC 33:V.1516.

Acceptability of the waste will be determined by comparing the waste shipping document with the applicable waste profiles that are maintained in the facility's records or by comparing it to SDSs or other reliable waste literature from the waste generator. If a waste analysis is not found in the on-site waste references, the facility will contact the generator or knowledgeable agencies, such as the Department of Defense (DOD), LDEQ, or the Louisiana Department of Public Safety (LDPS) to attempt to locate a waste analysis. The copy of new waste analyses will be obtained to permit a determination of the acceptability of the waste. Copies of the analyses will be entered into the operating record for reference and maintained on-site for future use.

The facility will acknowledge the acceptance of the waste by signing the manifest in accordance with LAC 33.V.1516. A copy of the manifest will be given immediately to the transporter. Within the appropriate time-frame required by applicable regulations, a copy of the manifest will be sent to the generator. A copy of the manifest will be maintained at the facility for at least three years from the date of treatment of the waste. After the three-year period, a summary, extract, electronic scan, or microfilm copy of the information will be retained at the facility to keep a record of the received waste loads until the facility is closed.

Incompatible wastes will be identified as part of the check-in procedures. Incompatible wastes are stored in separate storage units to eliminate accidental reaction that could cause an unplanned event. The waste delivery vehicles will be directed to the appropriate storage units. The truck staging/parking area has been sectioned with secondary containment structures to handle incompatible wastes in the event of a leak. Trucks will have containment areas separate from each other.

Waste containers are not opened until they are removed from storage to the treatment or preparation areas. The nature of thermal treatment does not result in significant odor; therefore, no odor control measures are necessary at the facility.

The overall life of the facility is projected to be more than 50 years, although this projection could be reduced, or it could be extended indefinitely depending on future business conditions and permitting requirements, among other factors. The currently anticipated closure date, as noted in Section 3503.A.1 of the latest permit application, is July 1, 2042. The life expectancy of the storage units is at least 50 years. Properly maintained burn unit are expected to have a service life corresponding to the intended service life of the facility. These units will be inspected and maintained or repaired, as needed, as required by LAC 33:V.1509.

Inspection and maintenance of on-site storage and treatment units and related equipment will be implemented in accordance with the procedures described in Section 1509 of the permit application. These procedures are designed to extend the operating life of the units and to prevent hazards to human health and the environment by malfunctions or deterioration. Records kept at the facility include, but are not necessarily limited to, the following:

- copies of waste manifests with each type of waste referenced by the EPA classification number and published waste analysis;
- on-site waste activity records, including storage locations, dates, and other pertinent information;
- waste treatment details;
- copies of notices given to generators to assure them that the facility is permitted to accept reactive wastes;
- inspection, maintenance, and repair records;
- incident reports;
- copies of the permit application, closure plan, closure cost estimates, contingency plan, and any current plan or permit revision; and
- copies of all correspondence with the administrative authority.

Facility personnel will record in writing the details of the activities completed that require reporting. Required documentation may include the name of the employee, name of the facility, date of the activity, type of activity, results, projected schedules such as for non-immediate repairs, and identification of waste activity such as receipt, on-site transfer, and treatment.

All records are retained at the facility office either on paper or electronically and will be made available at all reasonable times to the administrative authority for their review at its request. Records will include written documents, receipts, plans, or photographs as appropriate. Waste activity records will be kept current so that the location of all wastes stored on-site is known at all times to prevent mixing of incompatible wastes. The waste records will aid the operator in projecting storage availability, tracking elapsed time between storage and treatment of accepted wastes. The records are routinely reviewed for accuracy, relevancy, and other pertinent factors that may be used to determine future management practices at the facility.

As a part of the review process, the applicant may request changes in the facility design, operation, and closure procedures to respond to projected waste stream changes such as in quantity, type, or handling procedures; to improve the efficiency of the facility operations; or to address safety concerns. Such changes may require a request to modify the existing permit conditions in accordance with LAC 33:V.321. Such revision requests will be submitted to the administrative authority for review and approval. The changes will not be implemented until written approval has been received from the administrative authority. The records for the current operating year are kept in the administrative area either in filing cabinets or in other storage units. Generally, records that are older than the current year will be placed into cardboard boxes and moved to a suitable on-site records storage location. At the current time, the facility utilizes a separate shed for storage of many of the older documents. The facility has also implemented electronic filing procedures, including scanning and electronic copy filing of historic files.

Each load of incoming waste will be inspected at the facility office/checkpoint. An unloading report will be prepared as the waste is unloaded. Items on this unloading report will be checked against the waste manifest. Significant discrepancies or unmanifested wastes will be handled as described in Section 517.T.7.b.iii.(a) in the most recent permit application. The types of wastes listed on the manifest will be checked against profiles to verify their acceptability. The record for incoming wastes will include the source, form, quantity, EPA classification, and reference to the profile. On-site storage, transfer, and treatment of the accepted wastes will be recorded, including locations, date, time, and type of movement or action taken with respect to the waste. The waste activity records will permit each incoming waste load to be tracked from the time it is received until it is treated. The waste activity records will become part of the facility operating record. These records will be maintained at the facility office and will be available for inspection at all reasonable times by the administrative authority at its request.

ATTACHMENT 9-A

INSPECTION PLAN

CLEAN HARBORS COLFAX, LLC

INSPECTION PLAN

TABLE OF CONTENTS

FIGURES

TABLES

INSPECTION PLAN

In accordance with the regulatory requirements set forth in the Louisiana Administrative Code (LAC) Title 33, Part V.1509, Clean Harbors Colfax, LLC (Facility) has developed this Inspection Plan as an integral section of the Part II Permit Application for its thermal treatment located near Colfax, Louisiana. The procedures set forth in this plan are intended to show how this facility will be in compliance with applicable requirements of the LAC. A copy of this plan will be available at the facility at all times. ***This Inspection Plan, Inspection Schedule, and Inspection Forms will be updated to incorporate the proposed Contained Burn Chamber (CBC) and any associated structures when the unit is constructed and prior to placing it into service***

1.0 INTRODUCTION

This Inspection Plan is intended to provide a mechanism to minimize and detect system malfunctions, equipment deterioration and operator errors which, if allowed to continue without remedy, may ultimately lead to a release of hazardous waste constituents to the environment or create a threat to human health. The Inspection Plan is designed to provide an early warning of the potential for such events in order that corrective and preventive actions may be taken in a timely manner.

The Inspection Plan is divided into two segments: (1) the daily process unit inspection and (2) the monthly emergency equipment inspection. The first one focuses on each individual area of the operation such as the burn area, the control building, the preparation building, and the storage magazines. The second involves inspection of site-wide emergency response equipment and miscellaneous related items.

The Inspection Program is implemented by qualified individuals who are assigned the responsibility to detect any unsafe conditions at the facility and prevent adverse consequences. The designated individuals have the training and authority to: (1) implement the required inspections; (2) perform necessary evaluations and hazard assessments; and (3) order appropriate corrective or remedial actions.

Inspections are performed according to a pre-determined schedule based on engineering knowledge and operational experience with the systems and processes involved. Each inspection item has the content and frequency necessary to alert facility personnel prior to development of a serious problem. A trained inspector evaluates, and assesses each item indicated for potential malfunctions, equipment deterioration or operation error through regular observation of the process and procedures. The level of response and its timing is determined by the nature and seriousness of the problem identified, with protection of personnel and the prevention of adverse environmental impact being of paramount concern.

2.0 INSPECTION PROGRAM ADMINISTRATION

The General Manager is fully responsible for implementation of the Inspection Program. The inspection function operates independently of all other facility functions related to operations. Properly trained personnel are designated with the staff responsibility for the inspections. Reports of the results of the inspections with appropriate documentation are completed each operating day and made available to the General Manager. The General Manager is responsible for ensuring that the appropriate corrective measures are implemented in a timely manner. These forms may be maintained in paper or electronic formats.

2.1 Personnel Qualifications

Personnel responsible for conducting inspections are trained in hazardous waste management, fundamentals of material hazards assessment, inspection and follow-up procedures, documentation and record-keeping requirements, and various safety and contingency plan procedures.

2.2 Hazard Assessment and Evaluation Procedures

The designated inspector must be familiar with the location of the equipment and systems to be inspected and their normal configuration. For any discrepancy observed, the inspector shall determine the potential for personnel injury or for release of hazardous waste constituents and assess the nature and timing of remedial action required. His determination considers (1) the location and nature of the problem, (2) the presence of secondary containment or control, (3) the amount and type of waste material involved, (4) the potential for human exposure, and (5) the likelihood of waste migration.

The inspector maintains open lines of communication with the General Manager and other facility personnel who may assist with the corrective actions.

When an inspection indicates equipment malfunction or deterioration, or any other improper condition, at a minimum, the following actions are to be taken as appropriate:

- Assess the situation.
- Determine the corrective/remedial measures needed in response to the situation, including appropriate interim measures.
- Establish the time frame within which the remedial action must occur. For emergency or near-emergency situations, prompt verbal reports are made to the General Manager, to be followed later with written reports. For minor discrepancies, routine written reporting procedures, as discussed later, will be followed.

- Provide adequate follow-up to verify that the specified response has occurred and that the situation has been resolved satisfactorily.

In general, all remedial actions and re-inspections are expected to be completed within the week following the initial inspection in which a deficiency was noted. In specific cases where urgent action is required, appropriate coordination with facility personnel and frequent monitoring of the situation by the inspector will be continued until remedial actions are completed. In cases where physical and/or operational constraints (e.g., replacement equipment availability) may require longer time frames to complete the corrective measures, the inspection report will document completion of the work.

2.3 Documentation and Record Keeping

Inspections are conducted and documented using forms specifically designed to contain pertinent information. Completed inspection forms are filed in the facility's Operating Record following completion of all applicable notations regarding corrective actions including the specific nature of the corrective action as well as date the corrective action was completed. In some instances, a remedial work order that describes more complex corrective actions may also accompany the inspection documents. All completed forms and attachments are accumulated in the facility operating record. These are retained at the facility for a minimum period of three years from the date of an inspection. Records may be maintained in paper or electronic form.

Separate inspection forms are provided for specified daily, weekly, monthly or other scheduled inspections. Each periodic inspection form (see Figures 1 and 2 for examples) includes required information, such as the identification of the facility unit, the name of the inspector, and the date and time of the inspection. These forms may be periodically modified (without necessitating a formal Permit Modification) to accommodate the changing needs of the facility. If the equipment or unit is not in use, it is inspected routinely, and a notation of its operational status is made. The inspector's assessments, including notations regarding the urgency of the required response, are marked on the form. Any significant discrepancy is reported immediately to the General Manager.

In summary, the inspector observes facility operations and equipment on a periodic basis in accordance with a specified schedule and inspection elements. The inspector will initiate the required corrective actions and note them on the inspection form. In the event that the corrective actions are too extensive or require additional actions on the part of the General Manager, a remedial work order form may be created, and then corrective action is initiated. In any case, the corrective actions will be noted on the applicable inspection forms and/or the associated work order(s) for the required repairs.

In cases where specialized outside contractors are used to perform testing or inspection services (i.e., fire extinguisher repairs, etc.), the results are reported on the contractor's forms. Such documentation is made part of the Operating Record when received.

3.0 DAILY PROCESS UNIT INSPECTIONS

The process unit inspection activity encompasses the facility perimeter and those items within the permitted property (interior 43 acres) that are process-specific. These inspection activities encompass the following:

- Burn (Thermal Treatment) Area (See Figure 3 for burn pan layout);
- Enclosed Thermal Treatment Chamber
- Control Building;
- Preparation Building;
- Storage Magazines and associated areas;
- Containers within the storage areas; and
- General Site and miscellaneous concerns.

The general inspection schedules, including inspection parameters and frequencies, are determined by the types of problems that can potentially occur.

3.1 Types of Potential Problems

The following considerations are pertinent to identification of the types of problems that may occur related to facility operations:

- Containment areas may be compromised due to cracks or deterioration of concrete;
- Burn trays or culverts may need repair;
- Roofs or rain covers may need to be repaired;
- Storage magazines may be structurally unsound due to deterioration of materials of construction;
- Containers may be leaking, missing labels, improperly closed, etc.;
- Enclosed burn chamber burn pan may become damaged or inoperable;
- Containers used to collect baghouse particulate may be full and require replacement;

- Pollution control system may require maintenance (to be conducted by a third party at intervals to be determined);

- Breach of security, which may occur due to: (1) failure of the surveillance system, (2) damage to fences, natural barriers or entry control structures, (3) obstruction, damage or loss of warning signs, or (4) missing or damaged magazine locks.

- Unplanned releases not detected by environmental monitoring equipment due to malfunction or failure. Such problems may occur due to failure of flood protection or other containment structures if these are not kept in good repair.

- Health and safety equipment failure, absence or inaccessibility and/or

- Other problems as noted on the various inspection forms.

- Additional items related to the enclosed burn chamber will be added as appropriate.

3.2 Inspection Schedules

The inspection schedules are based on the facility's operational mode, potential failure modes, and an assessment of the hazard magnitude posed by a particular malfunction, failure, or discrepancy. The inspection schedules are included as attachments to this Inspection Plan. The schedules include each inspection element, the types of potential problems that could be encountered, and the frequency (at a minimum) at which the inspections will occur. All "daily" inspections will be completed during each operating day. Inasmuch as the regulatory requirements for these units involve only weekly inspection frequencies, this inspection schedule significantly exceeds the regulatory requirements. Therefore, weekend or holiday inspections are not considered necessary.

4.0 MONTHLY EMERGENCY EQUIPMENT INSPECTIONS

On no less than a monthly basis, the facility will conduct inspections of its emergency equipment. This inspection includes such items as fire extinguishers, PPE supplies, First Aid Kits, and Safety Showers. These inspections notwithstanding, the facility recognizes that it must replace or replenish any emergency supplies that may be utilized during an actual emergency. This activity is done as quickly as practical following a situation where one or more pieces of emergency equipment are utilized.

FIGURE 1

DAILY PROCESS UNIT INSPECTION FORM

CleanHarbors

CF Daily Burn Area and Control Room Inspection

Form Code: 1458

Compliance Header	
Inspector Name	
Area of Inspection	
Inspection Date and Time	
CF Daily Inspection Instructions	
Inspections must be conducted each operating day. Note condition of inspection items. If an item does not apply to an area, mark N/A. All unsatisfactory findings must be explained below. Include any repairs, changes or other remedial actions required or performed.	
Control Room Inspection Items	
Housekeeping	
Control Switches	
Warning Signal/ Horn	
Is current copy of Contingency Plan available and in place in the control room?	
Is current copy of Inspection Plan and Schedule available and in place in the control room?	
Burn Area General	
Housekeeping	
Satellite Accumulation	
Standing Water	
Containment / Concrete Slab	
Burn Pan 1 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 1	
Satellite Accumulation	
Containment / Concrete Slab	

Burn Pan 2 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 2	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 3 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 3	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 4 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 4	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 5 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 5	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 6 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	

Slab Valves	
Burn Pan 6	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 7 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 7	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 8 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 8	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 9 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 9	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan Area 10 Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 10	
Satellite Accumulation	

Containment / Concrete Slab	
Burn Pan 11 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 12 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 12	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 13 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 13	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 14 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 14	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 15 Area Inspection Items	
Housekeeping	

Igniter Stand, Cords	
Slab Valves	
Burn Pan 15	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 16 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 16	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 17 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 17	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 18 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 18	
Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 19 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 19	

Satellite Accumulation	
Containment / Concrete Slab	
Burn Pan 20 Area Inspection Items	
Housekeeping	
Igniter Stand, Cords	
Slab Valves	
Burn Pan 20	
Satellite Accumulation	
Containment / Concrete Slab	
Compliance Footer	
Inspector Signature	
Attach Photo	
Inspection Overall Assessment	

CleanHarbors

CF Daily Magazine Inspection

Form Code: 1459

Compliance Header	
Inspector Name	
Area of Inspection	
Inspection Date and Time	
CF Daily Inspection Instructions	
Inspections must be conducted each operating day. Note condition of inspection items. If an item does not apply to an area, mark N/A. All unsatisfactory findings must be explained below. Include any repairs, changes or other remedial actions required or performed.	
MAGAZINE STORAGE (DRY) 1 Inspection Items	
Housekeeping	
Capacity - (< 5000 pounds OR 5.93 cubic yards magazine)	
Containers	
Magazines (Shell/Roof/Floor/Door)	
Locks	
Vents	
Explosive Signs	
Magazine Buffer (25')	
MAGAZINE STORAGE (DRY) 2 Inspection Items	
Housekeeping	
Capacity - (< 5000 pounds OR 5.93 cubic yards magazine)	
Containers	
Magazines (Shell/Roof/Floor/Door)	
Locks	
Vents	
Explosive Signs	
Magazine Buffer (25')	

MAGAZINE STORAGE (DRY) 3 Inspection Items	
Housekeeping	
Capacity - (< 5000 pounds OR 5.93 cubic yards magazine)	
Containers	
Magazines (Shell/Roof/Floor/Door)	
Locks	
Vents	
Explosive Signs	
Magazine Buffer (25')	
MAGAZINE STORAGE (DRY) 4 Inspection Items	
Housekeeping	
Capacity - (< 5000 pounds OR 5.93 cubic yards magazine)	
Containers	
Magazines (Shell/Roof/Floor/Door)	
Locks	
Vents	
Explosive Signs	
Magazine Buffer (25')	
MAGAZINE STORAGE (DRY) 5 Inspection Items	
Housekeeping	
Capacity - (< 5000 pounds OR 5.93 cubic yards magazine)	
Containers	
Magazines (Shell/Roof/Floor/Door)	
Locks	
Vents	
Explosive Signs	
Magazine Buffer (25')	
MAGAZINE STORAGE (DRY) 6 Inspection Items	
Housekeeping	

Capacity - (< 5000 pounds OR 5.93 cubic yards magazine)	
Containers	
Magazines (Shell/Roof/Floor/Door)	
Locks	
Vents	
Explosive Signs	
Magazine Buffer (25')	
MAGAZINE STORAGE (DRY) 7 Inspection Items	
Housekeeping	
Capacity - (< 5000 pounds OR 5.93 cubic yards magazine)	
Containers	
Magazines (Shell/Roof/Floor/Door)	
Locks	
Vents	
Explosive Signs	
Magazine Buffer (25')	
LIQUID STORAGE - MAGAZINES 8 / STAGING AREA Inspection Items	
Housekeeping	
Capacity - (< 11968 gallons or < 5000 pounds per magazine)	
Containers	
Secondary Containment / Sump	
Staging Area - (< 80 55 gal drums of liquid)	
Magazines (Shell/Roof/Floor/Door)	
Locks	
Vents	
Explosive Signs	
Magazine Buffer (25')	
LIQUID STORAGE - MAGAZINES 9 / STAGING AREA Inspection Items	
Housekeeping	

Capacity - (< 11968 gallons or < 5000 pounds per magazine)	
Containers	
Secondary Containment / Sump	
Staging Area - (< 80 55 gal drums of liquid)	
Magazines (Shell/Roof/Floor/Door)	
Locks	
Vents	
Explosive Signs	
Magazine Buffer (25')	
LIQUID STORAGE - MAGAZINES 10 / STAGING AREA Inspection Items	
Housekeeping	
Capacity - (< 11968 gallons or < 5000 pounds per magazine)	
Containers	
Secondary Containment / Sump	
Staging Area - (< 80 55 gal drums of liquid)	
Magazines (Shell/Roof/Floor/Door)	
Locks	
Vents	
Explosive Signs	
Magazine Buffer (25')	
Compliance Footer	
Inspector Signature	
Attach Photo	
Inspection Overall Assessment	

CleanHarbors

CF Daily RCRA Inspection

Form Code: 1457

Compliance Header	
Inspector Name	
Area of Inspection	
Inspection Date and Time	
CF Daily Inspection Instructions	
Inspections must be conducted each operating day. Note condition of inspection items. If an item does not apply to an area, mark N/A. All unsatisfactory findings must be explained below. Include any repairs, changes or other remedial actions required or performed.	
PREPARATION BUILDING AND CONTAINER STORAGE Inspection Items	
Housekeeping	
Capacity - (< 60 cubic yards or 2500 gals. Site generated ash or waste not subject to ATF regs ONLY)	
Containers - Storage Area	
Floor/Curbing (Shell/Roof/Floor/Door)	
Locks (5 each)	
Saws (3 each)	
Safety Equipment / Exits	
Lighting	
GENERAL Inspection Items	
Housekeeping	
Truck Staging	
Fence Condition (43 acre perimeter)	
Gates #1, 2, 3 and 4	
Emergency Communications	
Danger Signs	
Roads, Fire Lanes	
Compliance Footer	

Inspector Signature	
Attach Photo	
Inspection Overall Assessment	

FIGURE 2

MONTHLY EMERGENCY EQUIPMENT INSPECTION

CleanHarbors

CF Emergency Equipment

Form Code: 235

Compliance Header	
Inspector Name	
Area of Inspection	
Inspection Date and Time	
CF Emergency Equipment Inspection Instructions	
Ensure the annual fire extinguisher tag is current. No non-tag are legal on site. Each extinguisher will be checked to ensure it has a current (yearly) inspection tag, it has not been discharged, has not been damaged, and is in its proper location. **If pin is removed extinguisher is damaged and needs to be replaced.	
CF Emergency Equipment Inspection Items	
Fire Extinguisher (#1) Company Truck (red)	
Fire Extinguisher (#2) Company Truck (grey)	
Fire Extinguisher (#3) Main Office	
Fire Extinguisher (#4) Guard Office	
Fire Extinguisher (#5) Mule #1	
Fire Extinguisher (#6) Mule #2	
Fire Extinguisher (#7) Tractor	
Fire Extinguisher (#8) Fork Lift	
Fire Extinguisher (#9) Control Building	
Fire Extinguisher (#10) Control Building Spare	
Fire Extinguisher (#11) Truck Staging Building	
Fire Extinguisher (#12) Truck Staging Building	
Fire Extinguisher (#13) Truck Staging Building	
Fire Extinguisher (#14) Truck Staging Building	
Fire Extinguisher (#15) Truck Staging Building	
Fire Extinguisher (#16) Truck Staging Building	
Fire Extinguisher (#17) Liquid Storage Building	
Fire Extinguisher (#18) Liquid Storage Building	

Fire Extinguisher (#19) Liquid Storage Building	
Fire Extinguisher (#20) Liquid Storage Building	
Fire Extinguisher (#21) Liquid Storage Building	
Fire Extinguisher (#22) Liquid Storage Building	
Fire Extinguisher (#23) New Preparation Building	
Fire Extinguisher (#24) New Preparation Building	
Fire Extinguisher (#25) New Preparation Building	
Fire Extinguisher (#26) New Preparation Building	
Fire Extinguisher (#27) Front End Loader	
Fire Extinguisher (#28) Break Room	
Fire Extinguisher (#29) Conference Room	
Fire Extinguisher (#30) Maintenance Building	
Fire Extinguisher (#31) Maintenance Building	
Lighting - Waste Management Area / Floodlights	
Eyewash Units (#1) Preparation Building	
Eyewash Units (#2) Maintenance Building	
PPE, First Aid Kits, Absorbent (#1) PPE Supply (Prep Bldg/Control Bldg)	
PPE, First Aid Kits, Absorbent (#2) First Aid Kits (Prep Bldg/Office/Trucks)	
PPE, First Aid Kits, Absorbent (#3) Emergency Response Kits	
Compliance Footer	
Inspector Signature	
Attach Photo	
Inspection Overall Assessment	

CleanHarbors

CF Monthly Heavy Equipment

Form Code: 234

Compliance Header	
Inspector Name	
Area of Inspection	
Inspection Date and Time	
CF Monthly Heavy Equipment Inspection Instructions	
Inspections must be conducted monthly when the facility is in operat on. Note condition of inspection items. If item does not apply to a area, mark N/A. All unsatisfactory findings must be explained below. Include any repairs, changes or other remedial act ons required or performed.	
CF Monthly Heavy Equipment Inspection Items	
Fire Plow	
Tractor	
Front End Loader	
Trailers	
Generators	
Mule #1	
Mule #2	
4-Wheeler	
Truck (red)	
Truck (grey)	
Compliance Footer	
Inspector Signature	
Attach Photo	
Inspection Overall Assessment	

FIGURE 3

BURN PAN LAYOUT

Clean Harbors Colfax, LLC
Burn Pan Layout (Not to Scale)

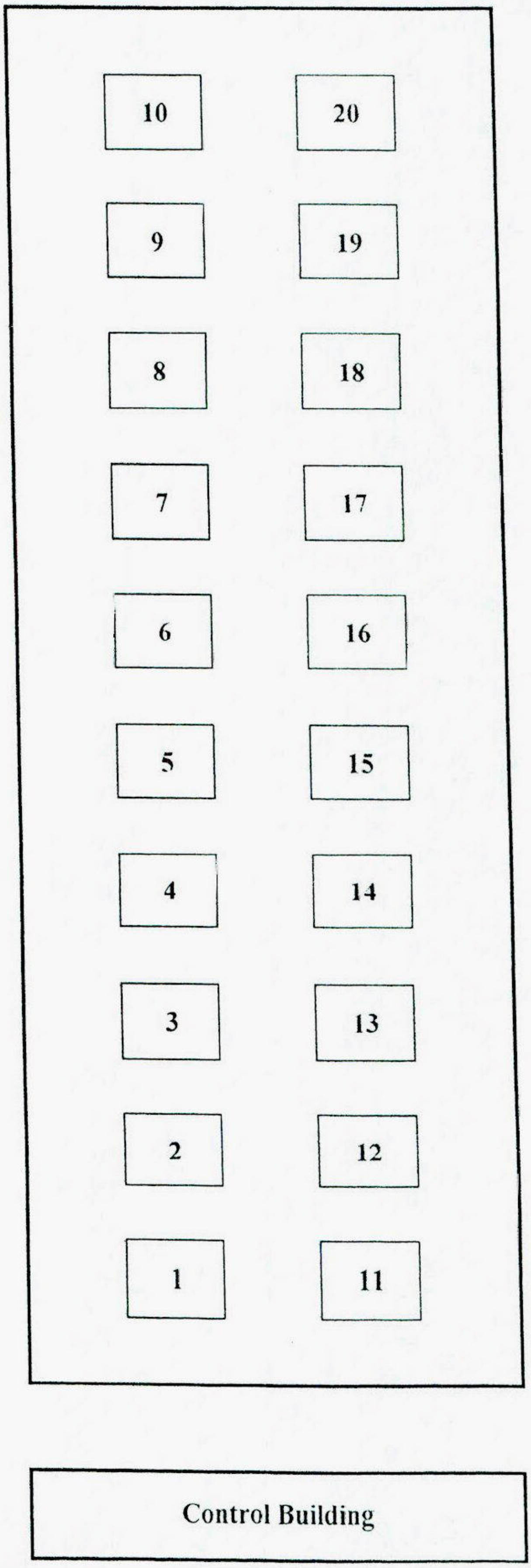


TABLE 1

INSPECTION SCHEDULE

ATTACHMENT 12-A

CONTINGENCY PLAN

Clean Harbors Colfax, LLC

Contingency Plan

QUICK REFERENCE GUIDE

1.0 TYPE/NAMES AND ESTIMATED MAXIMUM AMOUNTS OF HAZARDOUS WASTE

Clean Harbors Colfax, LLC is limited to a maximum of off-site hazardous waste in the amount of 50,000 pounds stored in the permitted storage magazines and up to 60 cubic yards of hazardous wastes that may be stored in the permitted portion of the Preparation Building. These wastes consist of various explosive material that include the waste code for reactivity (D003) and may include one or more additional characteristic waste codes such as D008 for lead, along with a few listed waste codes that are present only due to the characteristic of reactivity.

Certain wastes generated on-site, primarily ash from the thermal treatment operation may be present in roll-off containers which are stored in the Ash Storage Building for up to 90 days. This waste is mostly non-hazardous but on occasion may be hazardous for one or more RCRA metals.

2.0 ESTIMATED MAXIMUM AMOUNT OF EACH HAZARDOUS WASTE THAT MAY BE PRESENT AT ANY ONE TIME

Storage Facilities	Existing Capacity
Storage Magazines	50,000 pounds (Net Explosive Weight)
Ash Storage Building	Typically < 80 cubic yards in roll off boxes
Preparation Building (Rear)	60 cubic yards

3.0 HAZARDOUS WASTES REQUIRING UNIQUE/SPECIAL TREATMENT

All hazardous waste that is received by the facility contains explosive or reactive characteristics.

4.0 LOCATION OF HAZARDOUS WASTES

The hazardous waste will be in one of areas mentioned in Item 2.0 above, or it will be on the thermal treatment unit (Burn Pad) being processed. Refer to the attached drawing.

5.0 STREET MAP OF THE FACILITY IN RELATION TO SURROUNDING BUSINESSES, SCHOOLS AND RESIDENTIAL AREAS TO UNDERSTAND HOW BEST TO GET TO THE FACILITY AND ALSO EVACUATE CITIZENS AND WORKERS

Refer to the attached map.

6.0 LOCATION OF WATER SUPPLY

Water is available from the pond next to the administrative offices. Please note that due to the nature of the wastes managed on-site, in the event of a fire impacting the waste, no attempt will be made to extinguish it.

7.0 IDENTIFICATION OF ON-SITE NOTIFICATION SYSTEMS

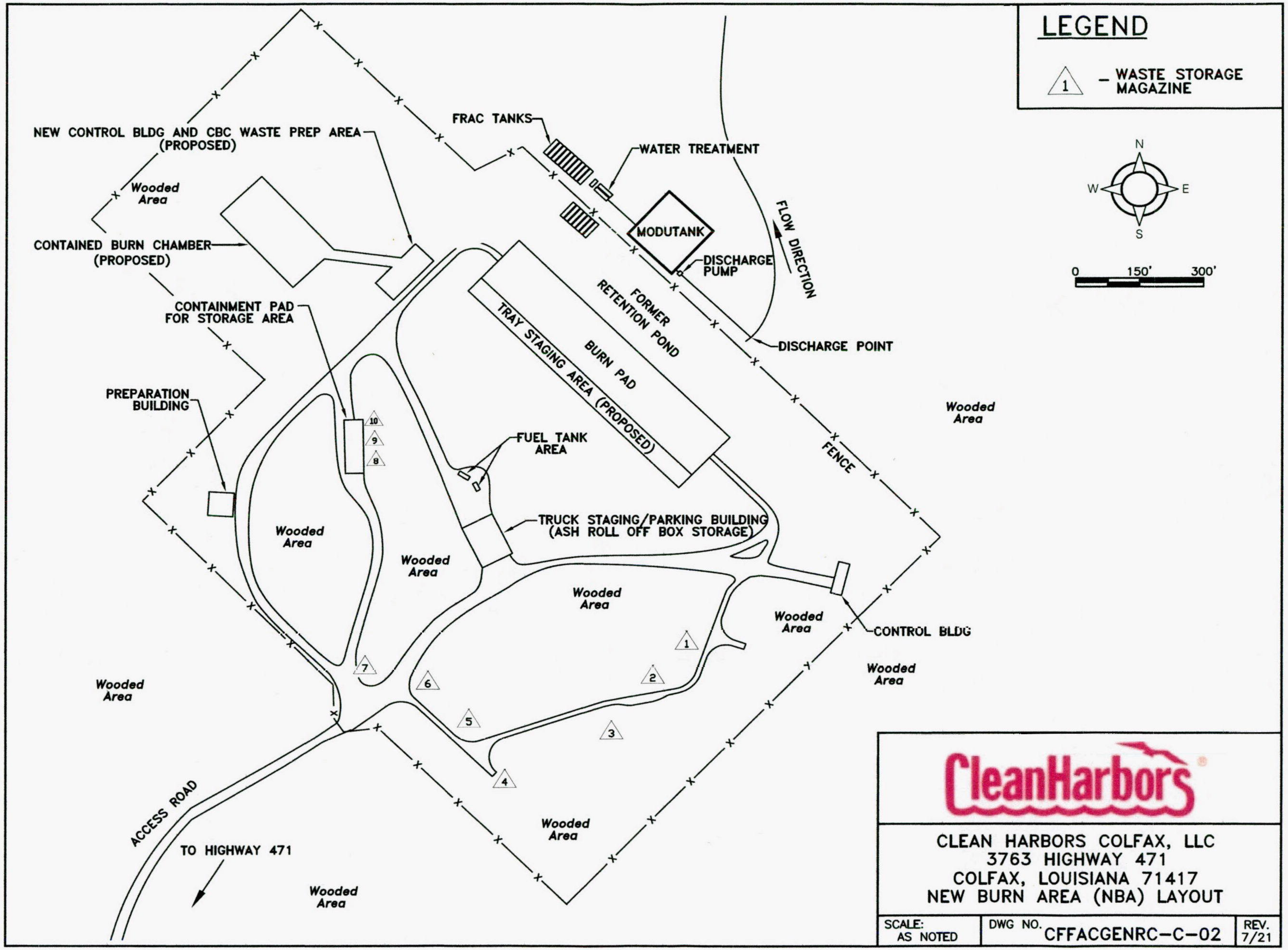
The communication system includes a telephone network. Supplementing the telephone network is a system of two-way radios, which are used by operations and administrative personnel throughout the facility.

Further communications between facility personnel may be achieved through cell phones which are issued to key site personnel.

8.0 NAME OF EMERGENCY COORDINATOR(S) AND 7/24 HOUR EMERGENCY TELEPHONE NUMBER(S)

The Emergency Coordinator is responsible for deciding when to implement the Contingency Plan and for directing the emergency response procedures once the Contingency Plan is implemented. At all times, there is an employee on-site at the facility or on call who can function as the Emergency Coordinator. He/she is familiar with all aspects of the Contingency Plan, all operations and activities at the facility, the location and characteristics of waste handled, the location of records, and the facility layout. The Emergency Coordinator has the authority to commit necessary resources to carry out the Contingency Plan.

NAME	EMERGENCY ROLE	CONTACT NUMBER
Scott Robertson	Primary Emergency Coordinator	Work: 318-627-3443 Cell: 318-419-8679
Joe Ganey	Alternate Emergency Coordinator	Work: 318-627-3443 Cell: 318-664-5438

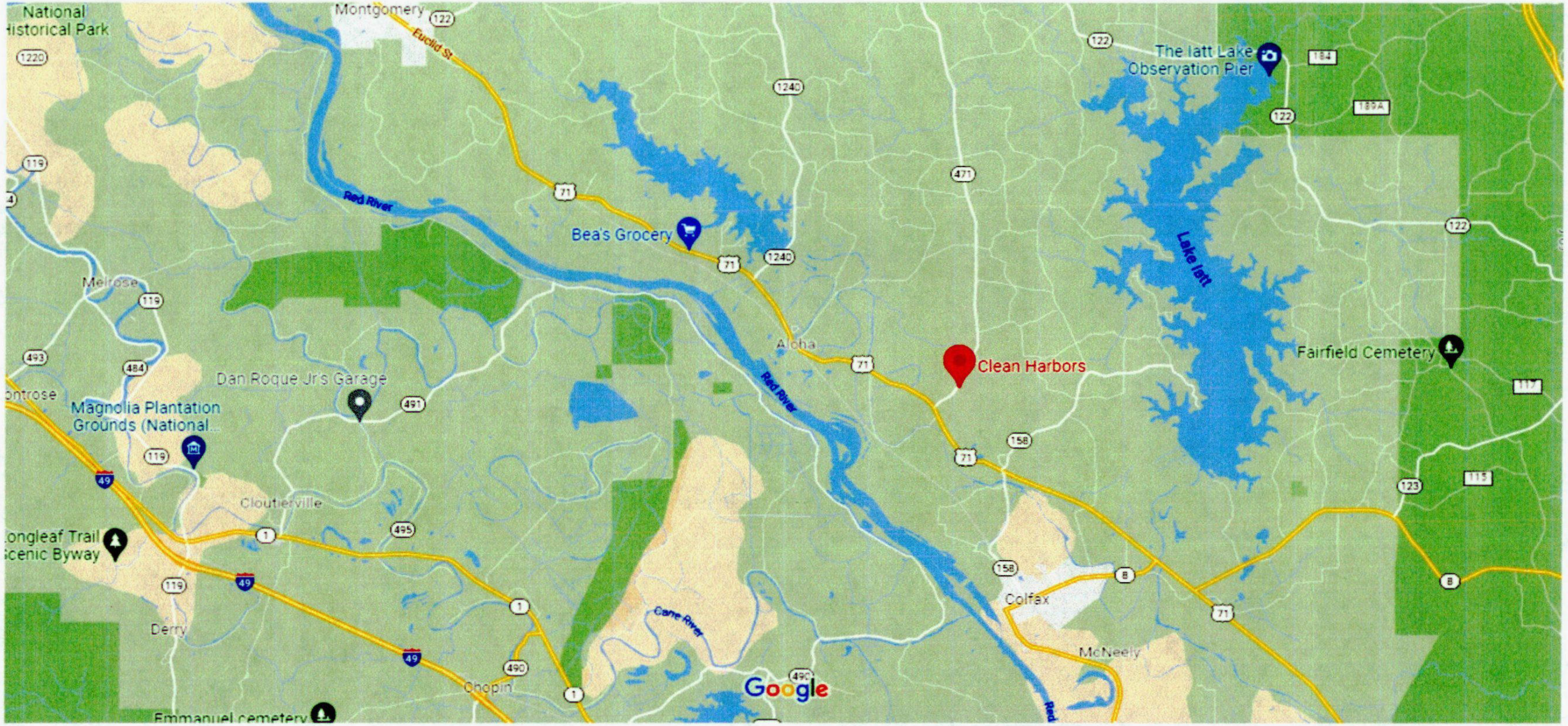


CleanHarbors

CLEAN HARBORS COLFAX, LLC
3763 HIGHWAY 471
COLFAX, LOUISIANA 71417
NEW BURN AREA (NBA) LAYOUT

SCALE: AS NOTED	DWG NO. CFFACGENRC-C-02	REV. 7/21

Google Maps **Clean Harbors**



Map data ©2021 Google 2 mi

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CLEAN HARBORS COLFAX, LLC
CONTINGENCY PLAN

I. INTRODUCTION AND PURPOSE

This Contingency Plan has been prepared in accordance with the State of Louisiana Hazardous Waste Regulations (LAC 33:V.1513) and as required by the hazardous waste permit for the facility. The Contingency Plan was approved along with the general permit to operate a TSD facility by the USEPA, Region 6 and the Louisiana Department of Environmental Quality on May 16, 1993. The purpose of this plan is to document procedures designed to minimize hazards to human health or the environment from fires, explosions, or any unplanned, sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil or surface water at the Clean Harbors Colfax, LLC ("the facility"). Provisions of the plan will be implemented immediately whenever there is a fire, explosion or the release of hazardous waste, which could threaten human health or the environment. ***This Contingency Plan and associated drawings will be updated once the new contained burn system is constructed and prior to placing it into service***

II. GENERAL INFORMATION

This Contingency Plan has been prepared for the facility located on Louisiana Highway 471, 5 miles northeast of Colfax, Louisiana. Figure 1 shows the approximate location of the facility in Grant Parish.

The facility specializes in the thermal treatment of hazardous waste explosives and reactives. Residues are collected and sent to proper disposal facilities.

Every effort has been made to anticipate any fire, explosion or unplanned, sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil or surface waters that could occur at this facility.

A. <u>Hazardous Waste Units</u>

The hazardous waste units at the facility include 10 storage magazines (explosives), 20 treatment units on a concrete pad, one truck staging building, one unloading building, and one preparation building. The locations of these areas and general facility layout are shown on Figure 2.

B. <u>Hazardous Wastes</u>

The specific hazardous wastes handled for treatment at the facility are listed in the Part A Application for the site. Essentially all incoming wastes are hazardous and include the D003 EPA waste code designation. The materials are explosive or otherwise reactive and may also be flammable. The following EPA waste codes may be managed at the facility: D001; D002; D003; D004; D005; D006; D007; D008; D010; D011; D022; D029; D030; D032; D034; D036; D038; D039; K044; K045; P081; P112.

III. IMPLEMENTATION OF THE CONTINGENCY PLAN

A. Contingency Plan Implementation Criteria

The decision to implement the Contingency Plan depends upon whether or not an imminent or actual incident could threaten human health or the environment. The purpose of this Section is to provide guidance to the Emergency Coordinator in making this decision by providing decision-making criteria.

The Contingency Plan will be implemented in the following situations:

1. Fire and/or Explosion

    a. A fire causes the release of toxic fumes.

    b. The fire spreads and could possibly ignite materials at other locations on-site or could cause heat-induced explosions.

    c. The fire could possibly spread to off-site areas.

    d. An imminent danger exists that an explosion could occur, causing a safety hazard because of flying fragments or shock waves.

    e. An imminent danger exists that an explosion could ignite other hazardous waste at the facility.

    f. An imminent danger exists that an explosion could result in the release of toxic material.

    g. An explosion has occurred.

2. Spills or Material Release

    a. The spill could result in release of flammable liquids or vapors, thus causing a fire or gas explosion hazard.

    b. The spill could cause the release of toxic liquid fumes.

    c. Any other spill (solid or liquid) that may threaten human health or the environment or have the potential to cause on-site or off-site contamination.

3. Hurricane Events

B. Emergency Response Procedures

Emergency response procedures will be implemented for the following situations:

- Fires and/or explosions
- Discharge, release or spills
- Hurricane events (that threaten employee safety or facility property)

1. Fires and/or Explosions

In the event of a fire or explosion, the following procedures will be implemented:

a. If an employee observes an incident -- Notify Emergency Coordinator immediately, using telephone or plant radio.

b. Remain in the area at a safe distance until help arrives.

c. The Emergency Coordinator will immediately review the incident and summon additional assistance as needed. Section VII.A. provides a list of available outside assistance.

d. Duties of the Emergency Coordinator are described in Section IV.A.

e. No effort will be made to fight fires involving explosives on the facility.

f. The facility maintains a fire lane along the RCRA area perimeter fence to minimize vegetation growth and reduce the likelihood that a potential fire from off-site will impact the RCRA property. If an off-site fire is observed, the local fire department will be immediately summoned.

2. Fires and/or Explosions During Off Hours

In the event of a fire or explosion during off hours, the following procedures will be implemented by the security guard or the security vendor, depending on which is being utilized at the time:

a. If the security guard or the security vendor observes an incident -- Notify Emergency Coordinator immediately, using telephone or plant radio.

b. Security Guard will remain in the area at a safe distance until help arrives or security vendor will remain on the phone to help assess the situation until the emergency coordinator arrives on site.

c. The Emergency Coordinator will immediately review the incident and summon additional assistance as needed. Section VII.A provides the list of available outside assistance.

d. Duties of the Emergency Coordinator are described in Section IV.A.

e. No effort will be made to fight fires involving explosives on the facility.

3. **Discharges, Releases, or Spills**

Any person observing, being involved with or recognizing a discharge, release or spill of hazardous waste is responsible to:

a. Identify the problem to the best of his ability, taking his own safety into account.

b. Immediately notify the Emergency Coordinator or alternate, providing a brief description of the problem.

c. Take the following measures to stop and/or contain the release only if there is no danger to human health:

   1. Stop the container from leaking if it can be accomplished without endangering human health.

   2. Contain the spill if possible.

   3. Apply absorbent material on spill.

d. Await further inspections from the Emergency Coordinator. Following notification, the Emergency Coordinator or alternate will direct responses for containment clean-up and thermal treatment or off-site disposal in the case of a discharge, release or spill.

4. **Discharges, Releases, or Spills During Off Hours**

In the event of a discharge, release or spill during off hours, the following procedures will be implemented by the security guard or the security vendor, depending on which is being utilized at the time:

a. If the security guard or the security vendor observes a discharge, release or spill -- Notify Emergency Coordinator immediately.

b. The security guard or the security vendor will assess the situation to the best of their ability and provide a brief description of the problem to the Emergency Coordinator.

C. Major Spills

Release of hazardous substances above the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), Section 102(a) "reportable quantity" (referred to as major releases throughout this Plan) might occur in areas inside and outside of diked areas. Response to releases within the diked areas, which provide immediate containment and outside of diked areas, are addressed separately. Procedures for notification of major spills are provided in Subsection C.3. Appendices A and B list the available emergency equipment and location of such equipment for responding to major spills. Figure 2 provides a site plan with the emergency equipment.

1. Within Diked Areas

Diked areas are present around all hazardous waste liquid storage areas. Upon the detection of a spill by any plant personnel, the emergency coordinator (or an alternate emergency coordinator) will be notified immediately.

Under the direction of the Emergency Coordinator, the following procedures will be used to respond to a release inside a diked area.

a. Immediately secure leaking equipment, either by temporary or permanent means.

b. Immediately prevent the spread of the spill outside of the diked area, if possible, or secure an absorbent material (i.e., floor dry, sand, earth, etc.) or any material to minimize the spread of the spill.

c. Personnel performing clean up must wear the appropriate personal protection equipment as specified by the Emergency Coordinator. Additional safety equipment may be necessary depending upon the type of spill.

d. Recover the spilled material, if appropriate. Unrecoverable materials will be cleaned up by using the appropriate absorbent materials and disposed of in the appropriate manner.

e. All materials recovered during the clean-up process (including the spilled material and all disposable clean-up aids such as absorbents, etc.) that are contaminated will be prepared for storage and/or disposal in the appropriate manner. Tools and other items that can be re-used will be contaminated. Spill kits will be re-stocked as needed to ensure sufficient equipment is available for any future spills that may occur.

f. All material must be put into DOT approved containers and properly labeled. All containers are to be moved to the appropriate area until disposal can be arranged. All information about the containers prepared for storage is to be recorded by the Emergency Coordinator.

g. After clean-up of a spill, all contaminated materials will be disposed of in an appropriate, approved manner.

2. **Outside Diked Areas**

Under the direction of the Emergency Coordinator, the following procedures will be used to respond to a release outside of a diked area.

a. Immediately secure the leaking equipment either by temporary or permanent means.

b. Immediately prevent the spread of the spill outside of the diked area, if possible, or secure an absorbent material (i.e., floor dry, sand, earth, etc.) or any material to minimize the spread of the spill.

c. Personnel performing clean up must wear the appropriate personal protection equipment as specified by the Emergency Coordinator. Additional safety equipment may be necessary depending upon the type of spill.

d. Recover the spilled material, if appropriate. Unrecoverable materials will be cleaned up by using the appropriate absorbent materials and/or disposed in the appropriate manner.

e. All materials recovered during the clean-up process (including the spilled material and all disposable clean-up aids such as absorbents, etc.) that are contaminated will be prepared for storage and/or disposal in the appropriate manner. Tools and other items that can be re-used will be decontaminated. Spill kits will be re-stocked as needed to ensure sufficient equipment is available for any future spills that may occur.

f. All material must be put into DOT approved containers and properly labeled. All containers are to be moved to the appropriate area until disposal can be arranged. All information about the containers prepared for storage is to be recorded by the Emergency Coordinator.

g. After clean-up of a spill, all contaminated materials will be disposed of in an appropriate, approved manner.

3. **Notification of Major Spills**

In the event of a major spill at the facility, the following agencies must be notified by the Emergency Coordinator or designee:

- National Response Center	800-424-8802
- U. S. EPA, Region 6	214-655-2222
- LA State Police Hazardous Materials Unit	225-925-6113
- Louisiana Department of Environmental Quality	225-219-3640 (M-F, 8 am– 4:30 pm) 225-342-1234 (nights/and holidays)
- Grant Parish Sheriff's Office	318-627-3261

These notifications will be completed in accordance with regulatory requirements either by the Primary Emergency Coordinator or designee or by the Environmental Compliance Manager for the facility.

4. Minor Spills

Small volume spills on plant floors, outdoor drives, etc., will be immediately cleaned up with absorbent materials and placed in DOT approved containers and labeled. All precautions will be taken to prevent such spills from reaching floor drains or storm sewers. Appendix B lists the available spill control equipment, including the equipment necessary to respond to minor spills. Any spill that exceeds the reportable quantities requires notification to the appropriate agencies. The DOT regulations list the reportable quantities for each type of waste that may be processed at the Colfax facility.

D. Hurricane Procedures

The purpose of this section of the procedure is to reduce, to the extent possible, the likelihood of injury to personnel, damage to property or loss of production due to a hurricane. Although in most cases when a hurricane hits the coastal areas, significant weakening occurs prior to reaching the Colfax area, there are occasions when hurricanes can produce very strong winds and torrential rainfall in the area of the facility. For this reason, these procedures are considered necessary. The hurricane season in the Atlantic, Caribbean, and Gulf of Mexico runs from June 1-November 30 of each year.

In general, the approach will be to take preliminary steps to minimize damage due to winds and flooding and then, if the hurricane approaches, curtail operations in such a manner as to have the facility in the safest condition under the circumstances.

Included in these plans is a shut-down schedule for the facility. This is a guide and will be adjusted or modified to best meet the conditions existing at the time.

Food and sleeping accommodations will be provided for those required to remain at the facility on a continuous basis, if deemed necessary by the Emergency Coordinator.

To efficiently carry out all of these hurricane emergency plans, certain people have been given special hurricane emergency assignments as indicated on the following pages.

Definitions:

Hurricane Watch - means a hurricane may threaten an area within 24-48 hours.

Hurricane Warning - means a hurricane is expected to strike an area within 24 hours.

National Hurricane Center - means the agency responsible for issuing advisories concerning hurricanes and other tropical systems.

Weather Bureau Report - means the official National Weather Service or similar agency that provides weather reports and guidance generally issued at four-hour intervals by National Weather Service in New Orleans, Louisiana

1. **Phase I (Beginning of Season)**

   a. Survey all guy wires and need for any wires (temporary buildings).

   b. Survey drainage and make sure all sewers and drainage areas are in good order. Make sure any sump pumps work.

   c. Survey all emergency generators and standby equipment.

   d. Survey all metal coverings and roofing for likelihood of being blown loose and have necessary repairs made.

   e. Check portable generators for operability. Store in an accessible area.

2. **Phase II (Hurricane Watch 24-48 Hours in Advance)**

   a. General clean-up campaign. Eliminate or secure all loose objects.

   b. Survey all metal coverings and roofing for likelihood of being blown loose and have necessary repairs made.

c. Survey all guy wires and need for guy wires (temporary buildings, etc.).

d. Survey all emergency generators and standby equipment.

e. Survey drainage and make sure all sewers are draining and in good order.

f. Determine need for air compressor.

g. Ample supply of flashlights and batteries should be assured.

h. Since the facility currently has only mobile offices, the plant will be shut down and employees sent home in the event that hurricane-force winds are anticipated.

i. Contractors working in the plant will be required to clean up their construction area (remove scaffold boards, tie down portable buildings, etc.).

j. The Facility Manager or designated alternate, will see to the coordination of all hurricane preparations and, when necessary, facility shutdown.

3. **<u>Phase III (Hurricane Warning - 12 Hours in Advance)</u>**

a. Secure all containers, scaffold material, etc., that could be blown by wind. When feasible, tie individual items into large bundles or groups to help prevent movement from the wind.

b. Tie down <u>all</u> portable buildings, especially in the vicinity of critical equipment such as transformer stations.

c. All booms, cranes, dock booms, etc., should be lowered and secured. All gantries should be secured.

d. Spot portable generators at maintenance building.

e. Tape all glass that has both dimensions larger than 18".

f. Fill all trucks and other equipment with fuel. (Cannot pump gasoline during power failure.) Fill 55-gallon containers and have hand pumps available.

g. Emergency drinking water should be stored.

h. The course and speed of the hurricane will be monitored by the

Facility Manager. When it becomes apparent that a hurricane will move into the Colfax area, the following steps will be taken:

- About eight (8) hours before the hurricane is expected to hit, volunteers will be called to the facility to begin preparation of facility shutdown.

- About six (6) hours before the hurricane-force winds are expected to hit, the order to shut down the facility will be given by the Facility Manager. At this time, the shutdown plans will go into effect.

- The loss of electrical power during the hurricane is to be expected.

- The office personnel will cover equipment to protect them from windows blowing out or leaking roofs. Offices will be expected to get wet, so efforts will be made to store papers and books in appropriate places.

i. Operating personnel at the plant will be released at least two (2) hours prior to a hurricane hitting the area.

E. Bomb Threat Procedures

In the event of a bomb threat, the facility will report it to the local law enforcement authorities for further investigation and recommendations as to the proper course of action. Since the facility is monitored at all times, it is highly unlikely that a bomb could be unknowingly brought into the facility. Due to the remote location of the facility and due to the lack of significant targets, the facility considers it extremely unlikely that it would be targeted for a bomb attack by terrorists or others. The facility has no documented occurrences of bomb threats to date. However, if there is a bomb threat, the Emergency Coordinator, in conjunction with the local authorities, will make a decision as to whether or not to evacuate. If the bomb threat is considered credible, outside law enforcement authorities will be requested to aid the facility with any appropriate searches or other actions as deemed necessary by the law enforcement officials. In the event of repeated prank bomb threats, an investigation of the source will be undertaken, and corporate officials will take the appropriate action against the perpetrator.

IV. HAZARDOUS WASTE EMERGENCY COORDINATORS

The facility maintains a list of employees who are capable of carrying out the responsibilities of Emergency Coordinator at all times in the event of an emergency. A primary Emergency Coordinator has been designated from this list and is responsible for coordinating emergency response measures. In the event the primary Emergency

Coordinator is not available, a designated alternate Emergency Coordinator will be responsible for coordinating all emergency response measures. A designated Emergency Coordinator will be at the facility at all times or will be available on an on-call basis.

The first person to be called during an emergency will be the primary Emergency Coordinator. If the primary Emergency Coordinator is unavailable, the alternate Emergency Coordinator will act as Emergency Coordinator and will be responsible for coordinating the emergency response measures. In the event of an emergency, the Emergency Coordinator responding to the emergency must call all others on the following list:

Primary Emergency Coordinator

Donald (Scott) Robertson
General Manager

Home Address:	4385 Highway 71 Colfax, LA 71417
Work Phone:	318-627-3443
Home Phone:	318-419-8679
Cell Phone:	318-419-8679

Alternate Emergency Coordinator

Gerry (Joe) Ganey
Operations Manager

Home Address:	684 O'Quinn Spur Road Colfax, LA 71417
Work Phone:	318-627-3443
Home Phone:	318-627-5437
Cell Phone:	318-664-5438

A. Responsibilities and Duties

The Emergency Coordinator or alternate is responsible for insuring that the Contingency Plan is implemented during an emergency situation and has complete authority from the facility to commit funds necessary to carry out any emergency procedure. The Emergency Coordinator determines, by report or actual observation, if an emergency exists at a hazardous waste facility. If an emergency exists, the Emergency Coordinator has the responsibility to:

1. Activate communication system to notify all plant personnel;
2. Notify appropriate emergency response and regulatory agencies;
3. Immediately identify the character, exact source, amount and extent of area

of any released materials;

4. Assess hazard to human health or the environment due to direct and indirect effects of any toxic, irritating or asphyxiating gases that are generated or the effects of any hazardous surface waste run-off from water or chemical agents used to control fire and heat-induced explosions.

5. If the Emergency Coordinator believes the emergency could threaten human health or the environment outside facility property, he must immediately:

   Notify the Louisiana Department of Environmental Quality Emergency Response Section and provide his name and telephone number, the name and address of the facility, time and type of incident, name and quantity of material(s) involved, the extent of injuries, if any, and the possible hazards to human health or the environment outside the plant. If evacuation of local areas may be advisable, immediately notify the appropriate local authorities;

6. Implement all measures necessary to ensure that fires, explosions and releases do not occur or spread to other hazardous wastes at the facility. These measures may include stopping operations, collecting and containing released waste and removing or isolating containers;

7. If the facility stops operation in response to a fire, explosion or release, take measures necessary to monitor the facility;

8. Directly following the emergency, provide for the treatment, storage or disposal of recovered waste, contaminated soil, surface water or other contaminated material resulting from the emergency;

9. Ensure that clean-up is complete before managing any waste that may be incompatible with the released waste;

10. Ensure that all emergency equipment is cleaned and fit for use before operations are resumed.

   After the emergency, the Emergency Coordinator is responsible for certain reporting requirements. The Louisiana Department of Environmental Quality and appropriate state and local authorities must be notified that the plant is in compliance before operations are resumed. It must be noted in the facility operating record the time, date and details of the emergency. Also, within 15 days of an emergency requiring implementation of the Contingency Plan, a written report must be submitted to the Louisiana Department of Environmental Quality which includes the following information:

a. Name, address and telephone number of owner;

b. Name, address and telephone number of plant;

c. Date, time and type of incident;

d. Name and quantity of material(s) involved;

e. The extent of injuries, if any;

f. An assessment of actual or potential hazards to human health or the environment, where applicable, and;

g. Estimated quantity and disposition of recovered material that resulted from the emergency.

B. Emergency Contacts

The following table lists the organizations that can be contacted by the Emergency Coordinator in the event of an emergency.

Emergency	Organization	Number
Injury/Illness	Rapides Regional Hospital	318-473-3000
	Acadian Ambulance Colfax, LA (ambulance/helicopter)	911
Fire or Explosion	LDEQ Baton Rouge, LA	225-219-5337
	Grant Parish Sheriff	318-627-3261 or 911
	Colfax Volunteer Fire Department	911
RQ Spill	National Response Center	800-424-8802
	Grant Parish LA Emergency Preparedness Committee	318-627-3261
	Louisiana State Police Hazardous Materials Unit	225-925-6113
	LDEQ	225-219-5337

V. EMERGENCY EQUIPMENT

The following sections describe the emergency equipment available at the facility, which could be used during an emergency. Each list of emergency equipment can be found in the appropriate sections of the appendices. The location of the emergency equipment at the facility is shown on Figure 2.

A. Fire Fighting Equipment

The list of firefighting equipment and firefighting systems, the locations and capabilities at the facility is located in Appendix A.

B. Spill Control Equipment

The list of the equipment available at the facility that may be used in the event of a hazardous waste spill is located in Appendix B.

C. Communications and Alarm Systems

The facility maintains an internal communications system for notification and instruction of personnel in case of an emergency. The communications system consists of an internal telephone network and two-way radios. In the event of an emergency, facility personnel have access to the communications system at the following locations:

Control Room (near burn pad)
Guard House or Administrative Office Building
Two-way radios are carried by operations personnel for communications purposes.

D. Decontamination Equipment

The list of the equipment available at the facility that may be used for decontamination efforts can be found in Appendix C.

Employees will utilize the equipment listed as needed to ensure that any impacted areas that become contaminated are properly decontaminated. If there is a liquid spill onto a concrete area, the spilled material will be covered with absorbent and then cleaned up using shovels, brooms, or other tools as appropriate. Spills of solid materials onto concrete areas will be removed using brooms, shovels, or other appropriate tools. Concrete areas may be pressure washed to remove any remaining residues if necessary. Any spills that occur outside of containment areas will be removed by over-excavating until all visible waste is removed.

All personnel who handle waste materials will utilize the proper PPE to minimize direct contact with waste. In the event of direct contact with waste, the employee will utilize the eye wash units or other water sources to remove contaminants.

All clean up materials and used PPE will be properly disposed in accordance with state and federal hazardous waste management regulations.

All equipment that becomes contaminated during the collection of hazardous waste and waste residues will be decontaminated using the appropriate means (such as using detergent washes followed by triple rinsing, if appropriate). Any decontamination materials including wash waters and rinsate that become contaminated with listed wastes will be collected and shipped off-site to a properly permitted facility for disposal.

VI. FACILITY EVACUATION PLAN

An evacuation plan has been developed for use in emergency situations when personnel must leave a portion of the plant due to a danger to human health. Sufficient aisle space is maintained at the facility to allow unobstructed movement of personnel, fire protection equipment and decontamination equipment to any area of the facility. Facility personnel will be notified to evacuate the facility via two-way radios in the event an emergency situation warrants evacuation. Employees shall leave the plant through the exit gate and proceed to the administrative office building. This point was selected as the primary rendezvous area, and it is sufficiently large enough to accommodate a mass exit of the entire work force. The entrance gate to the burn site has been chosen as a secondary rendezvous area. Figure 3 provides a diagram of the primary and secondary evacuation routes and rendezvous point.

Upon arrival at the rendezvous point, all supervisors will locate those employees assigned to their area. Missing employees will be reported to the Emergency Coordinator. The guard or the Facility Operations Manager will proceed to the rendezvous point with the visitor sign-in logbook noting the on-site visitors. Any missing visitor will be reported to the Emergency Coordinator.

Although the facility does not anticipate that its operations could ever necessitate any evacuations of the surrounding community, if the situation warrants, the facility will coordinate any external evacuations with the Grant Parish Sheriff's Department who will notify any surrounding residents of the need to evacuate. Due to the size of the facility and the wooded buffer zone surrounding the property, it is unlikely that any such evacuation will ever be needed.

VII. COORDINATION WITH OUTSIDE EMERGENCY AGENCIES

The facility has contacted and has made arrangements with outside emergency response agencies in order that these agencies become familiar with the facility. These arrangements include coordination with the Louisiana State Police Emergency Response Team in the event of a serious hazardous waste emergency at the plant that requires their assistance. The Rapides Regional Hospital in Alexandria, LA (or other medical facility, if utilized) will be provided with a description of the types of hazardous waste handled at the facility in order to be prepared for any injuries associated with a hazardous waste accident.

A. Arrangements with Police, Fire Department and Emergency Response Teams

Copies of the facility Contingency Plan will be supplied to the outside emergency agencies listed below. Written requests have been made to these agencies for assistance in the event an emergency situation occurs at the facility. Furthermore, these agencies have been offered the opportunity to visit the plant to become familiar with the plant layout, the hazardous waste facility locations and the emergency response systems. In addition to the written requests, meetings have been held with the local emergency response agencies to better explain and familiarize these agencies with the safety plans at the facility.

Grant Parish Sheriff Department
205 Cypress Street
Colfax, LA 71417

Acadian Ambulance
Colfax, LA 71417

Colfax Volunteer Fire Department
304 8th Street
Colfax, LA 71417

Grant Parish Office of
Louisiana Emergency Preparedness Committee
(LEPC - Old Civil Defense)
205 Cypress Street
Colfax, LA 71417

B. Designated Primary Authority

In the event of an emergency at the facility site requiring outside assistance, the designated primary on-scene coordinator will be an emergency response team member from the Louisiana Department of Environmental Quality's Emergency Response Team.

VIII. AMENDMENTS TO THE CONTINGENCY PLAN

This Contingency Plan will be reviewed and immediately amended, if necessary, whenever:

- The Contingency Plan fails in an emergency;
- The facility changes its design, construction, operations, maintenance or other circumstances in a way that materially increases the potential for fires, explosions or releases of hazardous waste or hazardous waste constituents;
- The list of Emergency Coordinators changes;
- The facility permit is revised;
- Applicable regulations are revised;
- The list of emergency equipment changes; and/or
- Changes occur to the response necessary in an emergency.

Whenever there has been an approved amendment to the Contingency Plan, all official copies of the Plan must be updated. For the list of official copies, refer to Appendix D of this Plan.

Clean Harbors
3763 Highway 471.
Colfax, LA 71417

318.627.3443
www.cleanharbors.com

Acadian Ambulance
Colfax, Louisiana 71417

Subject: **Renewal of Arrangements with Local Authorities**
Clean Harbors Colfax, LLC
LAD 981 055 791

I, the undersigned, have received a copy of the Contingency Plan for the hazardous waste management facility operated by Clean Harbors Colfax, LLC located at 3763 Highway 471, Colfax, LA 71417. I understand that this plan contains information concerning the layout of the facility (including roads and evacuation routes) and the procedures to be undertaken at the facility in the event of an emergency situation.

It is agreed that the organization listed above will, as appropriate, respond to and provide emergency services for Clean Harbors Colfax, LLC.

Signature: __________ Title: Operations Manager Acadian

Date Signed: 2-4-2021

CleanHarbors

Clean Harbors
3763 Highway 471.
Colfax, LA 71417

318.627.3443
www.cleanharbors.com

Mr. Steven McCain, Director of Homeland Security
Grant Parish Emergency Planning Committee
c/o Grant Parish Office of Homeland Security and Emergency Preparedness
205 Cypress Street
Colfax, Louisiana 71417

Subject: **Renewal of Arrangements with Local Authorities**
Clean Harbors Colfax, LLC
LAD 981 055 791

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It is agreed that the organization listed above will, as appropriate, respond to and provide emergency services for Clean Harbors Colfax, LLC.

Signature: ________ Title: Sheriff

Date Signed: 2-4-21

CleanHarbors

Clean Harbors
3763 Highway 471.
Colfax, LA 71417

318.627.3443
www.cleanharbors.com

Mr. Steven McCain, Sheriff
205 Cypress Street
Colfax, Louisiana 71417

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I, the undersigned, have received a copy of the Contingency Plan for the hazardous waste management facility operated by Clean Harbors Colfax, LLC located at 3763 Highway 471, Colfax, LA 71417. I understand that this plan contains information concerning the layout of the facility (including roads and evacuation routes) and the procedures to be undertaken at the facility in the event of an emergency situation.

It is agreed that the organization listed above will, as appropriate, respond to and provide emergency services for Clean Harbors Colfax, LLC.

Signature: Steven McCain Title: Sheriff

Date Signed: 2-4-21

Clean Harbors
3763 Highway 471.
Colfax, LA 71417
318.627.3443
www.cleanharbors.com

Colfax Volunteer Fire Department
304 8th Street
Colfax, Louisiana 71417

Subject: **Renewal of Arrangements with Local Authorities**
Clean Harbors Colfax, LLC
LAD 981 055 791

I, the undersigned, have received a copy of the Contingency Plan for the hazardous waste management facility operated by Clean Harbors Colfax, LLC located at 3763 Highway 471, Colfax, LA 71417. I understand that this plan contains information concerning the layout of the facility (including roads and evacuation routes) and the procedures to be undertaken at the facility in the event of an emergency situation.

It is agreed that the organization listed above will, as appropriate, respond to and provide emergency services for Clean Harbors Colfax, LLC.

Signature: Bee Hunt Title: Fire Chief

Date Signed: 2-4-21

FIGURE 1

SITE LOCATION MAP

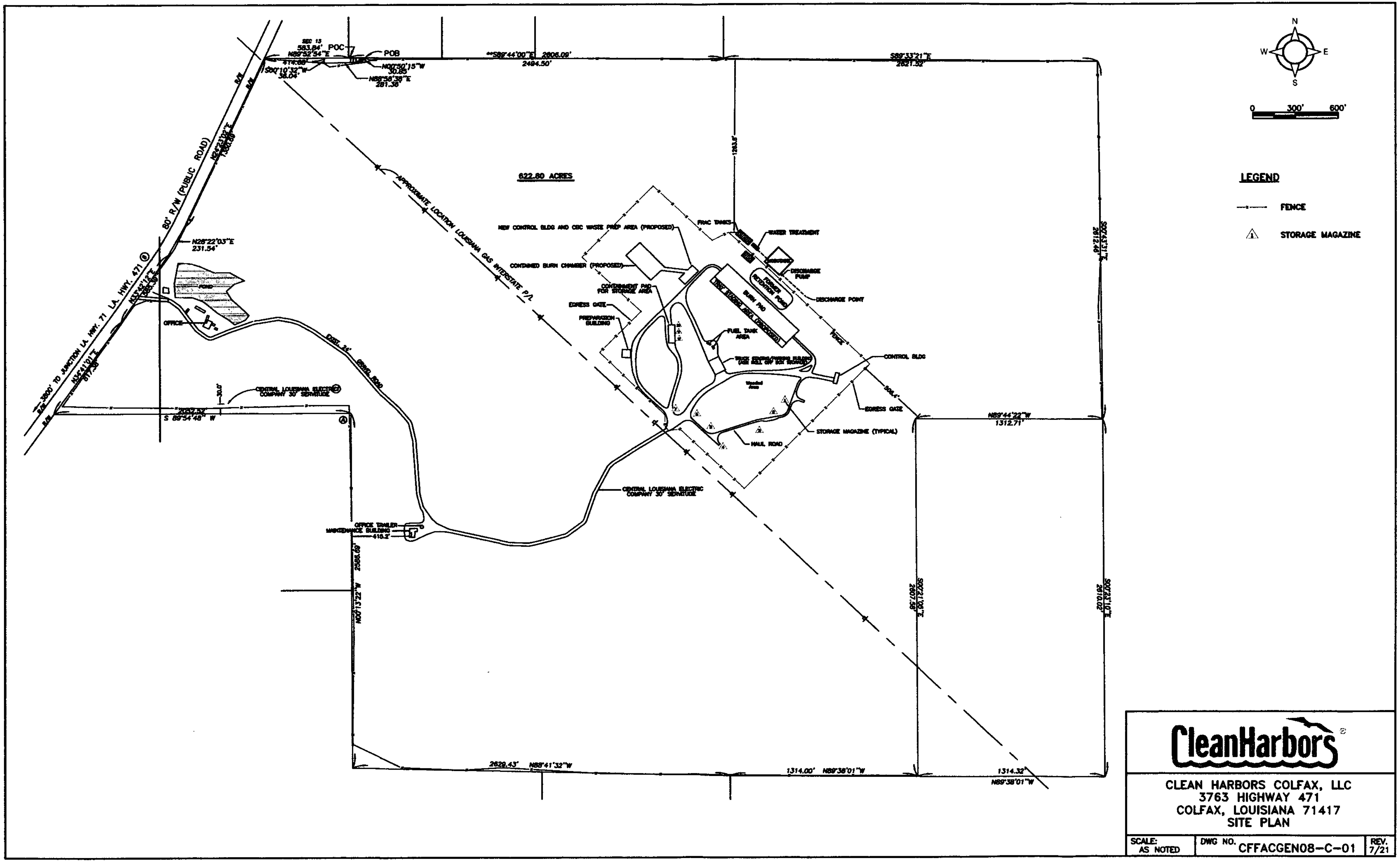
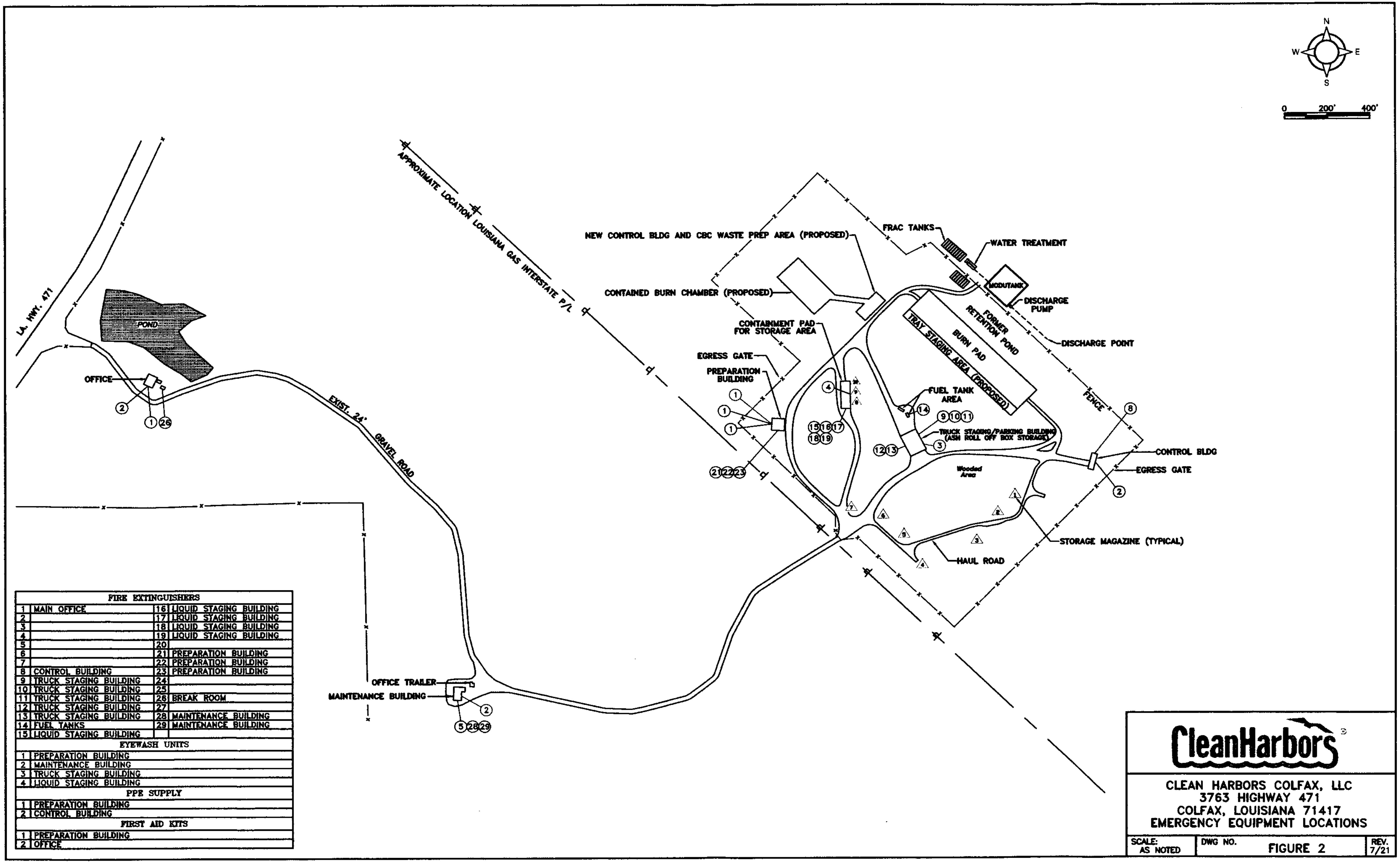

N
S
E
W
0
300'
600'
LEGEND
FENCE
STORAGE MAGAZINE
622.80 ACRES
SEC 13
POC
POB
S89°44'00"E 2606.09'
2494.50'
S89°33'21"E
2621.52'
N00°50'15"W
30.85
N88°58'38"E
281.38
80' R/W (PUBLIC ROAD)
LA. HWY. 471
3600' TO JUNCTION LA. HWY. 71
N28°22'03"E
231.54'
APPROXIMATE LOCATION LOUISIANA GAS INTERSTATE P/L
NEW CONTROL BLDG AND CBC WASTE PREP AREA (PROPOSED)
FRAC TANKS
WATER TREATMENT
CONTAINED BURN CHAMBER (PROPOSED)
DISCHARGE PUMP
DISCHARGE POINT
CONTAINMENT PAD FOR STORAGE AREA
EGRESS GATE
PREPARATION BUILDING
BURN PAD
FUEL TANK AREA
FENCE
CONTROL BLDG
EGRESS GATE
STORAGE MAGAZINE (TYPICAL)
HAUL ROAD
POND
OFFICE
CENTRAL LOUISIANA ELECTRIC COMPANY 30' SERVITUDE
S 89°54'48" W
N89°44'22"W
1312.71'
OFFICE TRAILER
MAINTENANCE BUILDING
S02°43'31"E
2612.46
S02°21'00"E
2607.58
S02°33'10"E
2610.02
N00°13'22"W
2629.43'
N88°41'32"W
1314.00'
N89°38'01"W
1314.32'
N89°38'01"W
CleanHarbors
CLEAN HARBORS COLFAX, LLC
3763 HIGHWAY 471
COLFAX, LOUISIANA 71417
SITE PLAN
SCALE: AS NOTED
DWG NO. CFFACGEN08-C-01
REV. 7/21

FIGURE 2

LOCATION OF EMERGENCY EQUIPMENT



FIRE EXTINGUISHERS			
1	MAIN OFFICE	16	LIQUID STAGING BUILDING
2		17	LIQUID STAGING BUILDING
3		18	LIQUID STAGING BUILDING
4		19	LIQUID STAGING BUILDING
5		20	
6		21	PREPARATION BUILDING
7		22	PREPARATION BUILDING
8	CONTROL BUILDING	23	PREPARATION BUILDING
9	TRUCK STAGING BUILDING	24	
10	TRUCK STAGING BUILDING	25	
11	TRUCK STAGING BUILDING	26	BREAK ROOM
12	TRUCK STAGING BUILDING	27	
13	TRUCK STAGING BUILDING	28	MAINTENANCE BUILDING
14	FUEL TANKS	29	MAINTENANCE BUILDING
15	LIQUID STAGING BUILDING		
EYEWASH UNITS			
1	PREPARATION BUILDING		
2	MAINTENANCE BUILDING		
3	TRUCK STAGING BUILDING		
4	LIQUID STAGING BUILDING		
PPE SUPPLY			
1	PREPARATION BUILDING		
2	CONTROL BUILDING		
FIRST AID KITS			
1	PREPARATION BUILDING		
2	OFFICE		

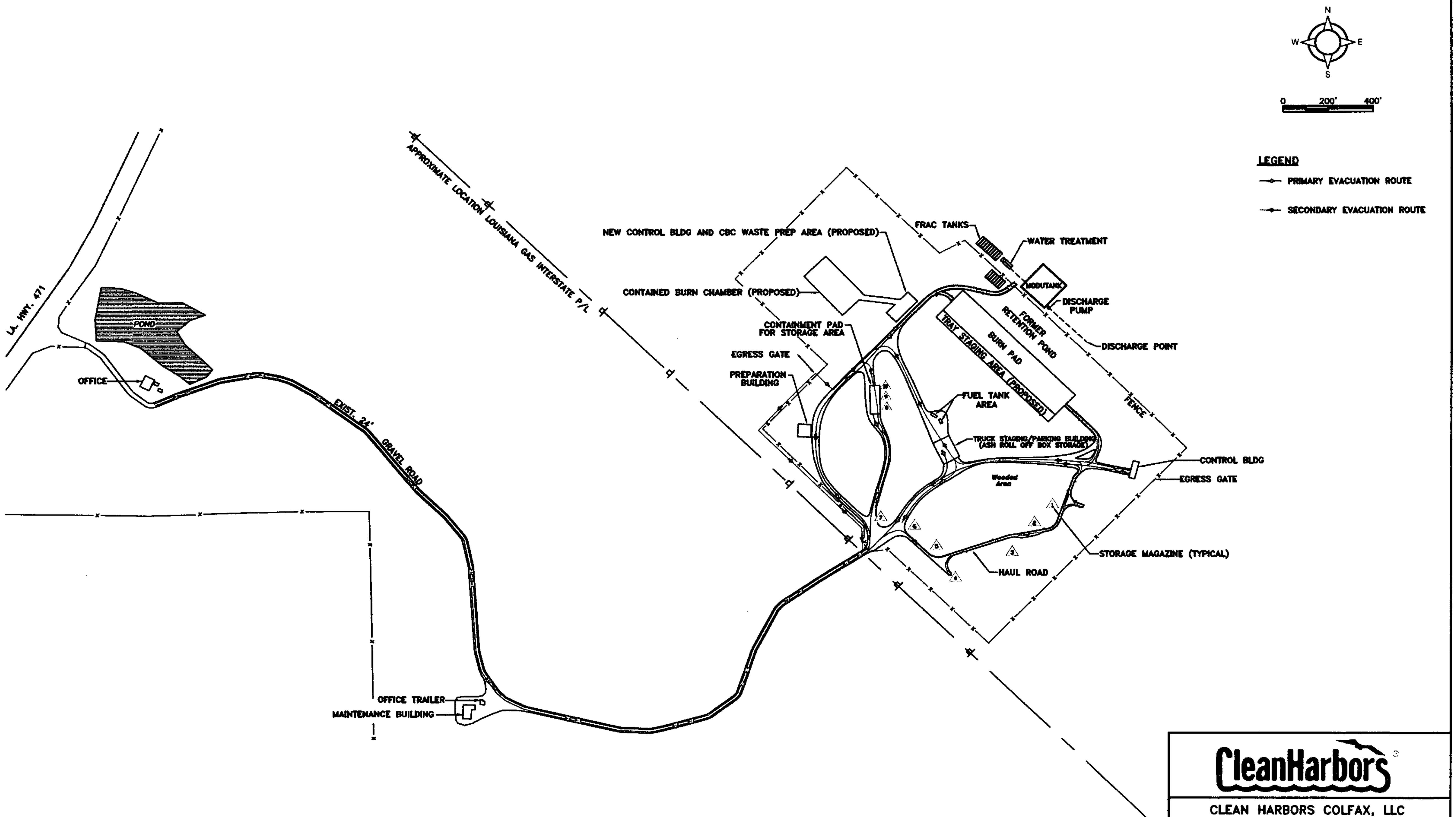
CleanHarbors

CLEAN HARBORS COLFAX, LLC
3763 HIGHWAY 471
COLFAX, LOUISIANA 71417
EMERGENCY EQUIPMENT LOCATIONS

SCALE: AS NOTED	DWG NO. FIGURE 2	REV. 7/21

FIGURE 3

EVACUATION PLAN



CleanHarbors

CLEAN HARBORS COLFAX, LLC
3763 HIGHWAY 471
COLFAX, LOUISIANA 71417
EVACUATION ROUTES

SCALE: AS NOTED	DWG NO. FIGURE 3	REV. 7/21

FIGURE 4

SITE CAMERA LOCATION MAP

(SENSITIVE INFORMATION NOT INCLUDED IN FILE)

FIGURE 5

ACTUAL SECURITY CAMERA ANGLES

(SENSITIVE INFORMATION NOT INCLUDED IN FILE)

APPENDIX A

LIST OF FIRE FIGHTING EQUIPMENT

Quantity	Equipment	Location	Capability
29	ABC Dry Chemical	Throughout Plant Area	Ten and twenty Pound units to be used on ABC type fires

APPENDIX B

LIST OF SPILL CONTROL EQUIPMENT

Quantity	Equipment	Location	Capability
1	Forklift	Mobile	Can be dedicated immediately to remove contaminated material
1	Front End Loader Bulldozer	Mobile	Can be dedicated or immediately to remove contaminated material or dig containment areas
1	Tractor	Mobile	Can be dedicated immediately to farm blade and build fire disc lanes
Multi	Shovels	Preparation Building	Will be used for spill containment and cleanup
3	Spill Kits*	Truck Staging and Truck Parking	Will be used for spill containment and cleanup
Multi	Spill Kit Replacements	Preparation Building	Replace materials for those used

*Spill kits consist of absorbent, containment booms, and a poly shovel.

APPENDIX C

DECONTAMINATION EQUIPMENT AND PPE

Quantity	Equipment	Location(s)	Capability
6	First Aid Kits	Administrative Office Prep Building Pickup Trucks	This equipment intended for minor injuries only.
1	Utility Vehicles	Mobile	Emergency transport
2	Eyewash	Preparation and Maintenance Building	To remove chemical contaminants if needed.
1	Pressure Washer	Maintenance Building	To clean off any contaminated equipment

Protective Equipment

The following protective equipment is available in the Preparation Building and/or the Control Room for Facility employees during a hazardous waste emergency.

Disposable suits (Tyveks)
Hard hats
Cartridge air purifying respirators (full-face)
Appropriate Cartridges for Respirators
Gloves with chemical protection
Rubber boots with chemical protection
Safety goggles and glasses
Flame Retardant Clothing
Face Shields

APPENDIX D

COPIES OF THE FACILITY CONTINGENCY PLAN

Official copies of the approved Contingency Plan (approved by the Louisiana Department of Environmental Quality) can be found at the locations indicated below. Whenever this Contingency Plan is modified, revisions will be provided in order to replace all copies of the Plan.

Locations:

General Manager's Office
Operation Manager's Office or Guard's Office
Control Room at Burn Unit
*Will also be maintained in the new Control Building for the Enclosed Burn Chamber once constructed and operational.

ATTACHMENT 12-B

TRAINING PLAN

CLEAN HARBORS COLFAX, LLC

TRAINING PLAN

TABLE OF CONTENTS

Training Program

In accordance with the regulatory requirements of the Louisiana Administrative Code (LAC) Title 33 Part V.1515, Clean Harbors Colfax, LLC has developed this Training Program, and it is an integral part of the Part II Permit Application for its facility located near Colfax, Louisiana. A copy of this program is available at the facility at all times. ***This Training Plan will be updated to incorporate the proposed Contained Burn Chamber (CBC) and any associated structures when the unit is constructed and prior to placing it into service***

1.0 INTRODUCTION

Proper training is essential for the safety and well being of all employees and the surrounding community as well as for the efficient and safe operation of all facility processes. Training helps to ensure rapid and effective response to emergency situations. It is the policy of Clean Harbors Colfax, LLC that all employees be trained to perform in a manner that emphasizes accident prevention to safeguard human health and the environment.

1.1 General Training Concept

The training program is designed to ensure that facility personnel can respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems, including, where applicable:

- Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment;
- Key parameter for automatic waste feed cut-off systems;
- Communications or alarm systems;
- Responses to fires or explosions;
- Responses to surface soils, surface water, and groundwater contamination incidents; and
- Shutdown of operations.

Each new employee is trained in the general orientation and operation of the facility. A training program related to the specified duties of each job function is specifically tailored for the position. No employee is permitted to work unsupervised until he has successfully completed all elements of the tailored training program. A certification of training completion will occur within six months of the new employee's entry into a specific job. In addition, every employee will participate in continuing training as determined necessary by the company to maintain proficiency, to learn new techniques and procedures, and to reinforce safety and quality consciousness.

Training records are maintained in accordance with applicable regulatory requirements. The records are maintained continuously during an employee's tenure and for a minimum of three years for former employees. At a minimum, each employee's training file will include the employee's current job title, a written job description, and records documenting the dates and types of training the employee has been provided. The written job description will include detailed information as to the type and amount of introductory and continuing training is required for that job title.

1.2 Program Implementation

Implementation of the training program encompasses:

- Identification of training requirements (for each job)
- Design of training modules and tests
- Selection of qualified instructors
- Employee testing
- Documentation of each training session

Responsibility for the training program rests with the General Manager. He or she, in conjunction with the corporate training personnel, designates qualified instructors, approves the training program content and format, provides the necessary resources, and maintains employee training records.

2.0 FACILITY ORGANIZATION

Training is tailored to prepare the employees to safely and effectively perform the functions of their position. Job descriptions are the key to designing responsibilities and duties of each position, and likewise the specific training necessary to accomplish those duties. Personnel with the following position titles are employed from time to time at this facility:

- General Manager

BASIC FUNCTIONS: Manages the Operations, maintenance, and Engineering functions and oversees all other activities at the Colfax Facility to achieve stated profitability goals. Provides dependable quality service to all customers while maintaining compliance with all regulations.

QUALIFICATIONS: Minimum four year technical or business, BS or BA degree from an accredited college, university, or equivalent. Minimum of five years experience or equivalent involving explosive/reactive operations. Experience in hazardous waste industry preferred.

SPECIFIC DUTIES:

1. Oversee and guide daily Operations and long-range business planning of the Colfax Facility.
2. Provides direct management of Operations, Maintenance, and Engineering activities at the Colfax Facility.
3. Coordinate the activities of Operations, Sales, Technical Services, Accounting, Compliance, Health and Safety, and Human Resources to ensure smooth operations in accomplishment of written business plans and objectives.
4. Develop written business plans, goals and objectives and develop strategies to attain them.
5. Ensure compliance with all regulatory requirements to maintain proper business operations.
6. Ensure a safe and healthful working and living environment for all employees, visitors, and surrounding neighbors.
7. Ensure a productive and motivated work force.
8. Maintain a good relationship and positive image with the local community.
9. Safeguard and maintain all physical assets at the facility.
10. Ensure an ROA on all assets acceptable to company guidelines and senior management.

- Operations Manager

BASIC FUNCTIONS: Supervises and manages daily facility explosive/reactive treatment and directs explosive technicians' daily routines and activities. Manages on site inventory control over explosive/reactive storage and tracking. Writes standard operating procedures (SOP) on explosive/reactive storage, on site transportation, treatment preparation and treatment processes. Provides facility management guidance in absence of General Manager. Assists facility management in providing quality service to all customers while maintaining compliance wit regulatory requirements. Assists in maintaining positive community relations.

QUALIFICATIONS: Minimum four year technical or business, degree from an accredited college or university, or equivalent. Three to five years experience or equivalent involving explosive/reactive operations. Experience in hazardous waste industry preferred.

SPECIFIC DUTIES:

1. Manages daily activities of explosive/reactive treatment operations of the Colfax Facility.
2. Writes procedures (SOP's) for all explosive/reactive operations.
3. Provides specialized professional services for preparing and packing
explosives / reactives for shipment from various customer locations.
4. Provides facility management guidance in g absence of General Manager.
5. Assists General Manager in developing plans, goals and objectives and strategies for

achievement.
6. Assists General Manager in maintaining compliance with all regulatory requirements.
7. Assists General Manager in maintaining a safe and healthful working and living environment for all employees, visitors and surrounding community.
8. Assists General Manager in maintaining a positive image and relationship with the local community.
9. Manages and conducts special projects as assigned.

- Lead Explosives Technician

BASIC FUNCTIONS: Supervises Explosive Technicians during preparation and thermal treatment of energetic materials such as explosive/reactive waste.

QUALIFICATIONS: Minimum high school diploma, previous explosive or hazardous waste experience required, valid driver's license.

SPECIFIC DUTIES:

1. Oversees maintenance and equipment associated with operations of explosive/reactive waste handling, storage and treatment.
2. Conducts inspections and inventories of explosive reactive waste according to established procedures.
3. Maintains required records for proper record keeping of explosive/reactive waste according to established procedures.
4. Operates and maintains communications, monitoring, alarm and security systems.
5. Provides direction on incoming explosive/reactive waste shipments, separates and stores according to compatibility.
6. Oversees preparation and loading of thermal treatment units with explosive/reactive waste for treatment.
7. Maintains and utilizes personal protective equipment according to established procedures.
8. Performs additional responsibilities as assigned by supervisor.

- Explosives Technician

BASIC FUNCTIONS: Preparation and thermal treatment of energetic materials such as explosive/reactive waste.

QUALIFICATIONS: Minimum high school diploma, previous explosive or hazardous waste experience preferred, valid driver's license.

SPECIFIC DUTIES:

1. Operates and maintains equipment associated with operations of explosive/reactive waste handling, storage and treatment.
2. Conducts inspections and inventories of explosive reactive waste according to established procedures.
3. Maintains required records for proper record keeping of explosive/reactive waste according to established procedures.
4. Operates and maintains communications, monitoring, alarm and security systems.
5. Loads and unloads incoming explosive/reactive waste shipments, separates and stores according to compatibility.
6. Prepares and loads thermal treatment units with explosive/reactive waste for treatment.
7. Maintains and utilizes personal protective equipment according to established procedures.
8. Performs additional responsibilities as assigned by supervisor.

- Maintenance Technician

BASIC FUNCTIONS: Maintenance and general housekeeping of all property, buildings, and equipment. Preparation and thermal treatment of energetic materials such as explosive/reactive waste.

QUALIFICATIONS: Minimum high school diploma, previous explosive or hazardous waste experience preferred, valid driver's license.

SPECIFIC DUTIES:

1. Maintains and operates all equipment associated with operations of explosive/reactive waste handling, storage, treatment, and maintenance.
2. Maintains all grounds and surroundings such as grass cutting, trimming trees, maintain fire lanes, control burning, picking up litter, grading roads, etc.
3. Maintains and operates all communications, monitoring, alarm and security systems.
4. Maintains required records for proper record keeping of equipment and property according to established procedures.
5. Maintains required records for proper record keeping of explosive/reactive waste according to established procedures.
6. Loads and unloads incoming explosive/reactive waste shipments, separates and stores according to compatibility.
7. Conducts inspections and inventories of explosive reactive waste according to established procedures.
8. Prepares and loads thermal treatment units with explosive/reactive waste for treatment.
9. Maintains and utilizes personal protective equipment according to established procedures.
10. Maintains and utilizes personal protective equipment according to established procedures.

11. Performs additional responsibilities as assigned by supervisor.

- Plant Coordinator

BASIC FUNCTIONS: Manages all aspects of facility Administration, Accounting, Purchasing, Human Resources, Customer Services and Facility Security and administrative office functions of Health & Safety, Environmental Affairs and Project Management by overseeing daily routines and managing staff activities to maintain a professional and efficient operation.

QUALIFICATIONS: Minimum two-year technical, business or Associate degree from an accredited college or university, or equivalent. Seven to eight years administrative experience or equivalent. Experience in hazardous waste industry or equivalent.

SPECIFIC DUTIES:

1. Manages daily activities of office and administrative staff of the Colfax Facility.
2. Provides direct management of Administration, Accounting, Purchasing, Human Resources, Customer Services and Facility Security.
3. Manages administrative activities of Health & Safety, Environmental Affairs and Project Management to maintain a professional and efficient operation.
4. Provides facility management as directed when Facility Manager is absent from facility.
5. Assists Facility Manager in developing plans, goals and objectives and strategies for achievement.
6. Assists Facility Manager in maintaining compliance with all regulatory requirements.
7. Assists Facility Manager in maintaining a safe and healthful working and living environment for all employees, visitors, and surrounding community.
8. Assists Facility Manager in maintaining a positive image and relationship with the local community.
9. Maintains accountability for all assets.
10. Manages and conducts special projects as assigned by Facility Manager.

A current facility organization chart is maintained on-site at all times. The position descriptions, including basic function, duties and job requirements presented for each of the above listed position titles are also maintained on-site at all times.

3.0 TRAINING PROGRAM

3.1 Orientation

All new employees participate in an orientation program designed to familiarize the employee with their new surroundings. To ensure that all appropriate topics are covered, an orientation checklist is completed and signed by all participating in the orientation. The completed checklist is then placed in the employee's personnel training file as a permanent record.

The following is a description of the Orientation Training:

1. Completion of all applicable personnel forms.
2. Discussion with the General Manager
   a. Welcome
   b. Organization and goals of:
      (i) Facility
      (ii) Company
3. Policies and Benefits
4. Safety
   a. Safety Policy
   b. Individual Responsibility
   c. Accident and Incident Reporting
   d. Issue and Discuss Safety Equipment (as appropriate)
      (i) Safety Glasses
      (ii) Respirator
      (iii) Gloves
      (iv) Rain Gear
      (v) Rubber Boots
5. Regulatory Review
6. Job Description and Duties (as applicable)
7. Facility Tour
   a. Storage Magazines
   b. Preparation Building
   c. Unloading Area
   d. Thermal Treatment Units, including the enclosed unit (once constructed)

3.2 Safety

Clean Harbors Colfax, LLC has a policy that no job shall be performed if that job endangers the safety or health of any person. The company ensures that all employees are trained to safely perform assigned tasks. All workers assigned to work in an area of the facility where the potential exists for exposure to hazardous waste must complete an intense safety training as mandated by OSHA 29 CFR 1910.120. This training consists of a minimum of 24 hours, and up to 40 hours of classroom activity followed by 24 hours of on-the-job supervised field activity. In addition to this initial training, employees working in any hazardous area receive an additional 8 hours of refresher training (at a minimum) annually thereafter. A list of topics covered, but not limited to, is as follows:

1. Possible Site Hazards
    a. Chemical Exposure
    b. Fire and Explosion
    c. Oxygen Deficiency
    d. Biological Hazards
    e. Electrical Hazards
    f. Heat and Cold Emergencies

2. Emergency Response
    a. Planning and Organization
    b. Site Control
    c. Emergency Contingency Plan
    d. Emergency Equipment
    e. Emergency Shutdown Procedures
    f. Decontamination

3. Medical Program and Health Monitoring
4. Use and Care of Personnel Protection Equipment
5. First Aid and Cardio-Pulmonary-Resuscitation
6. Handling Hazardous Waste
7. Confined Space Entry
8. Spill Response and Corrective Measures

All supervisory personnel are required to have 8 hours of supervisory training in the related safety training areas in addition to the above. Within six months of an employee's initial assignment to a job, this training will be conducted and documented in the employee's training file.

All personnel are benefited by additional safety training through safety meetings and discussion, provided by management on a regular basis. On-The-Job training is continuous and ongoing, to further reinforce the emphasis of safety.

3.3 Environmental Protection

Second only to employee safety is the commitment by Clean Harbors Colfax, LLC to environmental protection. All employees are trained to perform assigned tasks in a safe, environmentally sound manner. Employees are instructed as to the most current standards and regulations regarding the waste treatment operation conducted at the Colfax facility.

Additional training is provided to ensure that in the unlikely event of an emergency, personnel are knowledgeable as to the proper procedure to follow regarding corrective action as well as in reporting and documenting these circumstances. All employees are instructed in necessary emergency cleanup operations and decontamination.

3.4 Regulatory Requirements

Clean Harbors Colfax, LLC will provide training programs to all affected employees as required by various regulatory agencies. The following is a listing of training that is presently required by regulations.

1. OSHA Requirements
   (a) 24 or 40 Hour Initial Hazardous Waste Training (in accordance with 29 CFR 1910)
   (b) Respiratory Protection and Fit Testing
   (c) Confined Space Entry
   (d) Handling Carcinogenic Compounds
   (e) Electrical Safety
   (f) Moveable Vehicle including Fork Truck Training
   (g) Emergency Response Procedures (in accordance with 29 CFR 1910)
   (h) Welding and Cutting Operations
   (i) 8-Hour Annual Refresher Training (in accordance with 29 CFR 1910)
2. DOT Requirements (49 CFR)
   (a) Equipment Inspection
   (b) Notification of Deficiency
3. RCRA/LDEQ/EPA Requirements (in accordance with LAC 33.V. and 40 CFR Parts 262, 263, 264, and 268)
   (a) Emergency Equipment
      i. Location
      ii. Proper Usage
      iii. Inspection Procedures
      iv. Repair or Replacement Procedures
   (b) Emergency Operations Shutdown
      i. Location
      ii. Proper Usage
      iii. Inspection Procedures
      iv. Repair or Replacement Procedures
   (c) Emergency Response
      i. Contingency Plan
      ii. Spill Prevention
      iii. Spill Remediation, when necessary
   (d) Monitoring Equipment, Communications
      i. Location
      ii. Proper Usage
      iii. Inspection Procedures

iv. Repair or Replacement Procedures

(e) Annual Review of Initial Training (in accordance with LDEQ and RCRA)

4. ATF Regulatory Review (27 CFR)
   (a) Transportation of Explosives
   (b) Storage of Explosives
   (c) Thermal Treatment of Explosives
5. Waste Minimization (as required by LAC 33.V and 40 CFR Part 264)

4.0 SPECIFIC TRAINING REQUIREMENTS

- **Operations**

The General Manager is responsible for ensuring that each operations employee has been properly trained and can demonstrate knowledge and proficiency in all areas of his job assignment. Each operations employee shall complete an annual review of the Standard Operating Procedures necessary for his/her job assignment.

1. Operator-Lead Explosives Tech, Explosives Tech, Maintenance Tech
   a. General Safety
      (l) Review of Facility Safety Rule and Regulations
      (2) Use and Location of Fire Extinguishers
      (3) Location and Operation of Emergency Showers and Eye Wash Stations
   b. Equipment Operation
      (1) Truck Unloading Area
      (2) Preparation Building/Associated Equipment
      (3) Thermal Treatment Units
      (4) Enclosed Burn Chamber (proper waste loading requirements; maintenance and housekeeping; start-up and shutdown of the unit; monitoring of the unit for malfunctions; other items to be determined)
   c. Environmental Compliance
      (l) Laws and Regulations
      (2) Site Permit Requirements
      (3) Compliance Methods
      (4) Specific Duties
   d. Material Familiarization
      (l) Waste Classification
      (2) Review Waste Safety Sheets
   e. Emergency Procedures (Review of Contingency Plan)
      (l) Fire and/or Explosion
      (2) Injury

(3) Spills
(4) Surface Soils, Surface Water, and Groundwater Contamination
(5) Shutdown of Operations

In addition to the above training topics, all employees who manage wastes that may be subject to violent reactions are trained to recognize this possibility and to ensure that in these cases, only small quantities of such wastes are to be burned at a given time.

- **Clerical/Shared Services Administrator (Plant Coordinator)**

All clerical employees will be trained in those areas that are deemed to be desirable to complement the basic secretarial and clerical skills already possessed. The General Manager is responsible for ensuring that all secretarial and clerical employees are properly trained to efficiently and courteously perform all assigned duties.

1. Telephone Usage and Etiquette
   (a) Proper Identification Upon Answering Telephones
   (b) Proper Emergency Notification Procedures
2. Form Recognition
   (a) Standard Forms Utilized by the Company
   (b) Various Waste Identification Forms
3. Required Record Keeping
   (a) Clean Harbors Records Management
   (b) State Records
   (c) Reports/Operating Record
      (1) Type of Documents Maintained/Required
      (2) Dates Required
      (3) Distribution
4. Filing
5. Environmental Compliance
   (a) Laws and Regulations
   (b) Site Permit Requirements
   (c) Compliance Methods
   (d) Specific Duties

- **Supervisory-Operations Manager**

ALL Supervisory Employees will be trained to perform effectively in all areas of their assigned jobs. Additionally, each supervisor will be trained so that he is knowledgeable, experienced, and capable of training other employees. The General Manager is responsible for ensuring that each supervisor and staff employee is properly trained.

1. General Safety
   (a) Review of Facility Safety Rules and Regulations
   (b) Use of Personal Protective Equipment
   (c) Use and Location of Fire Extinguishers
   (d) Location and Operation of Emergency Showers and Eye Wash Stations
2. Emergency Procedures (Contingency Plan)
   (a) Fire and/or Explosion
   (b) Injury
   (c) Spills
   (d) Surface Soils, Surface Water, and Groundwater Contamination
   (e) Shutdown of Operations
3. Regulatory Familiarization
   (a) Review of Federal RCRA Regulations
   (b) Review of OSHA Regulations
   (c) Review of Louisiana DEQ Regulations
   (d) Review of all Site Permit Requirements
   (e) Review of ATF Regulations
4. Material Familiarization
   (a) Waste Material Classification
   (b) Waste Profile Sheets and/or SDS Information
5. Supervisory Techniques (A series of instruction courses completed as needed to strengthen weaknesses and complement strengths.)
6. Safety Training for Supervisors (A programmed instruction course to be completed under the leadership of the Health and Safety Department)
7. Accident - Incident Investigation (A course to be presented by the Health and Safety Department covering the techniques of investigation and report writing)
8. Company Policies
   (a) Review of Procedures Manual
   (b) Benefit Programs

- **Contractors/Outside Emergency Response Personnel**

All contractors and/or outside emergency response personnel (to the extent applicable) will be provided safety indoctrination to ensure the continued safe operations of the facility. Outside emergency personnel will also be periodically invited to visit the facility for tours of the site and informational training sessions to familiarize them with the layout of the facility, the evacuation routes, and the locations of on-site emergency response equipment. The General Manager will be responsible for ensuring that all contractor employees and emergency response personnel have been properly informed in all aspects of facility safety.

1. Facility Safety Policies and Procedures - The contractor's supervisor and/or foreman, along with all other contract personnel, will be provided a copy of the facility's safety policy and pertinent procedures to ensure safety.

2. Emergency Procedures - The contractor's supervisor and/or foreman, along with all other contract personnel, will be made familiar with Facility Contingency Plan.

3. Waste Profile Sheets - Copies of the Waste Profile Sheets, SDS's, or other similar documents that include safety information will be made available for contractors based upon potential exposure. The General Manager will be responsible for providing this information to all contract employees.

4. Emergency Equipment - The General Manager will inform all contractors as well as outside emergency response personnel regarding the location of fire extinguishers, safety showers, emergency eyewash stations, and first aid materials. Contractors will be provided a plot plan showing the location of all emergency equipment.

5. Security - The General Manager will provide security instructions to all contractors.

6. Environmental Compliance - The General Manager or the Compliance Manager will provide a compliance overview to all contractors.

ATTACHMENT 13

CLOSURE PLAN

CLEAN HARBORS COLFAX, LLC

CLOSURE PLAN

TABLE OF CONTENTS

VIII. FINANCIAL ASSURANCE - CLOSURE

EXHIBITS

Exhibit I	Maximum Permitted Off-Site Waste Inventory
Exhibit II	Closure Schedule
Exhibit III	Cost Basis Calculations
Exhibit IV	Closure Cost Summary

I. PURPOSE

The primary purpose of this plan is to provide a comprehensive analysis of the resources that will be needed to conduct closure and post-closure activities at Clean Harbors Colfax, LLC. In addition, this plan is an integral part of the RCRA Part B Permit for the facility. This plan also provides the Louisiana Department of Environmental Quality (LDEQ) and the U.S. Environmental Protection Agency with documentation of Clean Harbors' intentions, preparations, and capabilities to properly close its thermal treatment facility near Colfax, Louisiana. The plan demonstrates and ensures the technical and financial capabilities of Clean Harbors Colfax, LLC as the owner and operator to implement the closure requirements. This plan describes closure in writing and in detail, so that independently planned steps can be anticipated, enforced, and recorded as actual work progresses. Finally, this plan is comprehensive so that closure work meets the following criteria:

- Safe Completion of Closure Activities - Designed to pose no threat of illness or injury to workers involved in closure activities, to persons using or occupying surrounding property, or to outsiders who may inadvertently approach the facility during closure.

- Orderly and Timely Completion of Closure Activities - Follows preplanned and agreed upon schedules for beginning and completing each step of closure.

- Environmental Soundness of Closure Activities - Designed to present no current or future endangerment to human health or the environment by ensuring that there is no escape of hazardous wastes into the environment.

- 100% RCRA Compliant Closure Activities - Meets requirements of the Hazardous Waste Management Regulations as described by the Louisiana Administrative Code (LAC) and RCRA.

In the unlikely event that all or some portion of the structures and media cannot be adequately decontaminated by way of the means described herein and/or clean closure cannot be achieved, the facility will propose contingent closure methodology or a post-closure plan and cost estimate at such time as it becomes necessary. Prior to implementing such changes to the Closure Plan, the facility will obtain the necessary approvals from LDEQ in accordance with the requirements of LAC 33:V.Chapter 35.

II. SCOPE

This closure plan was developed to describe the activities necessary to close the RCRA-permitted units located at the facility. All on-site waste inventory is considered reactive, energetic, and shock sensitive. There are significant risks for handling, packaging, and transporting these materials. In addition, there are limited permitted off-site disposal options. Therefore, since the Colfax facility has the permitted units available for the final disposal of the waste inventories, the facility has assumed that the on-site thermal treatment units can be

FIGURE 5

ACTUAL SECURITY CAMERA ANGLES

(SENSITIVE INFORMATION NOT INCLUDED IN FILE)

APPENDIX A

LIST OF FIRE FIGHTING EQUIPMENT

Quantity	Equipment	Location	Capability
29	ABC Dry Chemical	Throughout Plant Area	Ten and twenty Pound units to be used on ABC type fires

APPENDIX B

LIST OF SPILL CONTROL EQUIPMENT

Quantity	Equipment	Location	Capability
1	Forklift	Mobile	Can be dedicated immediately to remove contaminated material
1	Front End Loader Bulldozer	Mobile	Can be dedicated or immediately to remove contaminated material or dig containment areas
1	Tractor	Mobile	Can be dedicated immediately to farm blade and build fire disc lanes
Multi	Shovels	Preparation Building	Will be used for spill containment and cleanup
3	Spill Kits*	Truck Staging and Truck Parking	Will be used for spill containment and cleanup
Multi	Spill Kit Replacements	Preparation Building	Replace materials for those used

*Spill kits consist of absorbent, containment booms, and a poly shovel.

APPENDIX C

DECONTAMINATION EQUIPMENT AND PPE

Quantity	Equipment	Location(s)	Capability
6	First Aid Kits	Administrative Office Prep Building Pickup Trucks	This equipment intended for minor injuries only.
1	Utility Vehicles	Mobile	Emergency transport
2	Eyewash	Preparation and Maintenance Building	To remove chemical contaminants if needed.
1	Pressure Washer	Maintenance Building	To clean off any contaminated equipment

Protective Equipment

The following protective equipment is available in the Preparation Building and/or the Control Room for Facility employees during a hazardous waste emergency.

Disposable suits (Tyveks)
Hard hats
Cartridge air purifying respirators (full-face)
Appropriate Cartridges for Respirators
Gloves with chemical protection
Rubber boots with chemical protection
Safety goggles and glasses
Flame Retardant Clothing
Face Shields

APPENDIX D

COPIES OF THE FACILITY CONTINGENCY PLAN

Official copies of the approved Contingency Plan (approved by the Louisiana Department of Environmental Quality) can be found at the locations indicated below. Whenever this Contingency Plan is modified, revisions will be provided in order to replace all copies of the Plan.

Locations:

General Manager's Office
Operation Manager's Office or Guard's Office
Control Room at Burn Unit
*Will also be maintained in the new Control Building for the Enclosed Burn Chamber once constructed and operational.

ATTACHMENT 12-B

TRAINING PLAN

CLEAN HARBORS COLFAX, LLC

TRAINING PLAN

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Training Program

In accordance with the regulatory requirements of the Louisiana Administrative Code (LAC) Title 33 Part V.1515, Clean Harbors Colfax, LLC has developed this Training Program, and it is an integral part of the Part II Permit Application for its facility located near Colfax, Louisiana. A copy of this program is available at the facility at all times. ***This Training Plan will be updated to incorporate the proposed Contained Burn Chamber (CBC) and any associated structures when the unit is constructed and prior to placing it into service***

1.0 INTRODUCTION

Proper training is essential for the safety and well being of all employees and the surrounding community as well as for the efficient and safe operation of all facility processes. Training helps to ensure rapid and effective response to emergency situations. It is the policy of Clean Harbors Colfax, LLC that all employees be trained to perform in a manner that emphasizes accident prevention to safeguard human health and the environment.

1.1 General Training Concept

The training program is designed to ensure that facility personnel can respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems, including, where applicable:

- Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment;
- Key parameter for automatic waste feed cut-off systems;
- Communications or alarm systems;
- Responses to fires or explosions;
- Responses to surface soils, surface water, and groundwater contamination incidents; and
- Shutdown of operations.

Each new employee is trained in the general orientation and operation of the facility. A training program related to the specified duties of each job function is specifically tailored for the position. No employee is permitted to work unsupervised until he has successfully completed all elements of the tailored training program. A certification of training completion will occur within six months of the new employee's entry into a specific job. In addition, every employee will participate in continuing training as determined necessary by the company to maintain proficiency, to learn new techniques and procedures, and to reinforce safety and quality consciousness.

Training records are maintained in accordance with applicable regulatory requirements. The records are maintained continuously during an employee's tenure and for a minimum of three years for former employees. At a minimum, each employee's training file will include the employee's current job title, a written job description, and records documenting the dates and types of training the employee has been provided. The written job description will include detailed information as to the type and amount of introductory and continuing training is required for that job title.

1.2 Program Implementation

Implementation of the training program encompasses:

- Identification of training requirements (for each job)
- Design of training modules and tests
- Selection of qualified instructors
- Employee testing
- Documentation of each training session

Responsibility for the training program rests with the General Manager. He or she, in conjunction with the corporate training personnel, designates qualified instructors, approves the training program content and format, provides the necessary resources, and maintains employee training records.

2.0 FACILITY ORGANIZATION

Training is tailored to prepare the employees to safely and effectively perform the functions of their position. Job descriptions are the key to designing responsibilities and duties of each position, and likewise the specific training necessary to accomplish those duties. Personnel with the following position titles are employed from time to time at this facility:

- General Manager

BASIC FUNCTIONS: Manages the Operations, maintenance, and Engineering functions and oversees all other activities at the Colfax Facility to achieve stated profitability goals. Provides dependable quality service to all customers while maintaining compliance with all regulations.

QUALIFICATIONS: Minimum four year technical or business, BS or BA degree from an accredited college, university, or equivalent. Minimum of five years experience or equivalent involving explosive/reactive operations. Experience in hazardous waste industry preferred.

SPECIFIC DUTIES:

1. Oversee and guide daily Operations and long-range business planning of the Colfax Facility.
2. Provides direct management of Operations, Maintenance, and Engineering activities at the Colfax Facility.
3. Coordinate the activities of Operations, Sales, Technical Services, Accounting, Compliance, Health and Safety, and Human Resources to ensure smooth operations in accomplishment of written business plans and objectives.
4. Develop written business plans, goals and objectives and develop strategies to attain them.
5. Ensure compliance with all regulatory requirements to maintain proper business operations.
6. Ensure a safe and healthful working and living environment for all employees, visitors, and surrounding neighbors.
7. Ensure a productive and motivated work force.
8. Maintain a good relationship and positive image with the local community.
9. Safeguard and maintain all physical assets at the facility.
10. Ensure an ROA on all assets acceptable to company guidelines and senior management.

- Operations Manager

BASIC FUNCTIONS: Supervises and manages daily facility explosive/reactive treatment and directs explosive technicians' daily routines and activities. Manages on site inventory control over explosive/reactive storage and tracking. Writes standard operating procedures (SOP) on explosive/reactive storage, on site transportation, treatment preparation and treatment processes. Provides facility management guidance in absence of General Manager. Assists facility management in providing quality service to all customers while maintaining compliance wit regulatory requirements. Assists in maintaining positive community relations.

QUALIFICATIONS: Minimum four year technical or business, degree from an accredited college or university, or equivalent. Three to five years experience or equivalent involving explosive/reactive operations. Experience in hazardous waste industry preferred.

SPECIFIC DUTIES:

1. Manages daily activities of explosive/reactive treatment operations of the Colfax Facility.
2. Writes procedures (SOP's) for all explosive/reactive operations.
3. Provides specialized professional services for preparing and packing explosives / reactives for shipment from various customer locations.
4. Provides facility management guidance in g absence of General Manager.
5. Assists General Manager in developing plans, goals and objectives and strategies for

achievement.
6. Assists General Manager in maintaining compliance with all regulatory requirements.
7. Assists General Manager in maintaining a safe and healthful working and living environment for all employees, visitors and surrounding community.
8. Assists General Manager in maintaining a positive image and relationship with the local community.
9. Manages and conducts special projects as assigned.

- Lead Explosives Technician

BASIC FUNCTIONS: Supervises Explosive Technicians during preparation and thermal treatment of energetic materials such as explosive/reactive waste.

QUALIFICATIONS: Minimum high school diploma, previous explosive or hazardous waste experience required, valid driver's license.

SPECIFIC DUTIES:

1. Oversees maintenance and equipment associated with operations of explosive/reactive waste handling, storage and treatment.
2. Conducts inspections and inventories of explosive reactive waste according to established procedures.
3. Maintains required records for proper record keeping of explosive/reactive waste according to established procedures.
4. Operates and maintains communications, monitoring, alarm and security systems.
5. Provides direction on incoming explosive/reactive waste shipments, separates and stores according to compatibility.
6. Oversees preparation and loading of thermal treatment units with explosive/reactive waste for treatment.
7. Maintains and utilizes personal protective equipment according to established procedures.
8. Performs additional responsibilities as assigned by supervisor.

- Explosives Technician

BASIC FUNCTIONS: Preparation and thermal treatment of energetic materials such as explosive/reactive waste.

QUALIFICATIONS: Minimum high school diploma, previous explosive or hazardous waste experience preferred, valid driver's license.

SPECIFIC DUTIES:

1. Operates and maintains equipment associated with operations of explosive/reactive waste handling, storage and treatment.
2. Conducts inspections and inventories of explosive reactive waste according to established procedures.
3. Maintains required records for proper record keeping of explosive/reactive waste according to established procedures.
4. Operates and maintains communications, monitoring, alarm and security systems.
5. Loads and unloads incoming explosive/reactive waste shipments, separates and stores according to compatibility.
6. Prepares and loads thermal treatment units with explosive/reactive waste for treatment.
7. Maintains and utilizes personal protective equipment according to established procedures.
8. Performs additional responsibilities as assigned by supervisor.

- Maintenance Technician

BASIC FUNCTIONS: Maintenance and general housekeeping of all property, buildings, and equipment. Preparation and thermal treatment of energetic materials such as explosive/reactive waste.

QUALIFICATIONS: Minimum high school diploma, previous explosive or hazardous waste experience preferred, valid driver's license.

SPECIFIC DUTIES:

1. Maintains and operates all equipment associated with operations of explosive/reactive waste handling, storage, treatment, and maintenance.
2. Maintains all grounds and surroundings such as grass cutting, trimming trees, maintain fire lanes, control burning, picking up litter, grading roads, etc.
3. Maintains and operates all communications, monitoring, alarm and security systems.
4. Maintains required records for proper record keeping of equipment and property according to established procedures.
5. Maintains required records for proper record keeping of explosive/reactive waste according to established procedures.
6. Loads and unloads incoming explosive/reactive waste shipments, separates and stores according to compatibility.
7. Conducts inspections and inventories of explosive reactive waste according to established procedures.
8. Prepares and loads thermal treatment units with explosive/reactive waste for treatment.
9. Maintains and utilizes personal protective equipment according to established procedures.
10. Maintains and utilizes personal protective equipment according to established procedures.

11. Performs additional responsibilities as assigned by supervisor.

- Plant Coordinator

BASIC FUNCTIONS: Manages all aspects of facility Administration, Accounting, Purchasing, Human Resources, Customer Services and Facility Security and administrative office functions of Health & Safety, Environmental Affairs and Project Management by overseeing daily routines and managing staff activities to maintain a professional and efficient operation.

QUALIFICATIONS: Minimum two-year technical, business or Asscciate degree from an accredited college or university, or equivalent. Seven to eight years administrative experience or equivalent. Experience in hazardous waste industry or equivalent.

SPECIFIC DUTIES:

1. Manages daily activities of office and administrative staff of the Colfax Facility.
2. Provides direct management of Administration, Accounting, Purchasing, Human Resources, Customer Services and Facility Security.
3. Manages administrative activities of Health & Safety, Environmental Affairs and Project Management to maintain a professional and efficient operation.
4. Provides facility management as directed when Facility Manager is absent from facility.
5. Assists Facility Manager in developing plans, goals and objectives and strategies for achievement.
6. Assists Facility Manager in maintaining compliance with all regulatory requirements.
7. Assists Facility Manager in maintaining a safe and healthful working and living environment for all employees, visitors, and surrounding community.
8. Assists Facility Manager in maintaining a positive image and relationship with the local community.
9. Maintains accountability for all assets.
10. Manages and conducts special projects as assigned by Facility Manager.

A current facility organization chart is maintained on-site at all times. The position descriptions, including basic function, duties and job requirements presented for each of the above listed position titles are also maintained on-site at all times.

3.0 TRAINING PROGRAM

3.1 Orientation

All new employees participate in an orientation program designed to familiarize the employee with their new surroundings. To ensure that all appropriate topics are covered, an orientation checklist is completed and signed by all participating in the orientation. The completed checklist is then placed in the employee's personnel training file as a permanent record.

The following is a description of the Orientation Training:

1. Completion of all applicable personnel forms.
2. Discussion with the General Manager
    a. Welcome
    b. Organization and goals of:
        (i) Facility
        (ii) Company

3. Policies and Benefits
4. Safety
    a. Safety Policy
    b. Individual Responsibility
    c. Accident and Incident Reporting
    d. Issue and Discuss Safety Equipment (as appropriate)
        (i) Safety Glasses
        (ii) Respirator
        (iii) Gloves
        (iv) Rain Gear
        (v) Rubber Boots

5. Regulatory Review
6. Job Description and Duties (as applicable)
7. Facility Tour
    a. Storage Magazines
    b. Preparation Building
    c. Unloading Area
    d. Thermal Treatment Units, including the enclosed unit (once constructed)

3.2 Safety

Clean Harbors Colfax, LLC has a policy that no job shall be performed if that job endangers the safety or health of any person. The company ensures that all employees are trained to safely perform assigned tasks. All workers assigned to work in an area of the facility where the potential exists for exposure to hazardous waste must complete an intense safety training as mandated by OSHA 29 CFR 1910.120. This training consists of a minimum of 24 hours, and up to 40 hours of classroom activity followed by 24 hours of on-the-job supervised field activity. In addition to this initial training, employees working in any hazardous area receive an additional 8 hours of refresher training (at a minimum) annually thereafter. A list of topics covered, but not limited to, is as follows:

1. Possible Site Hazards
    a. Chemical Exposure
    b. Fire and Explosion
    c. Oxygen Deficiency
    d. Biological Hazards
    e. Electrical Hazards
    f. Heat and Cold Emergencies

2. Emergency Response
    a. Planning and Organization
    b. Site Control
    c. Emergency Contingency Plan
    d. Emergency Equipment
    e. Emergency Shutdown Procedures
    f. Decontamination

3. Medical Program and Health Monitoring
4. Use and Care of Personnel Protection Equipment
5. First Aid and Cardio-Pulmonary-Resuscitation
6. Handling Hazardous Waste
7. Confined Space Entry
8. Spill Response and Corrective Measures

All supervisory personnel are required to have 8 hours of supervisory training in the related safety training areas in addition to the above. Within six months of an employee's initial assignment to a job, this training will be conducted and documented in the employee's training file.

All personnel are benefited by additional safety training through safety meetings and discussion, provided by management on a regular basis. On-The-Job training is continuous and ongoing, to further reinforce the emphasis of safety.

3.3 Environmental Protection

Second only to employee safety is the commitment by Clean Harbors Colfax, LLC to environmental protection. All employees are trained to perform assigned tasks in a safe, environmentally sound manner. Employees are instructed as to the most current standards and regulations regarding the waste treatment operation conducted at the Colfax facility.

Additional training is provided to ensure that in the unlikely event of an emergency, personnel are knowledgeable as to the proper procedure to follow regarding corrective action as well as in reporting and documenting these circumstances. All employees are instructed in necessary emergency cleanup operations and decontamination.

3.4 Regulatory Requirements

Clean Harbors Colfax, LLC will provide training programs to all affected employees as required by various regulatory agencies. The following is a listing of training that is presently required by regulations.

1. OSHA Requirements
   - (a) 24 or 40 Hour Initial Hazardous Waste Training (in accordance with 29 CFR 1910)
   - (b) Respiratory Protection and Fit Testing
   - (c) Confined Space Entry
   - (d) Handling Carcinogenic Compounds
   - (e) Electrical Safety
   - (f) Moveable Vehicle including Fork Truck Training
   - (g) Emergency Response Procedures (in accordance with 29 CFR 1910)
   - (h) Welding and Cutting Operations
   - (i) 8-Hour Annual Refresher Training (in accordance with 29 CFR 1910)
2. DOT Requirements (49 CFR)
   - (a) Equipment Inspection
   - (b) Notification of Deficiency
3. RCRA/LDEQ/EPA Requirements (in accordance with LAC 33.V. and 40 CFR Parts 262, 263, 264, and 268)
   - (a) Emergency Equipment
     - i. Location
     - ii. Proper Usage
     - iii. Inspection Procedures
     - iv. Repair or Replacement Procedures
   - (b) Emergency Operations Shutdown
     - i. Location
     - ii. Proper Usage
     - iii. Inspection Procedures
     - iv. Repair or Replacement Procedures
   - (c) Emergency Response
     - i. Contingency Plan
     - ii. Spill Prevention
     - iii. Spill Remediation, when necessary
   - (d) Monitoring Equipment, Communications
     - i. Location
     - ii. Proper Usage
     - iii. Inspection Procedures

iv. Repair or Replacement Procedures
(e) Annual Review of Initial Training (in accordance with LDEQ and RCRA)
4. ATF Regulatory Review (27 CFR)
(a) Transportation of Explosives
(b) Storage of Explosives
(c) Thermal Treatment of Explosives
5. Waste Minimization (as required by LAC 33.V and 40 CFR Part 264)

4.0 SPECIFIC TRAINING REQUIREMENTS

- **Operations**

The General Manager is responsible for ensuring that each operations employee has been properly trained and can demonstrate knowledge and proficiency in all areas of his job assignment. Each operations employee shall complete an annual review of the Standard Operating Procedures necessary for his/her job assignment.

1. Operator-Lead Explosives Tech, Explosives Tech, Maintenance Tech
   a. General Safety
      (1) Review of Facility Safety Rule and Regulations
      (2) Use and Location of Fire Extinguishers
      (3) Location and Operation of Emergency Showers and Eye Wash Stations
   b. Equipment Operation
      (1) Truck Unloading Area
      (2) Preparation Building/Associated Equipment
      (3) Thermal Treatment Units
      (4) Enclosed Burn Chamber (proper waste loading requirements; maintenance and housekeeping; start-up and shutdown of the unit; monitoring of the unit for malfunctions; other items to be determined)
   c. Environmental Compliance
      (1) Laws and Regulations
      (2) Site Permit Requirements
      (3) Compliance Methods
      (4) Specific Duties
   d. Material Familiarization
      (1) Waste Classification
      (2) Review Waste Safety Sheets
   e. Emergency Procedures (Review of Contingency Plan)
      (1) Fire and/or Explosion
      (2) Injury

(3) Spills
(4) Surface Soils, Surface Water, and Groundwater Contamination
(5) Shutdown of Operations

In addition to the above training topics, all employees who manage wastes that may be subject to violent reactions are trained to recognize this possibility and to ensure that in these cases, only small quantities of such wastes are to be burned at a given time.

- **Clerical/Shared Services Administrator (Plant Coordinator)**

All clerical employees will be trained in those areas that are deemed to be desirable to complement the basic secretarial and clerical skills already possessed. The General Manager is responsible for ensuring that all secretarial and clerical employees are properly trained to efficiently and courteously perform all assigned duties.

1. Telephone Usage and Etiquette
   (a) Proper Identification Upon Answering Telephones
   (b) Proper Emergency Notification Procedures
2. Form Recognition
   (a) Standard Forms Utilized by the Company
   (b) Various Waste Identification Forms
3. Required Record Keeping
   (a) Clean Harbors Records Management
   (b) State Records
   (c) Reports/Operating Record
      (1) Type of Documents Maintained/Required
      (2) Dates Required
      (3) Distribution
4. Filing
5. Environmental Compliance
   (a) Laws and Regulations
   (b) Site Permit Requirements
   (c) Compliance Methods
   (d) Specific Duties

- **Supervisory-Operations Manager**

ALL Supervisory Employees will be trained to perform effectively in all areas of their assigned jobs. Additionally, each supervisor will be trained so that he is knowledgeable, experienced, and capable of training other employees. The General Manager is responsible for ensuring that each supervisor and staff employee is properly trained.

1. General Safety
   (a) Review of Facility Safety Rules and Regulations
   (b) Use of Personal Protective Equipment
   (c) Use and Location of Fire Extinguishers
   (d) Location and Operation of Emergency Showers and Eye Wash Stations
2. Emergency Procedures (Contingency Plan)
   (a) Fire and/or Explosion
   (b) Injury
   (c) Spills
   (d) Surface Soils, Surface Water, and Groundwater Contamination
   (e) Shutdown of Operations
3. Regulatory Familiarization
   (a) Review of Federal RCRA Regulations
   (b) Review of OSHA Regulations
   (c) Review of Louisiana DEQ Regulations
   (d) Review of all Site Permit Requirements
   (e) Review of ATF Regulations
4. Material Familiarization
   (a) Waste Material Classification
   (b) Waste Profile Sheets and/or SDS Information
5. Supervisory Techniques (A series of instruction courses completed as needed to strengthen weaknesses and complement strengths.)
6. Safety Training for Supervisors (A programmed instruction course to be completed under the leadership of the Health and Safety Department)
7. Accident - Incident Investigation (A course to be presented by the Health and Safety Department covering the techniques of investigation and report writing)
8. Company Policies
   (a) Review of Procedures Manual
   (b) Benefit Programs

- **Contractors/Outside Emergency Response Personnel**

All contractors and/or outside emergency response personnel (to the extent applicable) will be provided safety indoctrination to ensure the continued safe operations of the facility. Outside emergency personnel will also be periodically invited to visit the facility for tours of the site and informational training sessions to familiarize them with the layout of the facility, the evacuation routes, and the locations of on-site emergency response equipment. The General Manager will be responsible for ensuring that all contractor employees and emergency response personnel have been properly informed in all aspects of facility safety.

1. Facility Safety Policies and Procedures - The contractor's supervisor and/or foreman, along with all other contract personnel, will be provided a copy of the facility's safety policy and pertinent procedures to ensure safety.

2. Emergency Procedures - The contractor's supervisor and/or foreman, along with all other contract personnel, will be made familiar with Facility Contingency Plan.

3. Waste Profile Sheets - Copies of the Waste Profile Sheets, SDS's, or other similar documents that include safety information will be made available for contractors based upon potential exposure. The General Manager will be responsible for providing this information to all contract employees.

4. Emergency Equipment - The General Manager will inform all contractors as well as outside emergency response personnel regarding the location of fire extinguishers, safety showers, emergency eyewash stations, and first aid materials. Contractors will be provided a plot plan showing the location of all emergency equipment.

5. Security - The General Manager will provide security instructions to all contractors.

6. Environmental Compliance - The General Manager or the Compliance Manager will provide a compliance overview to all contractors.

ATTACHMENT 13

CLOSURE PLAN

CLEAN HARBORS COLFAX, LLC

CLOSURE PLAN

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VIII. FINANCIAL ASSURANCE - CLOSURE

EXHIBITS

I. PURPOSE

The primary purpose of this plan is to provide a comprehensive analysis of the resources that will be needed to conduct closure and post-closure activities at Clean Harbors Colfax, LLC. In addition, this plan is an integral part of the RCRA Part B Permit for the facility. This plan also provides the Louisiana Department of Environmental Quality (LDEQ) and the U.S. Environmental Protection Agency with documentation of Clean Harbors' intentions, preparations, and capabilities to properly close its thermal treatment facility near Colfax, Louisiana. The plan demonstrates and ensures the technical and financial capabilities of Clean Harbors Colfax, LLC as the owner and operator to implement the closure requirements. This plan describes closure in writing and in detail, so that independently planned steps can be anticipated, enforced, and recorded as actual work progresses. Finally, this plan is comprehensive so that closure work meets the following criteria:

- Safe Completion of Closure Activities - Designed to pose no threat of illness or injury to workers involved in closure activities, to persons using or occupying surrounding property, or to outsiders who may inadvertently approach the facility during closure.

- Orderly and Timely Completion of Closure Activities - Follows preplanned and agreed upon schedules for beginning and completing each step of closure.

- Environmental Soundness of Closure Activities - Designed to present no current or future endangerment to human health or the environment by ensuring that there is no escape of hazardous wastes into the environment.

- 100% RCRA Compliant Closure Activities - Meets requirements of the Hazardous Waste Management Regulations as described by the Louisiana Administrative Code (LAC) and RCRA.

In the unlikely event that all or some portion of the structures and media cannot be adequately decontaminated by way of the means described herein and/or clean closure cannot be achieved, the facility will propose contingent closure methodology or a post-closure plan and cost estimate at such time as it becomes necessary. Prior to implementing such changes to the Closure Plan, the facility will obtain the necessary approvals from LDEQ in accordance with the requirements of LAC 33:V.Chapter 35.

II. SCOPE

This closure plan was developed to describe the activities necessary to close the RCRA-permitted units located at the facility. All on-site waste inventory is considered reactive, energetic, and shock sensitive. There are significant risks for handling, packaging, and transporting these materials. In addition, there are limited permitted off-site disposal options. Therefore, since the Colfax facility has the permitted units available for the final disposal of the waste inventories, the facility has assumed that the on-site thermal treatment units can be used by a third party for the disposal of all wastes remaining in inventory at the time closure commences as well as some of the waste generated residues as a result of the closure activities. In addition, the facility has an on-site Wastewater Treatment System which has the capability to treat and discharge the contact stormwaters and closure decontamination waters under an LPDES site-specific permit. For cost purposes, the facility assumed that the on-site treatment activities and closure activities would be completed by third party personnel using the on-site permitted thermal and wastewater treatment units. Closure of the thermal treatment units will occur following the completion of all other RCRA closure activities described in this plan.

This closure plan includes closure procedures for the existing currently permitted storage and treatment units. The 2020 Operating Permit Renewal Application also proposes a new Contained Burn System (CBS), new replacement Magazines 6 and 7, expansion in size of the rear portion of the Preparation Building. Details on the Magazines and the Preparation Building have been included in this Closure Plan. Design details on the CBS have not been finalized. used for calculating the closure costs. This Closure Plan and closure cost estimate will be updated to include any changes in final CBS design following completion of construction and prior to placing into operation. Detailed closure procedures are presented herein. In addition, brief information regarding the background of the facility and its layout is included below.

A. Site History

The facility began operations in June 1985 to assist the Louisiana State Police in the treatment of explosives. The hazardous waste management storage units consisted of ATF approved storage magazines. The thermal treatment units were concrete pots or steel troughs located on top of concrete pads.

The facility was contacted by both military and non-military personnel regarding the potential treatment of reactive materials. Reactives and explosives were treated by the facility under a series of Emergency Permits issued by the LDEQ until the final RCRA permit became effective in May 1993.

B. Description of Units

The storage units consist of ten storage magazines that are designed in accordance with requirements established by the Bureau of Alcohol, Tobacco, and Firearms. The magazines are 10 feet by 20 feet in area and 8 feet high (except that Magazines 1 and 2 are 8 feet by 40 feet by 8 feet high). The facility plans to replace existing magazines 6 and 7 with new magazines 8 feet by 40 feet by 8 feet high. The interior roof, doors, floors, and walls are lined with hardwood paneling (approximately 4 inches thick). Vents are installed in the walls and roofs to permit proper ventilation and to prevent the build-up of extreme heat or pressure.

Liquid storage magazines 8, 9 and 10 are equipped with 12-inch high thresholds at the door openings. The floor vents in these magazines are equipped with 12-inch high extensions.

All magazines are grounded to prevent the occurrence of an accidental fire or explosion from a lightning strike. The doors of the magazines are double locked with 5 tumbler locks and steel hoods. Appendix B of the permit renewal application contains typical cross sections of the magazines.

The thermal treatment area is constructed on a 700-foot by 130-foot reinforced concrete slab (6 inches thick). The thermal treatment units consist of twenty (20) concrete curbed treatment pads atop the slab, each equipped with an interchangeable burner assembly. All twenty (20) of the burner assemblies consist of a 6-foot by 6-foot square by 20 inches high open steel pan. All metal pans are constructed of 3/16-inch minimum steel thickness. Each of the treatment units is equipped with a retractable roof structure to minimize rainfall accumulation.

The current preparation building is 40 feet wide by 40 feet long with a concrete apron at the entrance. There is an L-shaped containment area in the back (approximately 18 feet x 60 feet and 10 feet x 12 feet). The facility plans to expand this area (approximately 20 feet to approximately 38 feet x 60 feet and 10 feet x 12 feet). The structure is enclosed on three sides with a roll-up door on the front. The preparation building is supplied with electric power to operate the drill press and band saw used for preparation activities. All electrical switches, motors, controls, and lights conform to the requirements of Class II, Division 2 of the National Electric Code. The building floor plan is shown in Appendix B of the permit renewal application.

A covered truck staging/parking area is provided for overnight parking within the fenced treatment area. The staging/parking area consists of four (4) bays constructed of reinforced concrete (approximately 16 feet x 75 feet each). Each bay is self-contained with raised curbs and sumps. Appendix B of the permit renewal application shows the foundation plan and details for this unit.

The liquid storage magazines loading/unloading unit is a reinforced concrete secondary containment area (approximately 28 feet x 107 feet) located adjacent to storage magazines 8, 9, and 10. This area is covered to minimize precipitation accumulation and is designed to contain spilled liquid. The concrete base is sloped toward a centralized sump and raised curbs are located on the perimeter. Appendix B of the permit renewal application shows the foundation plan and details.

Preliminary design for the Contained Burn System (CBS) consists of a Contained Burn Chamber (~15' diameter x 60' long steel vessel), Deactivation Furnace (~7' x7' x 20' long steel vessel), Thermal Oxidizer (~7' x 7' x 23' steel vessel), Cyclone (~84" x 84" x 35' tall steel vessel), Gas Cooler (~7'2' x 5'8" x 31'6" tall steel vessel), Bag House (~11'5" x 11'5" x 39' tall steel vessel), HEPA Filter (~8' 6' x 2' steel vessel), and Stack (~24" diameter x 60' tall steel vessel). The preliminary design assumes the CBS is founded on a concrete containment slab (~150' x 150'). The final dimensions, details, and closure procedures on the CBS including closure costs will be revised in the Closure Plan following construction and prior to placing in operation)

The maximum extent of operations that will be active during the life of the facility is the storing of wastes in the ten storage magazines, ash storage in the ash container storage area, the use of the preparation building, and the treatment of wastes in the twenty open burners and the CBS. The truck staging and containment areas will only be used for temporary staging of trucks waiting to unload and will not be used to hold waste inventory.

Final closure of the facility will occur when all stored wastes have been treated; treatment by-products have been removed from the site; and all waste management units have been decontaminated. The storage magazines and preparation building will remain in service until all stored wastes have been prepared and removed for treatment. The open burners and the CBS will remain in service until all on-site wastes, and any potential spill residues have been thermally treated. It is assumed that all closure activities will be conducted by a third party.

III. PRE-CLOSURE PREPARATION

A. Waste Scheduling

Generators, transporters, customers, and other parties involved in the shipment of wastes to the facility will be given appropriate notice of impending closure. The Closure Coordinator will ensure that the final shipments are scheduled to allow for disposal prior to the commencement of closure activities.

B. Equipment Inventory

The Closure Coordinator will prepare an equipment inventory, determining the proposed disposition of each item. The inventory will include the extent to which any item will be decontaminated and list the intended destination of any item to be removed from the site.

IV. CLOSURE ACTIVITIES

A. Closure of the Open Burn Unit and Associated Structures by Third Party

At closure, the wastes stored in the magazines will be moved to the preparation building if needed, and then the materials will be thermally treated in the burners (if required) or in the CBS. Untreated reactive material spilled during the preparation and treatment procedures will be collected immediately and thermally treated. Ash residue generated from treatment will be collected and containerized for proper off-site disposal. Disposal will comply with the Land Disposal Restrictions contained in LAC 33:V.Chapter 22. The treatment area concrete pad will be cleaned with mechanical sweepers or by manual sweeping and scrubbing, as needed. Residues will be disposed at an appropriate permitted facility.

Subsequent to final treatment and removal of waste, the steel burner assemblies (pans) and retractable roof covers will be decontaminated by pressure washing, dismantled, and scrapped (smelter and not for reuse). The concrete burn pads will be removed and disposed at an appropriate permitted facility.

The treatment area concrete pad will then be pressure washed using an industrial detergent followed by a clean water rinse(s). The final rinsate from the pad will be sampled to demonstrate clean closure. The final rinsate from the pad will be sampled in each of the sump areas and analyzed for VOCs (SW-846 Method 8260, total metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag, Cu, Ni, V, Zn, Sb, Tl and Be) using SW-846 Method 6010B and SW-846 Method 7470A, and extractable explosives (SW846 Method 8330). The most current version of the appropriate analytical testing methods will be used, and the analytical testing will be done by LELAP accredited laboratory(ies) for the required method versions. If the rinsate target constituent concentrations exceed TCLP, the rinsate will be treated as hazardous waste. Any contaminated rinsate will be pumped into a tanker truck or mobile storage tank (e.g., frac tanks) prior to being transported off-site to an approved permitted facility in accordance with all applicable requirements of LAC 33:V Chapter 22. If constituent concentrations are below background levels, the rinsate will be disposed of on-site in the waste water treatment system operated by a third party. This system may be utilized for the treatment and disposal of all waters generated during this closure process (including those waters generated during closure activities for other units discussed in this plan).

Other areas to be closed include the CBS, storage magazines, preparation building, truck staging and containment areas, and the ash container storage area. The buildings and concrete pads will remain on-site or be removed at the facility's discretion. All former waste management units that are left on-site following closure activities must meet RECAP standards in order to remain in place. Otherwise, the units will be dismantled for off-site disposal. Additional details regarding RECAP are included in Section IV.G.

B. Closure of the Truck Staging Area

Although this area is not a permitted waste management unit, the ash container storage area will be closed after all ash, spill residue and burner units have been removed from the site. The truck staging and containment areas will no longer be required for receiving wastes when closure is initiated; however, they will remain in service for equipment decontamination as required until closure of other areas/units is complete.

The maximum inventory of untreated waste that would be on-site at any time during the operating life of the facility is provided in Table II of Part I. This value assumes all storage areas contain the maximum allowable waste in storage. The specific activities required to meet the closure performance standard for existing and proposed units are discussed below.

Once all equipment has been decontaminated, the concrete containment areas will be pressure washed with a water/detergent followed by a fresh water rinse. Samples of the fresh water rinse will be collected from each sump and analyzed as described above for the direct burn area. This unit must also meet RECAP standards if left in place following closure activities.

C. Closure of the Storage Magazines

Once all of the waste has been removed from the storage magazines, the wood interior will be manually swept to remove any loose debris. This material will be thermally treated in burn pans. Following this activity, the wood interiors will be removed and shipped off-site for disposal. Subsequent to removal of the wood interiors, all ten magazines including both the existing and proposed magazines 6 and 7 (storage units) will be swept/vacuumed to remove any trace of reactive material which will be treated on-site and/or shipped off-site for disposal. The interior will be then pressure washed with fresh water.

The final rinsewater for each magazine shall be sampled (one sample per magazine) within the unit and analyzed for VOCs (SW846 Method 8260), total metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag, Cu, Ni, V, Zn, Sb, Tl and Be) using SW-846 Method 6010B and SW-846 Method 7470A, and extractable explosives (SW846 Method 8330). The most current version of the appropriate analytical testing methods will be used, and the analytical testing will be done by LELAP accredited laboratory for the required method versions.

If extractable explosives or volatile organic compounds are detected based upon the lower detectable limits established by the analytical method, or if the concentrations of metals exceed background levels as established through analysis of source water, a decision will be made to repeat decontamination procedures or to declare the unit hazardous and dispose in a permitted facility. It is anticipated that one decontamination event will be required per unit to clean close. If the rinsewater clean closure criteria constituents are below background levels, the rinsewater will be treated in the on-site wastewater treatment unit and discharged through Outfall 001 in accordance with the LPDES Permit.

Once decontamination is complete, the magazine's metal exterior shell may be left in place and/or scrapped (smelter and not for reuse).

Following closure of the liquid storage magazines, the concrete unloading area will be pressure washed with a water/detergent followed by a fresh water rinse. A sample of the fresh waster rinse will be collected from the sump following the procedures described above.

D. Closure of the Preparation Building

The preparation building will be closed by first cleaning and removing all equipment. Equipment will be cleaned by pressure washing with a water/detergent followed by a fresh water rinse. The equipment will then be removed from the building for further use at the owner's discretion.

After equipment removal, the building floor and walls will be pressure washed with a water/detergent followed by a fresh water rinse. Any deposits not removed by water washing will be scraped using hand tools. Washwater will be analyzed and handled as described for the storage magazines. Decontamination will be confirmed through final rinse analysis following the same procedures as described above.

E. Closure of the Contained Burn System (CBS)

The CBS will be closed by first cleaning and removing all ash, debris, ceramic fiber/brick, and filter media. These materials will be containerized prior to shipment off-site for proper disposal. The CBS vessel components will be cleaned by pressure washing with a water/detergent followed by a fresh water rinse.

The concrete containment area will be pressure washed with a water/detergent followed by a fresh water rinse. Any deposits not removed by water washing will be scraped using hand tools. All wash waters will be collected and stored on-site prior to treatment through the on-site WWTS. Decontamination will be confirmed through final rinse analysis following the same procedures as described above. The equipment will be left in place or removed and sent off-site for similar use at other locations, and/or scrapped (smelter, only. not for reuse.)

F. Soil Sampling and Analysis

After all waste has been thermally treated, soil near the storage and treatment areas will be examined for signs of spillage. It is not anticipated that spilled waste will be present; however, if any spilled waste is found, it will be removed with hand tools. Hand tools will be cleaned by detergent wash and clean water rinse. All wash water will be collected and properly disposed. If at least one half of the removed media is spilled waste, then this removed media should be treated in the burners. If the spilled waste makes up less than one half of the removed media, then, the media must be sent to a permitted facility for treatment or disposal in accordance with applicable regulations. Also, a surface soil sample will be collected after removal of the spilled material to verify the area is clean. The surface sample will be analyzed for VOCs (SW846 Method 8260), total metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag, Cu, Ni, V, Zn, Sb, Tl and Be) using SW-846 Method 6010B and SW-846 Method 7470A, and extractable explosives (SW-846 Method 8330). The most current version of the appropriate analytical testing methods will be used, and the analytical testing will be done by LELAP accredited laboratory for the required method versions.

After storage magazines 1 - 7 have been closed, a discrete surface soil sample will be collected from an area adjacent to each entry. The discrete samples will be analyzed for the same constituents as listed above. If the levels of detectable compounds exceed the established criteria for clean closure, the following procedures will be implemented. Otherwise, the soil will be considered to be at background levels.

For the magazine(s) that show target constituents above closure criteria levels, the top six (6) inches of soil will be excavated from an area approximately four (4) feet by six (6) feet immediately adjacent to the concrete slab at the front entrance of the magazine. This excavation activity will result in approximately 0.5 cubic yards of soil per unit where excavation is required. This soil will be sent to a permitted facility for disposal. Disposal will comply with the Land Disposal Restrictions contained in LAC 33:V.Chapter 22. Subsequent to soil removal a confirmation surface soil sample will be collected from the excavated area.

The confirmation sample will be analyzed for the above stated parameters. If the confirmation sample meets the established criteria for clean closure described above, then the storage magazine area will be considered clean closed.

All soil samples collected for VOC analysis will be collected in accordance with SW-846 Method 5035, and all analyses will be completed by an LDEQ accredited laboratory for this required method. For purposes of establishing clean closure, all sample results will be compared to RECAP values.

G. Disposal of Residuals

After the reactive wastes and any spill residues are thermally treated, the ash will be removed from the burners and containerized for disposal off-site. Disposal will comply with the Land Disposal Restrictions contained in LAC 33:V.Chapter 22. The metal trough burners, grates and retractable roof covers will be decontaminated by pressure washing, dismantled, and scrapped (smelter and not for reuse) or disposed. The concrete burner pads will be disposed. These materials will be removed and containerized, or they will be loaded directly onto trucks for disposal at an approved facility. The burners, ash, spill residue, and concrete burn pads from burner locations which handled listed waste will be containerized and disposed of at a properly permitted off-site facility.

If VOCs or extractable explosives are detected above the lower detectable limits established by the analytical method, or if the concentrations of metals exceed closure criteria levels, a decision will be made either to repeat decontamination procedures or to declare the unit hazardous and dispose in a permitted facility in accordance with the Land Disposal Restrictions of LAC 33:V.Chapter 22. It is anticipated that one decontamination event will be required per unit in order to clean close.

The soil surrounding the treatment area will be assessed through the Tier I Detection Monitoring Plan. Soil sampling locations 13, 14, 15, 16, and 17 are located in the immediate vicinity of the treatment area. If closure occurs later than 180 days after the last Soil Monitoring Plan sampling event and treatment has occurred within that period, these sampling locations will be resampled and analyzed in accordance with the Plan. If it is determined that the soil near the treatment area has been impacted, a Tier II or Tier III assessment plans will be developed. The Closure Plan will be updated to include these plans including the cost estimates for implementation.

There are currently 18 groundwater monitoring wells on-site (~8 to 73' deep). The well construction details are included in Exhibit III-E. A revised groundwater monitoring sampling and analysis plan (GSWAP) is being submitted as part of the operating permit renewal application. Costs for the implementation of the GWSAP and reporting and plugging and abandonment of the monitoring wells during closure are included.

At this time, it is anticipated that an appropriate, approved and permitted landfill will be used to dispose of solid treatment residues for the purpose of this closure plan. Disposal will comply with the Land Disposal Restrictions contained in LAC 33:V.Chapter 22.

An appropriate, approved and permitted liquids treatment facility will be used to dispose of washwater and rinsate. The basis for the quantities of wastes, residues and decontamination liquids are provided in Exhibit III. All materials will be collected, containerized and disposed off-site at an approved permitted facility in accordance with the Land Disposal Restrictions of LAC 33:V. Chapter 22 or treated on-site in the wastewater treatment system and discharged through Outfall 001 in accordance with the LPDES Permit.

H. General Sampling, Analysis, and Evaluation Requirements

All soil and water samples will be collected and analyzed in accordance with approved methods under SW-846. All sampling procedures will be designed to minimize the possibility of cross contamination and sample mismanagement. Sample containers which have been prepared by the receiving laboratory will be used with no further field preparation. All samples will be collected in accordance with the procedures outline in LDEQ's "Risk Evaluation/Corrective Action Program" (RECAP) document, latest edition, where applicable.

All soil and sediment samples taken for VOCs will be collected in accordance with USEPA SW-846 Method 5035. Otherwise soil and sediment samples will be collected using stainless steel spoons or a gloved hand to place the sample into the sample container. Sampling personnel shall wear a separate pair of disposable latex gloves for each sampling point.

Water samples will be collected directly from the final rinsate subsequent to cleaning operations. At each sampling location sampling personnel will wear a separate pair of disposable latex gloves. All sample containers for organic analysis will be filled completely to minimize or eliminate headspace between the sample and the container cap. Care will be taken to minimize disturbance of the sample.

Sample locations will be marked in the field and identification numbers will be assigned to each point. All sample containers will be labeled immediately after sample collection with a unique identification number to reflect the location and depth at which the sample was taken. Other information which will be provided includes the names of sampling personnel, time and date.

Groundwater samples will be collected in accordance with the current Groundwater Sampling and Analyses Plan (GWSAP) dated April 15, 2016 and approved by the LDEQ on May 17, 2016 and calculated RECAP groundwater screening standards (GWss) and MO-1 groundwater 2 (GW2) standards approved by the LDEQ on May 20, 2019. A revised GWSAP is being submitted as part of the 2020 Operating Permit Renewal Application. This Closure Plan and cost estimate will be revised to reflect the new GWSAP following LDEQ approval.

Sample containers will be cooled to 4 degrees Celsius and will be shipped to the laboratory within 24 hours of collection. A chain-of-custody record will accompany the shipment and every precaution will be taken to ensure that the sample integrity is maintained from point of collection to the laboratory.

An LDEQ accredited laboratory will complete all analyses. As required by RECAP, the laboratory will utilize SW-846 methods that will provide sample quantitation limits at the lowest practical quantitation limits (PQLs). These PQLs will generally be at or lower than any risk-based corrective action level (i.e. RECAP Screening Standard, background level, or other derived RECAP standard). The LDEQ accredited laboratory prior to initiating closure activities will confirm the PQLs for all constituents. Any detection limit variances required by the laboratory will be reported to the LDEQ.

The rinsate, soil, and sediment sample results will be compared to RECAP values. The naturally occurring constituents (e.g., metals) will be compared to background values and/or screening standards. Background levels will be developed in accordance with RECAP standards. Non-naturally occurring constituents (e.g. VOCs and extractable explosives) sample results will be compared to the RECAP Screening Standards, unless a higher tier of RECAP evaluation is performed and approved by the LDEQ. Prior to closure, the source of water for these proposed closure activities will also be sampled for both the naturally and non-naturally constituents. These sampling results will form the basis for background values to be used in evaluating the final rinsate samples. Additional decontamination and re-sampling efforts are anticipated, and a reasonable cost estimate is included in this plan for such purposes.

V. STAFFING

A. Closure Coordinator

1. Qualifications:

   The Closure Coordinator will have a technical education and experience in management of a hazardous waste facility. He/she will be well versed in thermal treatment of reactive materials and will be intimately familiar with the details of this plan. During pre-closure and closure periods, the General Manager may serve as Closure Coordinator.

2. Duties:

   In preparation prior to closure, the Closure Coordinator will keep this plan current with periodic updates to reflect changes in the facility, in cost of implementation, or in applicable regulations. During closure, the Closure Coordinator will manage the facility until all wastes are thermally treated using standard operating procedures. After waste treatment operations are completed, the balance of closure procedures will be carried out under the supervision of the Closure Coordinator. He/she will serve as the Clean Harbors Colfax, LLC contact person for LDEQ inspection, evaluation, and approval activities. Finally, he/she will ensure that post-closure inspection and maintenance activities are accomplished as scheduled.

B. Closure Engineer

1. Qualifications

The Closure Engineer will be a Registered Louisiana Professional Engineer. He/she will be familiar with the design and operation of the facility. He/she will be thoroughly knowledgeable regarding all aspects of this plan. During closure, the Closure Engineer may also serve as Closure Coordinator.

2. Duties

The Closure Engineer will be available to consult in the formulation and any necessary revisions in this plan. He/she will be present to supervise the closure, so that closure activities are accomplished in accordance with this plan. After closure, the Closure Engineer will prepare and submit the certification required by the LAC 33:V.3517. Upon completion of post-closure care, the Closure Engineer will be responsible for the preparation and submittal of the certification required by LAC 33:V.3523.

VI. ADMINISTRATIVE REQUIREMENTS

A. Plan Review and Updating

1. Periodic Review

This plan will be reviewed by the Closure Coordinator and revised as necessary. The scope of planned closure activities will be expanded to include any modifications in processes, new construction, or changes in the capacity of wastes stored, treated, or disposed at the facility.

Costs of the above plan changes will also be included in the plan cost estimates. The cost estimate for closure will also be reviewed and adjusted for inflation on an annual basis as required by LAC 33:V.3705 and 3709.

After a plan review, updating, and re-evaluation of costs, a revised plan will be prepared. Copies of the revised plan will be made available to the LDEQ and will be maintained at all time at the facility.

2. Other Required Reviews

After any significant changes in the facility operations or equipment and associated permit modifications, this plan will be reviewed to determine if changes are necessary.

Prior to the anticipated closure, this plan will be reviewed to ensure that all proposed actions and estimated costs are accurate and up-to-date. The plan schedules will be converted from elapsed time to actual dates. A final implementation revision of the plan will be prepared and submitted to the Office of Environmental Services, Permits Division of LDEQ, at the time of notification of intention to close.

B. Notification of Intention to Close

1. Closure Engineer

The Closure Engineer will be notified of intended closure well in advance of closure activities. If necessary, he/she should provide consultation in preparing the final implementation revision of this plan and support pre-closure preparations.

2. Office of Environmental Services, Permits Division (OESPD)

The Closure Coordinator will give written notification to the OESPD at least 180 days before commencing any closure activities. The following information will be provided:

a. date of planned closure;
b. requested changes, if any, in the closure plan which take advantage of new technology, unforeseen situations, and other requests which improve the safety of the closed facility;
c. closure schedule and estimated costs of each phase of the closure plan; and
d. a request for release of closure funds in amounts and times as required by the closure schedule (to the extent applicable).

VII. COST ESTIMATES

A. Basis of Cost Estimates

Costs are based on the most expensive set of normal operating circumstances. This assumes a greatest extent/worst case situation but does not presuppose any spills or other accidental occurrences.

The cost for labor to thermally treat the remaining inventory assumes the cost necessary to pay third party personnel to manage the materials in the on-site thermal treatment unit.

The closure cost basis calculations and references are included in Exhibit III.

All costs estimates are based on 2021 dollars.

B. Total Costs Summary

Costs are summarized for Closure activities. A contingency of 10 percent is included. Refer to Exhibit IV.

VIII. FINANCIAL ASSURANCE - CLOSURE

In accordance with LAC 33:V.3509.B, Clean Harbors Colfax, LLC will comply with the "Financial Assurance for Closure", LAC 33:V.4403, by providing OESPD with financial assurance in the form of insurance, providing OESPD with sufficient funds to cover the anticipated closure activities. Financial assurance documentation is provided in Appendix N.

EXHIBIT I

MAXIMUM PERMITTED OFF-SITE WASTE INVENTORY

Waste Status	Amount	
Storage in Containers	593	cubic yards
Total hazardous waste storage inventory at closure: (50,000 pounds Net Explosive Weight)	**593**	**cubic yards**

Including waste in process, the total that might be present at the site (worst case) is 55,950 pounds of Net Explosive Weight.

EXHIBIT II

CLOSURE SCHEDULE

Action to be Taken	**Days from Closure Start Date**
Revise Plan (if needed)	-240 to -180
Notify LDEQ	by -180
Prepare Equipment Inventory	-180 to -30
Prepare Waste Schedule	-30 to -5
Receive Wastes	to -1
Begin Closure	0
Treat Stored Wastes	0 to +18
Closure Engineer to Inspect Empty Magazines	+18 to +25
Mobilize Decontamination Contractor	+25 to +32
Decontaminate Equipment, Removal & Clean-up	+32 to +125
Closure Engineer to Verify Decontamination	+65 to +125
LDEQ and Closure Engineer Inspection	+125 to +155
Conduct Measures to Achieve LDEQ Approval	+155 to +180
Complete Closure	by +180
Submit Closure Certification to LDEQ	by +240

Clean Harbors Colfax, LLC - Closure Plan Cost Estimate - Exhibit III-A
Assumptions

Assumptions:

All on-site waste inventory are considered reactive, energetic, and shock sensitive.
Risks too great to ship waste inventory offsite for treatment & disposal.
Offsite disposal locations limited for these types wastes.
Assume all existing Subpart X, ATF, RCRA, Air, and LPDES permits active and available for use during closure.
Assume treatment & disposal of waste inventory done onsite by 3rd party.
All closure work done by 3rd party contractors.
Assume magazine shells are decontaminated, scrapped and/or left onsite.
Assume buildings and burn pad decontaminated and left onsite.
Assume burn chamber unit decontaminated, left onsite, or disassembled for reuse elsewhere.
Assume Wastewater Treatment System decontaminated, left onsite, or disassembled for reuse elsewhere.

Maximum Permitted On-Site Waste Inventory Disposal:

Storage in Containers - 593 cubic yards
Total Hazardous Waste (HW) Storage (50,000 # Net Explosive Weight)
Worst Case Total HW at site = 55,950 # NTW or 665 cy.

Assume all Onsite Waste Inventory Treated/Disposed Onsite Using 3rd party.
Burn Rate @ 3,690#/day: 55,950/3690 = 16 days
Waste Residues = 30 cy or 2 roll off containers = 2 loads
(16 day onsite + 2 days mob/demob + 1 day disposal) x 2 bins = 38 days bin rental
Supervisor & 3 Explosive Field Technicians, Pickup, Skidsteer, Fuel, Small Tools, PPE, etc.

Decontamination & Closure of Permitted Units:

Supervisor & 2 Field Technicians, Pickup, Skidsteer, Pressure Washer, Hoses & Small Tools,
Vacuum Truck, Fuel, 10 ea. Frac Tanks, PPE, etc.

10 each Storage Magazines plus 2 replacements (Reference Drawings 108-110, 117)

All magazines interior floor, walls, ceiling & door ways covers w/4" thick hardwood.
Magazines #1 and #2: 8' x 40' x 8' high.
Magazines #3 through #10: 10' x 20' x 8' high.
Magazine #6R and #10R replacements: 8' x 40' x8' high.

Total surface area per Magazines #1, #2, #6R, & #10R:
2(8' x8') + 2(40' x 8') + 2(40' x 8") = 1408 sf.
Total surface area per Magazines #3 through #10:
2(10' x 20') + 2(10' x 8') + 2(20' x 8') = 880 sf.

Total Surface Area = (4 x 1408) + (8 x 880) = 12,672 sf

Volume of Wood = 12,672 sf x 4"/12 = 4,224 cf
Add 10% for 2 x 4 nailer = 423 cf
Total volume of wood = 4,647 cf or 4,647/27 = 172 cy
Assume 12 cy/roll off bin = 172/12 = 15 roll off bin loads

Clean Harbors Colfax, LLC - Closure Plan Cost Estimate - Exhibit III-A
Assumptions

Removal of wood assume 2 hrs/magazine x 12 = 24 hrs.
Sweeping & Vacuuming of Magazines 1 hr/magazine x 12 = 12 hrs.

Assume 800 sf/hr detergent wash & rinse cycles.
Assume 4 gallons/sf water for 3 wash & 1 rinse cycles.

Time required per wash cycle = 12,672 sf/800 = 16 hrs.
Time required per rinse cycle = 12,672sf/800 = 16 hrs.
Assume 1 additional wash & rinse cycle for 1 magazine =
1408/800 + 1408/800 = 3.52 hrs - Use 4 hrs.

Total wash & rinse time = 16 x 3 + 16 x 1 + 4 = 68 hrs.

Total water generated = 12,672 x 4 + 1408 x 4 = 56,320 gallons

Total time for Magazines - 24 + 12 + 68 = 104 hrs. or 11 days.

Rolloff Bin Rental = 15 x 11 days + 15 x 2 days mob/demob + 15 x 1 day disposal = 210 Bin Rertal Days

Truck Parking/Staging Area:

Floor Surface Area (4 bays) = 68' x 75' = 5100 sf (Reference Drawing #107)
Curb Surface Area (Height = 16" or 1.33') = 8 ea. x 1.33 x 107' = 1139 sf
Sumps Surface Area = 4 ea. x 2' x2' x 1.83' = 30 sf
Sloped Entrance Areas (4 bays x 2 ends) = 2 ea. x 16' x 68' = 2176 sf
Total Surface Area = 5100 + 1139 + 30 + 2176 = 8445 sf or 8445/4 = 2112 sf/bay.

Assume 800 sf/hr detergent wash & rinse cycles.
Assume 4 gallons/sf water for 3 wash & 1 rinse cycles.

Time required for wash cycle = 8445/800 = 10.56 hrs.
Time required for rinse cycle =8445/800 = 10.56 hrs.
Assume 1 additional wash/rinse cycle for 1 bay = 2112/800 + 2112/800 = 5.3 hrs.
Total hours = 3 x 10.56 + 1 x 10.56 + 5.3 = 47.54 hrs. Use 48 hrs.

Total water generated = 8445 x 4 + 2112 x 4 = 42,228 gallons. Use 42,230 gallons.

Total time for Truck Parking/Staging Area = 48 hours or 5 days.

Preparation Building:

Total Floor Surface Area = (40' x 40') + (18' x 60') + (10' x 12') + addition (20' x 60') = 4,000 sf
(Reference Drawings 111-113)
Curb height (3" or 0.25') = 0.25' x (88' x 2 + 60' x 2) = 74 sf
Total Surface Area = 4,000 + 74 = 4074 sf
Assume 800 sf/hr detergent wash & rinse cycles.
Assume 4 gallons/sf water for 3 wash & 1 rinse cycles.

Remove equipment from building - 1 day

Clean Harbors Colfax, LLC - Closure Plan Cost Estimate - Exhibit III-A
Assumptions

Time required per wash cycle = 4,074/800 = 5.1 hrs.
Time required per wash cycle = 4,074/800 = 5.1 hrs.

Assume 10% of area requires additional wash/rinse cycles = 10.2 hrs x 0.10 = 1.02 hr.

Total hours = 3 x 5.1 + 5.1 + 1.02 = 21.42 hrs. Use 21.5 hrs.

Amount of water generated for wash & rinse cycles = 4,000 x 4 x 1.10 (10%) = 17,600 gallons.

Total time for Preparation Building = 21.5 + 10 hrs = 31.5 hrs or 3 days.

Truck Unloading - Liquid Storage Magazine Area:

Floor Surface Area = 28' x 75' = 2100 sf (Reference Drawing 108)
Sump Areas = 2' x 2' x 1.833" sides = 8 sf
Entrance Curb Areas = (6"/12 x 75' x 2 ea = 75 sf
Curb Height On sides - 6" = 6"/12 x (75' x 2 + 28' x 2) = 103 sf
Total Surface Area = 2100 + 8 + 75 + 103 = 2286 sf
Assume 10 % of area requires additional wash/rinse = 2286 x 0.10 = 229 sf.

Total Surface Area = 2515 sf.

Time required for wash cycle = 2402/800 = 3 hrs.
Time required for rinse cycle = 2402/800 = 3 hrs.
Total hours = 3 x 3 + 3 = 12 hrs.

Amount of water generated for wash & rinse cycles = 2402 x 4 gal/sf = 9,608 gallons.

Total time for Truck Unloading = 12 hrs. or 2 days

Burn Pad Area:

Supervisor & 2 Field Technicians, Pickup, Skidsteer, Pressure Washer, Hoses & Small Tools,
Vacuum Truck, Fuel, 15 ea. Frac Tanks, PPE, Torches & Small Tools, Excavator & Concrete Breaker, etc.

Metal burn pans, retractable roof covers, concrete pad pedestals:

20 each 6' x 6' x 20" high burn pans
20 x 2[(6' x 6') + (6' x 4')(20"/12)] = 20 x 2 (36 + 40) = 40 x 76 = 3,040 sf
20 each retractable roof covers - 22' x 22'
20 x 22' x 22' x 2 = 19, 360 sf
Total Surface Area = 3,040 + 19, 360 = 22,400 sf
Assume 10% of surface area requires additional wash/rinse cycle = 22,400 x 0.10 = 2,240 sf
Total Surface Area = 24,640 sf

Time required for wash cycle = 24,640/800 = 30.8 hrs
Time required for rinse cycle = 24,640/800 = 30.8 hrs.
Total time = 3 x 30.8 + 30.8 = 123.2 hrs. - Use 123.5 hrs.

Amount of water generated for wash & rinse cycles = 24,640 x 4 gals/sf = 98560 gallons

Clean Harbors Colfax, LLC - Closure Plan Cost Estimate - Exhibit III-A
Assumptions

Dismantle burn pans and retractable roofs - assume 1 hr each x (20 pans & roofs) = 20 hrs.
Metal burn pans & retractable roof covers - assume 4 each 20 cy roll off bins for the burn pans anc
assume 6 each 20 cy roll end dumps (live load) for retractable roofs required for offsite disposal. 10 loads -20 cy each = 200 cy.

Removal of burn pad pedestals 0.5 hr each x 20 = 10 hrs
Volume of concrete burn pad pedestals = (20 x 16' x 16' x 1.5') = 7,680 df or 7,680/27 = 284.4 cy.
Use 285 cy. Transportation = 285/20 = 15 loads. (Assume end dumps live load)

Total time = 123.5 + 20 + 10 = 153.5 hrs or 16 days. Use 154 hrs.

Bin Rental = 4 ea. x 16 days + 4 x 2 days mob/demob + 4 x 1 day disposal = 76 Bin Rental Days.

Concrete Pad Surface Area:

Floor Surface Area = 700' x 130' = 91,000 sf
Sumps = 3 each x 2' x 2' x 5' = 60 sf
Curbs (18" high) = 2(700' x 18"/12) + 2(130' x 18"/12) = 2490 sf
Total Surface Area = 91,000 + 60 + 2490 = 93,550 sf
Assume 10% of area requires additional wash/rinse cycle = 93,550 x 0.10 = 9,355 sf
Total Surface Area = 93,550 + 9,355 = 102,905 sf

Time required for wash cycle = 102,905/800 = 128.6 hrs
Time required for rinse cycle = 102,905/800 = 128.6 hrs
Total hours = 3 x 128.6 + 128.6 = 514.4 hrs. - Use 514.5 hrs. or 52 days.

Amount of water generated for wash & rinse cycles = 102,905 x 4 gals./sf = 411,620 gallons.

Total hours burn pad = 123.5 + 20 + 10 +514.5 = 668 hrs. or 67 days.

Total amount of water burn pad = 98,560 + 411,620 = 510,180 gallons.

Assume 1 vac box of solids & sweepings off of burn pad requiring disposal.

Vac Box Rental = 1 ea. x 67 days + 2 days mob/demob + 1 day disposal = 70 Vac Box Rental Days.

Contained Burn System (CBS): Assumed components & dimensions

Assume remove any brick, filter media, ash, etc. - disposal HW landfill
Assume decontaminated vessels - pressure washing
Assume CBS system remains in place or dismantled for use elsewhere
No costs included for dismantling, etc.

Contained Burn Chamber (CBC) - ~15' diameter x 60' long steel vessel

Volume = (3.14 x 15 x 15 x 60)/4 = 10598 cf
Surface Area = (3.14 x 15 x 60) - Inside = 2826 sf.

Deactivation Furnace (DF) - ~ 7' x 7' x 20' steel with 8"ceramic fiber/brick vessel

Clean Harbors Colfax, LLC - Closure Plan Cost Estimate - Exhibit III-A
Assumptions

Volume = (7 x 7 x 20) = 980 cf
Surface Area = (7 x 7) x 2 ends + (7 x 20) x 4 sides = 658 sf
Volume of ceramic & brick = 658 x 8/12 = 439 cf

Thermal Oxidizer (TO) - ~ 7' x 7' x 23' steel with 8" ceramic fiber/brick vessel

Volume = (7 x 7 x 23) = 1127 cf
Surface Area = (7 x 7) x 2 ends + (7 x 23) x 4 sides = 742 sf
Volume of ceramic & brick = 742 x 8/12 = 495 cf.

Cyclone (CY)- ~84" x 84" x 35' tall steel vessel

Volume = (84 x 84 x 35)/144 = 1715 cf
Surface Area = (84 x 84) x 2 ends/144 + (84 x 35) x 4 sides/12 = 1078 sf

Gas Cooler (GC) - ~7'2" x 5'8" x 31'6" tall steel vessel

Volume = (86 x 68 x 31.5)/144 = 1280 cf
Surface Area = (86 x 68) x 2 ends/144 + (86 x 31.5) x 2 sides /12 + (68 x 31.5) x 2 sides/12
Surface Area = 81.2 + 452 + 357 = 891 sf

Baghouse (BH) - ~11'5" x 11'5" x 39' tall steel vessel

Volume = (11.417 x 11.417 x 39) = 5084 cf
Surface Area = (11.417 x 11.417) x 2 ends + (11.417 x 39) x 4 sides = 2042 sf

HEPA Filter (HF) - ~8' x 6' x 2' deep steel vessel

Volume = (8 x 6 x 2) = 96 cf
Surface Area = (2 x 2) x 2 ends + (8 x 6) x 4 sides = 200 sf
Volume of filters & ash = 96 cf

Stack - 24" diameter x 60' steel stack

Volume = (3.14 x 2 x 2 x 60)/4 = 189 cf
Surface Area = (3.14 x 2 x 60) = 377 sf

Concrete Containment Area (CCA) 150' x 150' w/12" high curbing

Surface Area = 150 x 150 + 4 x 150 x 1' + (2 x 2 x 4) x 2 sumps= 23,132 sf

Total CBS Surface Area:

CBC - 2826 + DF - 658 + TO - 742 + CY - 1078 + GC - 891 + BH - 2042 + HF - 200 +
ST - 377 + CCA - 23,132 = 31,946 sf

Assume 10% of surface area requires rewashing = 31,946 x 1.10 = 35,141 sf

Time required for wash cycle = 35,141/800 = 44 hrs

Clean Harbors Colfax, LLC - Closure Plan Cost Estimate - Exhibit III-A
Assumptions

Time required for rinse cycle = 35,141/800 = 44 hrs
Total hours = 3 x 44 + 44 = 176 hrs. or 18 days for pressure washing.
Assume 1 day each to remove brick/filters from DF, TO & HF = 3 days
Total crew days = 21 days

Amount of water generated for wash & rinse cycles = 35,141 x 4 gals./sf = 140,564 gallons.

Debris, Brick, Filters, Ash = DF - 439 cf + TO - 495 cf + HF - 96 cf = 1030 cf or 38.2 cy
Add 20 cy for ash, debris, etc.
Total disposal = 68.2 cy - Use 70 cy
4 rolloff boxes required: 4 x (21 days + 2 days mob/demob + 1 day disposal) = 24 rolloff box rental days.

Cleanout of 10 ea. rental frac tanks (21,000 gallons each) - temporary storage of decontamination waters.

Total Days Frac Tank Rental: 11 (Magazines) + 5 (Truck Parking) + 2 (Prep Building) + 1 (Truck Unloading) + 70 (Burn Pad) + 11 (Frac Tank) = 100 days. Assume 5 months @ 30 days/month.

(Note several of temporary frac tanks decontaminated following closure of WWTS - see below).
Assume 1 vacuum box of accumulated solids requiring disposal
Assume 1 day per tank to cleanout, wash, rinse & sample
Assume 10% of tank volume/tank for 3 wash & rinse cycles decon waters generated.
Assume 1 tank requires additional wash & rinse.
Crew days (10 hrs/day) = 10 x 1 + 1 = 11 days or 110 hrs.
Decon waters = 10 x 0.1 x 21,000 + 1 x 0.1 x 21,000 = 23,100 gallons
Vac Box Rental = 1 ea. x 11 days onsite + 2 days mob/demob + 1 day disposal = 14 Vac Box Rental Days.

Onsite LPDES Wastewater Treatment System (WWTS):

Assume WWTS operated during closure - treat onsite generated waters including decontamination waters. Assume water treatment rate 40 gpm and one water treatment operator required.
Assume WWTS operator full time during closure.

10 ea. 21,000 gallon Frac Tanks, 2 each 40' Conex Boxes each with 3 ea. 4000 gal vessels,
2 ea. 2000 gal vessels, & 1 each 4 bag filter vessel. 1 ea. 20' Conex w/control system (No decon required).
Each 40' Conex Box - 18,000 # filter media (Carbon, Activated Aluminum, & Organo-clay) & 100 cf of resin beads.
500,000 gallon Modular Check Tank

Total Decontamination Waters - Permitted Units Closure:

Magazines - 56,320 gals. + Truck Parking/Staging - 42,230 gals. + Preparation Building - 17,600 gallons + Truck Unloading - 9,608 gallons + Burn Pad - 510,180 gallons + CBS - 140,564 + Temporary Frac Tanks - 23,100 gallons = 799,602 gallons

Decontamination Waters Treatment Days - (799,602 gallons/40 gpm)/60 minutes/10 hrs/day = 33.3 days
Use 35 days. Discharges - 799,602/500,000 = 2 discharges for decontamination waters. Assume 2 other discharges of stormwater.

Assume 10 each 21,000 gallon temporary frac tanks for extra storage of decontamination waters (see above).

Cleanout and decontamination of 10 ea. WWTS frac tanks (21,000 gallons each).

Clean Harbors Colfax, LLC - Closure Plan Cost Estimate - Exhibit III-A
Assumptions

Assume 1 vacuum box of accumulated solids requiring disposal
Assume 1 day per tank to cleanout, wash, rinse & sample
Assume 10% of tank volume/tank for 3 wash & rinse cycles decon waters generated.
Assume 1 tank requires additional wash & rinse.
Crew days (10 hrs/day) = 10 x 1 + 1 = 11 days or 110 hrs.
Decon waters = 10 x 0.1 x 21,000 + 1 x 0.1 x 21,000 = 23,100 gallons treated through WWTS vessels.
Assume piping and hoses flushed/deconned with waters from cleaning frac tanks.
Vac Box Rental = 1 ea. x 11 days + 2 days mob/demob + 1 day disposal = 14 Vac Box Rental Days.

Total Decontamination Waters Treated Onsite = 776,502 + 23,100 = 799,602 gallons
Decontamination Waters Treatment Days - (799,602 gallons/40 gpm)/60 minutes/10 hrs/day = 33.3 days Use 34 days.

Discharges - 799,602/500,000 = 2 discharges for decontamination waters. Assume 2 other discharges of stormwater.
Cleanout and decontamination of 6 ea. 4K gal vessels, 4 ea. 2K gal vessels, 2 ea. 4 bag filter (0.25K gal) vessels:

Assume 1 day to remove filter media and bags from the 12 vessels.
Assume 2 vacuum boxes & 1 roll off box of filter media for disposal.
Assume 4 days to decon vessels. Asssume 2 ea. 2K gal vessels rewashed.
Decon waters = 32,500 x 0.1 + 4,000 x0.1 = 3,650 gallons stored in temporary fracs for offsite disposal.
Offsite Disposal TMI Deer Park - 3,650/5,000 = 1 load
Vac Box Rental = 2 ea. x 4 days + 2 x 2 days mob/demob + 2 x 1 day disposal = 14 Vac Box Rental Days.
Rolloff Box Rental = 1 ea. x 4 days + 2 days mob/demob + 1 day disposal = 7 Rolloff Box Rental Days.

Total Decontamination Waters - 635,938 (Unit Closure) + 140,564 (CBS) + 23,100 (WWTS Frac Tanks) + 3,650 (WWTS Vessels) = 803,252 gallons

Detergent Required = 803,252 x 0.001 = 803.252 gallons. Use 825 gallons.

Assume WWTS frac tanks, Conex Boxes, & vessels can be reused at other locations.

Decontamination, dismantle & disposal of 500K gal modular tank:

Assume 2 days to remove sludge from modular tank. Assume 1 vacuum box.
Assume 2 days to dismantle modular tank. Assume 2 roll off boxes for disposal of liner.
Vac Box Rental = 1 ea. x 2 days + 2 days mob/demob + 1 day disposal = 5 Vac Box Rental Days.
Rolloff Box Rental = 2 ea. x 2 days + 2 x 2 days mob/demob + 2 x 1 day disposal = 10 Rolloff Box Rental Days.

Total days to decon & dismantle WWTS = 11 (Frac Tanks) + 1 (Filter Media) + 4 (Vessels) + 4 (Modular Tank) = 20 days

Quarterly Tier 1 Soil & GW Sampling & Reporting During Closure:

Assume 2 quarters of Soil & GW Sampling & Reporting Events.

Plug & Abandonment Monitor Wells:

18 each monitor wells (2-4" diameter PVC) - total depth ~850 feet.
Reference Table 1 Monitor Well Construction Summary.
P&A Costs - Reference Walker Hill Quoted Rates

Clean Harbors Colfax, LLC Closure Plan Cost Estimate - Exhibit III-B				
Labor and Equipment Unit Rates				
Labor Description:	Hourly Rate		Equipment Description:	Unit Rate
Closure Coordinator	$ 95.00		Pressure Washer	$376/day
			Vacuum Truck	$119/hr
Closure and Post-Closure Crew			Frac Tank	$22/day
			Frac Tank Mob & Demob	$250/ea. way
Supervisor	$ 72.50		Vac Truck Washout	$2,000/tanker
Field/Explosives Technician/Operator	$ 46.00		Pickup	$150/day
Field Technician/Operator	$ 46.00		PPE	$150/day
Wastewater Treatment Operator	$ 46.00		Hoses and Small Tools	$150/day
Per Diem & Lodging (Man-day)	$ 150.00		Torches and Small Tools	$300/day
			Excavator	$9,180/month
Certification:			Excavator	$3,500/week
			Concrete Hammer	$4,285/week
Closure Professional Engineer	$ 135.00		Skid Steer	$2,720/month
Closure Engineer	$ 85.00		Manlift	$2,125/month
			Roll Off Bin	$10/day
Quarterly Sampling & Reporting - 3rd Party			Vacuum Box	$21/day
Consultant			Mob/Demob Roll Off Bin Double Rail - 2 ea. way	$380 ea. way
			Mob/Demob Vac Box Double Rail - 2 ea. way	$380 ea. way
Quarterly Tier 1 Soil Monitoring Report	$3,500.00		Closure Burn Pad Fuel - 400 gallons diesel/day	$1000/day
Quarterly GW Monitoring Report	$2,500.00		Closure Equipment Fuel - 100 gallons diesel/day	$250/day
Quarterly Tier 1 Soil Sample Collection	$4,000.00		Equipment Excavator Mob & Demob	$500/ea. way
Quarterly GW Sample Collection	$1,500.00		Equipment Skidsteer & Manlift Mob & Demob	$250/ea. way
			Utilities during closure	$3,500/month
Drilling Contractor Quoted			Soap	$1.25/gallon
			Chem Waste Carlyss - Disposal	$150/cy
Drill Crew Mob & Demob	$1,200.00		Chem Waste Carlyss - Transportation	$1125/load
Drill Crew Daily Rate	$2,800.00		Texas Molecular - Disposal	$0.51/gal
Grouting	$6/ft		Texas Molecular - Transportation	$1750/load
Remove Surface Completion	$100/ea.		WMI Magnolia - Disposal	$60/cy
Drill Crew Per Diem & Lodging	$450/day		WMI Magnolia - Transportation	$1125/load

Clean Harbors Colfax, LLC Closure Plan Cost Estimate - Exhibit III-C			
Closure and Post-Closure Plan Analytical Unit Rates			
Decontamination Rinsate Samples - Analytical Costs		Quarterly Tier 1 Soil Samples	
Analytical Tests	Unit Rates*	Analytical Tests	Unit Rates*
VOA - EPA 8260	$ 50.00	VOA - EPA 8260	$ 50.00
Perchlorate-EPA6850	$ 150.00	SemiVOA-EPA 8270	$ 120.00
Metals (15+)-EPA200.7/6010B	$ 75.00	Perchlorate-EPA6850	$ 150.00
Metals Digestion-EPA 3005A	$ 5.00	Explosives-EPA8330	$ 95.00
Mercury-EPA245.1/7470	$ 18.00	Metals (25+)-EPA200.7/6010B	$ 141.00
Explosives-EPA8330	$ 95.00	Metals Digestion-EPA 3005A	$ 5.00
Filter Media Perchlorate	$ 10.00	Mercury-EPA245.1/7470	$ 18.00
Sample Disposal Fee	$ 2.00	Filter Media Perchlorate	$ 10.00
		Encore Kit-EPAV5035	$ 30.00
Total Per Rinsate Sample	$ 405.00	Sample Disposal Fee	$ 2.00
Use	$ 405.00	Total Per Soil Sample	$ 621.00
		Use	$ 625.00
Quarterly Groundwater Samples			
		Trip Blanks VOA - EPA624/8260B	$ 50.00
VOA - EPA 8260	$ 50.00		
SemiVOA-EPA 8270	$ 115.00	LPDES Discharge Samples	
Perchlorate-EPA6850	$ 150.00		
Explosives-EPA8330	$ 95.00	Perchlorate-EPA6850	$ 150.00
Metals (25+)-EPA200.7/6010B	$ 141.00	Explosives-EPA8330	$ 95.00
Metals Digestion-EPA 3005A	$ 5.00	Metals (18+)-EPA200.7/6010B	$ 90.00
Mercury-EPA245.1/7470	$ 18.00	Metals Digestion-EPA 3005A	$ 5.00
Filter Media Perchlorate	$ 10.00	Mercury-EPA245.1/7470	$ 18.00
Sample Disposal Fee	$ 2.00	TSS	$ 12.00
		TDS	$ 10.00
Total Per Groundwater Sample	$ 586.00	Oil&Grease	$ 35.00
		TOC	$ 15.00
Use	$ 590.00	Chloride	$ 12.00
		Sample Disposal Fee	$ 2.00
Trip Blanks VOA - EPA624/8260B	$ 50.00		
		Total LPDES Discharge Sample	$ 444.00
		Use	$ 445.00
		Lab Courier Per Pickup	$ 150.00

Clean Harbors Colfax, LLC Closure Plan Cost Estimate - Exhibit III-D Number of Groundwater, Soil, & Rinsate Analytical Test Samples					
Description	Number	Frequency	Test Type	Number Tests	Unit Costs
Groundwater Samples					
Groundwater Monitoring Wells	4	Quarterly During Closure (per well)	See Lab Rates	4	$ 590.00
1 QA/QC Duplicate per event	1	Quarterly During Closure (per well)	See Lab Rates	1	$ 590.00
1 Equipment Blank	1	Per Quarterly Event	See Lab Rates	1	$ 590.00
Trip Blanks	2	Per Quarterly Event	See Lab Rates	2	$ 50.00
Rinsate Samples*					
Magazines	12	Closure Event (1 per magazine)	See Lab Rates	12	$ 405.00
Magazines Resample	1	Resample Rinsate for 1 magazine	See Lab Rates	1	$ 405.00
Magazine	1	1 QA/QC Duplicate	See Lab Rates	1	$ 405.00
Truck Parking/Staging (4 bays)	4	Closure Event (1 per bay)	See Lab Rates	4	$ 405.00
Truck Parking/Staging	1	Resample Rinsate for 1 bay	See Lab Rates	1	$ 405.00
Truck Parking/Staging	1	1 QA/QC Duplicate	See Lab Rates	1	$ 405.00
Preparation Building	2	Closure Event	See Lab Rates	2	$ 405.00
Preparation Building	1	1 QA/QC Duplicate	See Lab Rates	1	$ 405.00
Truck Unloading/Liquid Storage	1	Closure Event	See Lab Rates	1	$ 405.00
Truck Unloading/Liquid Storage	1	1 QA/QC Duplicate	See Lab Rates	1	$ 405.00
Burn Pad (3 sumps)	3	Closure Event (1 per sump)	See Lab Rates	3	$ 405.00
Burn Pad	1	Resample Rinsate for 1 sump	See Lab Rates	1	$ 405.00
Burn Pad	1	1 QA/QC Duplicate	See Lab Rates	1	$ 405.00
CBS (7 vessels & 1 stack)	7	Closure Event (1 per unit)	See Lab Rates	7	$ 405.00
CBS (7 vessels & 1 stack)	1	Resample Rinsate for 1 vessel	See Lab Rates	1	$ 405.00
CBS (7 vessels & 1 stack)	2	2 QA/QC Duplicates	See Lab Rates	2	$ 405.00
CBS Containment Slab (2 sumps)	2	Closure Event (1 per sump)	See Lab Rates	2	$ 405.00
CBS Containment Slab (2 sumps)	1	Resample Rinsate for 1 sump	See Lab Rates	1	$ 405.00
CBS Containment Slab (2 sumps)	2	2 QA/QC Duplicates	See Lab Rates	2	$ 405.00
Temporary Frac Tanks	10	Decontamination	See Lab Rates	10	$ 405.00
Temporary Frac Tanks	1	Decontamination Resample	See Lab Rates	1	$ 405.00
Temporary Frac Tanks	1	1 QA/QC Duplicate	See Lab Rates	1	$ 405.00
WWTS Frac Tanks	10	Decontamination	See Lab Rates	10	$ 405.00
WWTS Frac Tanks	1	Decontamination Resample	See Lab Rates	1	$ 405.00
WWTS Frac Tanks	1	1 QA/QC Duplicate	See Lab Rates	1	$ 405.00
WWTS Vessels	12	Decontamination	See Lab Rates	12	$ 405.00
WWTS Vessels	1	Decontamination Resample	See Lab Rates	1	$ 405.00
WWTS Vessels	1	1 QA/QC Duplicate per event	See Lab Rates	1	$ 405.00
			Total	83	
Trip Blanks	43	One Per Courier Pickup/ No. of samples.	See Lab Rates	43	$ 50.00
Soil Samples					
Quarterly Soil Samples	27	Quarterly Soil Samples	See Lab Rates	27	$ 625.00
Quarterly Soil Samples Rinsate	1	Equipment Rinsate	See Lab Rates	1	$ 625.00
Quarterly Soil Samples	1	1 QA/QC Duplicate per event	See Lab Rates	1	$ 625.00

Clean Harbors Colfax, LLC Closure Plan Cost Estimate - Exhibit III-D					
Number of Groundwater, Soil, & Rinsate Analytical Test Samples					
				Number	Unit
Description	Number	Frequency	Test Type	Tests	Costs
Magazine Entrance Soil Samples*	13	Magazine Closure Soil Confirmation	See Lab Rates	13	$ 625.00
Truck Parking/Staging Soil Samples*	9	Entrance Closure Soil Confirmation	See Lab Rates	9	$ 625.00
Preparation Building Soil Samples*	4	Entrance/Perimeter Closure Soil Confirmation	See Lab Rates	4	$ 625.00
Truck Unloading Soil Samples*	4	Entrance Closure Soil Confirmation	See Lab Rates	4	$ 625.00
Burn Pad Soil Samples*	40	Entrance/Perimeter Closure Soil Confirmation	See Lab Rates	40	$ 625.00
CBS Unit Soil Samples	20	Perimeter Closure Soil Confirmation	See Lab Rates	20	$ 625.00
Wastewater Treatment Soil Samples*	30	Foot Print/Perimeter Closure Soil Confirmatio	See Lab Rates	30	$ 625.00
Quarterly Groundwater Sampling Event					
Groundwater Sample Collection		Lump Sum Per Event - 2 Events			$1,500.00
Quarterly Tier 1 Soil Sampling Event					
Tier 1 Soil Sample Collection		Lump Sum Per Event - 2 Events			$4,000.00
Quarterly Groundwater Monitoring Report					
Reporting		Lump Sum Per Event - 2 Events			$2,500.00
Quarterly Tier 1 Soil Monitoring Report					
Reporting		Lump Sum Per Event - 2 Events			$3,500.00
LPDES Sampling & Reporting					
Sample Collection		Assume done by WWTS Operator			N/C
Discharge Samples	4	LPDES Analytical Testing	See Lab Rates	4	$ 445.00
DMR Reporting		Lump Sum Per Monthly Report			$ 250.00

*-Assume rinsate and magazine soil samples collected by 3rd party closure engineer.

Clean Harbors Colfax, LLC Closure Plan Cost Estimate - Exhibit III-E
Table 1. Monitor Well Construction Summary
Clean Harbors Colfax, LLC

Well No.	Date Installed	Relative Gradient	Location	Distance (ft)	Diameter (in.)	Ground Elevation (ft, NGVD)	TOC Elevation (ft, NGVD)	Measured Well depth (ft, bTOC)	Riser (ft)	Screen Depth (ft)	Screen Length (ft)	Screen Interval Elevation (ft, NGVD)
P-3	15-Jul-93	DG	North	100	2	167.3	170	55.9	2.7	22-56	34	148.1-114.1
P-4	25-Dec-93	UG	Northeast	20	2	165.5	168.4	48.2	2.9	33-48	15	135.2-120.2
P-5	29-Dec-93	DG	Southwest	300	2	181.7	184.9	52.6	3.2	32-52	20	152.3-132.3
MW-1	23-Jul-93	N/A	N/A	N/A	4	N/A	169.07	140.45	2.9	107-134	27	52.72-25.72
MW-2	23-Jul-93	DG	Southeast	150	4	161.2	164.3	45	3.1	20-45	25	144.3-119.3
MW-3	28-Mar-17	UG	Northwest	500	2	169.8	172.94	33.85	3.14	20-30	10	139-149
MW-4	18-Oct-17	UG	Southwest	550	2	178.97	182.43	48.43	3.46	35-45	10	134-144
MW-5	17-Oct-17	DG	Southeast	800	2	159.8	163.7	27.72	3.9	35-45	10	136-146
MW-6	29-Mar-17	DG	Northeast	400	2	147.1	150.37	26.84	3.27	18-23	5	123.5-128.5
MW-7S	30-Mar-17	DG	East	600	2	175.1	178.33	43.4	3.23	30-40	10	135-145
MW-7D	30-Mar-17	DG	East	600	2	175.1	178.43	59.51	3.33	46-56	10	119-129
MW-8	31-Mar-17	DG	Southeast	400	2	178.5	181.49	41.09	2.99	31-41	10	140-150
MW-9	17-Oct-17	DG	Southeast	800	2	156.7	160.75	28.15	4.05	15-25	10	132.6-142.6
MW-10	28-Mar-17	UG	West	600	2	182	185.07	52.5	3.07	39-49	10	132.5-142.5
MW-11	3-Apr-17	UG	Southwest	225	2	174.3	177.58	44.8	3.28	26-41	15	132.8-147.8
MW-12	5-Feb-18	DG	Southeast	950	2	150.32	153.63	20	3.31	9.75-19.75	10	133.6-143.6
MW-13	6-Feb-18	DG	Southeast	1,000	2	149.97	146.6	20	3.37	9.75-19.75	10	126.6-136.6
EPAMW-01B	13-Dec-16	N/A	N/A	N/A	2	N/A	147.85	57.2	2.55	44-54	10	100.65-90.65

Total Well Depth (ft) = 845.64 Use 850'

N/A=Not Applicable or Available
DG= Downgradient
UG= Upgradient
ft, NGVD=Elevation in feet referenced to National Geodetic Vertical Datum
TOC=Top Of Casing measuring point
bTOC=below TOC
Location relative to former pond
Distance from pond perimeter

Clean Harbors Colfax, LLC Closure Plan Cost Estimate - Exhibit IV							
Pre-Closure Activities	**Description**	**Quantity**	**Unit**	**$**	**/Unit**		**Total**
Prepare site inventory	Closure Coordinator	10	hrs	95.00	hr	$	950
Prepare site inventory	Supervisor	20	hrs	72.50	hr	$	1,450
Prepare Closure Schedule	Closure Coordinator	5	hrs	95.00	hr	$	475
Prepare Closure Schedule	Supervisor	10	hrs	72.50	hr	$	725
Pickup Truck	Rental	3	days	150.00	day	$	450
PPE and H&S Supplies	Purchase	3	days	150.00	day	$	450
Per Diem (Man-days)	Purchase	4	man-days	150.00	day	$	600
Preclosure Meeting	Professional Engineer	8	hrs	135.00	hr	$	1,080
Preclosure Meeting	Closure Engineer	8	hrs	85.00	hr	$	680
Preclosure Meeting	Closure Coordinator	8	hrs	95.00	hr	$	760
Preclosure Meeting	Supervisor	8	hrs	72.50	hr	$	580
		Sub-total				**$**	**8,200**
Inventory On-site Wastes	**Description**	**Quantity**	**Unit**	**$**	**/Unit**		**Total**
Labor Inventory Wastes	Closure Coordinator	4	hrs	95.00	hr	$	380
Labor Inventory Wastes	Supervisor	16	hrs	72.50	hr	$	1,160
Labor Inventory Wastes	Explosive Technicians (3 ea.)	48	hrs	46.00	hr	$	2,208
Pickup Truck	Rental	2	days	150.00	day	$	300
PPE and H&S Supplies	Rental	2	days	150.00	day	$	300
Per Diem (Man-days)	Purchase	8	man-days	150.00	day	$	1,200
		Sub-Total				**$**	**5,548**
Disposal On-site - Waste Inventory	**Description**	**Quantity**	**Unit**	**$**	**/Unit**		**Total**
Labor Waste Disposal	Closure Coordinator	40	hrs.	95.00	gal	$	3,800
Labor Waste Disposal	Supervisor	160	hrs	72.50	hr	$	11,600
Labor Waste Disposal	Explosive Technicians (3 ea.)	480	hrs	46.00	hr	$	22,080
Pickup Truck	Rental	16	days	150.00	day	$	2,400
PPE and H&S Supplies	Rental	16	days	150.00	day	$	2,400
Hoses and Small Tools	Rental	16	days	150.00	day	$	2,400
Per Diem (Man-days)	Purchase	64	man-days	150.00	day	$	9,600
Rolloff Bin (2 each)	Rental	32	days	10.00	day	$	320
Rolloff Bin Mob/Demob (2 ea. x 2 trips)	Transportation	4	ea.	380.00	trip	$	1,520
Fuel - Burn Pans	Purchase	16	days	1,000.00	day	$	16,000
Fuel - Equipment	Purchase	16	days	250.00	day	$	4,000
		Sub-Total				**$**	**76,120**
Closure of Magazines	**Description**	**Quantity**	**Unit**	**$**	**/Unit**		**Total**
Labor	Closure Coordinator	30	hrs	95.00	hr	$	2,850
Labor	Supervisor	110	hrs	72.50	hr	$	7,975
Labor	Field Technicians (2 ea.)	220	hrs	46.00	hr	$	10,120
Pickup Truck	Rental	11	days	150.00	day	$	1,650
PPE and H&S Supplies	Rental	11	days	150.00	day	$	1,650
Hoses and Small Tools	Rental	11	days	150.00	day	$	1,650
Per Diem (Man-days)	Purchase	33	man-days	150.00	day	$	4,950
Rolloff Bin	Rental	210	days	10.00	day	$	2,100
Rolloff Bin Mob/Demob (15 ea. x 2 trips)	Transportation	30	ea.	380.00	trip	$	11,400
Pressure Washer	Rental	7	days	376.00	day	$	2,632
Vacuum Truck	Rental	7	days	1,190.00	day	$	8,330
Fuel - Equipment	Purchase	11	days	250.00	day	$	2,750
Disposal Wood, etc. - Chem Waste Carlyss	Disposal	172	cy	150.00	cy	$	25,800
Transportation - Chem Waste Carlyss	Transportation	15	ea.	1,125.00	load	$	16,875
Rinsate Samples	Purchase	14	ea.	405.00	each	$	5,670
Trip Blanks	Purchase	14	ea.	50.00	each	$	700
Lab Courier	Purchase	14	ea.	150.00	each	$	2,100
Entrance Soil Samples	Purchase	13	ea.	625.00	each	$	8,125
Trip Blanks	Purchase	2	ea.	50.00	each	$	100
Lab Courier	Purchase	2	ea.	150.00	each	$	300
		Sub-Total				**$**	**117,727**
Closure of Truck Parking/Staging Area	**Description**	**Quantity**	**Unit**	**$**	**/Unit**		**Total**
Labor	Closure Coordinator	12	hrs	95.00	hr	$	1,140
Labor	Supervisor	50	hrs	72.50	hr	$	3,625
Labor	Field Technicians (2 ea.)	100	hrs	46.00	hr	$	4,600
Pickup Truck	Rental	5	days	150.00	day	$	750

Clean Harbors Colfax, LLC Closure Plan Cost Estimate - Exhibit IV

[redacted]							
PPE and H&S Supplies	Rental	5	days	150.00	day	$	750
Hoses and Small Tools	Rental	5	days	150.00	day	$	750
Per Diem (Man-days)	Purchase	15	man-days	150.00	day	$	2,250
Pressure Washer	Rental	5	days	376.00	day	$	1,880
Vacuum Truck	Rental	5	days	1,190.00	day	$	5,950
Fuel - Equipment	Purchase	5	days	250.00	day	$	1,250
Rinsate Samples	Purchase	6	ea.	405.00	each	$	2,430
Trip Blanks	Purchase	2	ea.	50.00	each	$	100
Lab Courier	Purchase	2	ea.	150.00	each	$	300
Entrance Soil Samples	Purchase	9	ea.	625.00	each	$	5,625
Trip Blanks	Purchase	1	ea.	50.00	each	$	50
Lab Courier	Purchase	1	ea.	150.00	each	$	150
		Sub-Total				**$**	**31,600**
Closure of Preparation Building	**Description**	**Quantity**	**Unit**	**$**	**/Unit**	**Total**	
Labor	Closure Coordinator	8	hrs	95.00	hr	$	760
Labor	Supervisor	30	hrs	72.50	hr	$	2,175
Labor	Field Technicians (2 ea.)	60	hrs	46.00	hr	$	2,760
Pickup Truck	Rental	3	days	150.00	day	$	450
PPE and H&S Supplies	Rental	3	days	150.00	day	$	450
Hoses and Small Tools	Rental	3	days	150.00	day	$	450
Per Diem (Man-days)	Purchase	9	man-days	150.00	day	$	1,350
Pressure Washer	Rental	3	days	376.00	day	$	1,128
Vacuum Truck	Rental	3	days	1,190.00	day	$	3,570
Fuel - Equipment	Purchase	3	days	250.00	day	$	750
Rinsate Samples	Purchase	3	ea.	405.00	each	$	1,215
Trip Blanks	Purchase	1	ea.	50.00	each	$	50
Lab Courier	Purchase	1	ea.	150.00	each	$	150
Entrance/Perimeter Soil Samples	Purchase	4	ea.	625.00	each	$	2,500
Trip Blanks	Purchase	1	ea.	50.00	each	$	50
Lab Courier	Purchase	1	ea.	150.00	each	$	150
		Sub-Total				**$**	**17,958**
Closure of Truck Unloading-Liquid Storage	**Description**	**Quantity**	**Unit**	**$**	**/Unit**	**Total**	
Labor	Closure Coordinator	4	hrs	95.00	hr	$	380
Labor	Supervisor	20	hrs	72.50	hr	$	1,450
Labor	Field Technicians (2 ea.)	40	hrs	46.00	hr	$	1,840
Pickup Truck	Rental	2	days	150.00	day	$	300
PPE and H&S Supplies	Rental	2	days	150.00	day	$	300
Hoses and Small Tools	Rental	2	days	150.00	day	$	300
Per Diem (Man-days)	Purchase	6	man-days	150.00	day	$	900
Pressure Washer	Rental	2	days	376.00	day	$	752
Vacuum Truck	Rental	2	days	1,190.00	day	$	2,380
Fuel - Equipment	Purchase	2	days	250.00	day	$	500
Rinsate Samples	Purchase	2	ea.	405.00	each	$	810
Trip Blanks	Purchase	1	ea.	50.00	each	$	50
Lab Courier	Purchase	1	ea.	150.00	each	$	150
Entrance Soil Samples	Purchase	4	ea.	625.00	each	$	2,500
Trip Blanks	Purchase	1	ea.	50.00	each	$	50
Lab Courier	Purchase	1	ea.	150.00	each	$	150
		Sub-Total				**$**	**12,812**
Closure of Burn Pans & Roofs	**Description**	**Quantity**	**Unit**	**$**	**/Unit**	**Total**	
Labor	Closure Coordinator	40	hrs	95.00	hr	$	3,800
Labor	Supervisor	160	hrs	72.50	hr	$	11,600
Labor	Field Technicians (2 ea.)	320	hrs	46.00	hr	$	14,720
Pickup Truck	Rental	16	days	150.00	day	$	2,400
PPE and H&S Supplies	Rental	16	days	150.00	day	$	2,400
Hoses and Small Tools	Rental	16	days	150.00	day	$	2,400
Torches and Small Tools	Rental	16	days	300.00	day	$	4,800
Per Diem (Man-days)	Purchase	48	man-days	150.00	day	$	7,200
Pressure Washer	Rental	16	days	376.00	day	$	6,016
Vacuum Truck	Rental	16	days	1,190.00	day	$	19,040
Excavator	Rental	1	month	9,180.00	month	$	9,180

Clean Harbors Colfax, LLC Closure Plan Cost Estimate - Exhibit IV

Concrete Hammer	Rental	1	week	4,285.00	week	$ 4,285
Mob & Demob Excavator & Hammer	Rental	4	trips	500.00	ea. way	$ 2,000
Fuel - Equipment	Purchase	16	days	250.00	day	$ 4,000
Rolloff Bin	Rental	76	days	10.00	day	$ 760
Rolloff Bin Mob/Demob (4 ea. x 2 trips)	Transportation	8	ea.	380.00	trip	$ 3,040
Disposal Pans & Roofs - WMI Magnol:a	Disposal	200	cy	60.00	cy	$ 12,000
Transportation - WMI Magnolia	Transportation	10	loads	1,125.00	each	$ 11,250
Disposal Concrete Pads - WMI Magnolia	Disposal	285	cy	60.00	cy	$ 17,100
Transportation - WMI Magnolia	Transportation	15	loads	1.125.00	each	$ 16,875
		Sub-Total				**$ 154,866**
Closure of Burn Pad	**Description**	**Quantity**	**Unit**	**$**	**/Unit**	**Total**
Labor	Closure Coordinator	110	hrs	95.00	hr	$ 10,450
Labor	Supervisor	520	hrs	72.50	hr	$ 37,700
Labor	Field Technicians (2 ea.)	1,040	hrs	46.00	hr	$ 47,840
Pickup Truck	Rental	52	days	150.00	day	$ 7,800
PPE and H&S Supplies	Rental	52	days	150.00	day	$ 7,800
Hoses and Small Tools	Rental	52	days	150.00	day	$ 7,800
Per Diem (Man-days)	Purchase	156	man-days	150.00	day	$ 23,400
Pressure Washer	Rental	52	days	376.00	day	$ 19,552
Vacuum Truck	Rental	52	days	1,190.00	day	$ 61,880
Vacuum Box Rental (1 ea.)	Rental	70	days	21.00	day	$ 1,470
Vacuum Box Mob/Demob (1 ea. x 2 trips)	Transportation	2	ea.	380.00	trip	$ 760
Vacuum Box Disposal - Chem Waste Carlyss	Disposal	15	cy	150.00	cy	$ 2,250
Vacuum Box Transportation - Chem Waste Carlyss	Transportation	1	ea.	1,125.00	load	$ 1,125
Fuel - Equipment	Purchase	52	days	250.00	day	$ 13,000
Rinsate Samples	Purchase	5	ea.	405.00	each	$ 2,025
Trip Blanks	Purchase	2	ea.	50.00	each	$ 100
Lab Courier	Purchase	2	ea.	150.00	each	$ 300
Entrance/Perimeter Soil Samples	Purchase	40	ea.	625.00	each	$ 25,000
Trip Blanks	Purchase	2	ea.	50.00	each	$ 100
Lab Courier	Purchase	1	ea.	150.00	each	$ 150
		Sub-Total				**$ 270,502**
Closure of CBS Unit	**Description**	**Quantity**	**Unit**	**$**	**/Unit**	**Total**
Labor	Closure Coordinator	40	hrs	95.00	hr	$ 3,800
Labor	Supervisor	210	hrs	72.50	hr	$ 15,225
Labor	Field Technicians (2 ea.)	420	hrs	46.00	hr	$ 19,320
Pickup Truck	Rental	21	days	150.00	day	$ 3,150
PPE and H&S Supplies	Rental	21	days	150.00	day	$ 3,150
Hoses and Small Tools	Rental	21	days	150.00	day	$ 3,150
Per Diem (Man-days)	Purchase	63	man-days	150.00	day	$ 9,450
Pressure Washer	Rental	21	days	376.00	day	$ 7,896
Vacuum Truck	Rental	21	days	1,190.00	day	$ 24,990
Rollof Box Rental (4 total)	Rental	96	days	10.00	day	$ 960
Roffoff Box Mob/Demob (4 ea. x 2 trips)	Transportation	8	ea.	380.00	trip	$ 3,040
Roll of Box Disposal - Chem Waste Carlyss	Disposal	70	cy	150.00	cy	$ 10,500
Rolloff Box Transportation - Chem Waste Carlyss	Transportation	4	ea.	1,125.00	load	$ 4,500
Fuel - Equipment	Purchase	21	days	250.00	day	$ 5,250
Rinsate Samples	Purchase	15	ea.	405.00	each	$ 6,075
Trip Blanks	Purchase	15	ea.	50.00	each	$ 750
Lab Courier	Purchase	5	ea.	150.00	each	$ 750
Perimeter Soil Samples	Purchase	20	ea.	625.00	each	$ 12,500
Trip Blanks	Purchase	2	ea.	50.00	each	$ 100
Lab Courier	Purchase	1	ea.	150.00	each	$ 150
		Sub-Total				**$ 134,706**
Equipment Rental, Utilities, etc.	**Description**	**Quantity**	**Unit**	**$**	**/Unit**	**Total**
Skidsteer	Rental	5	months	2,720.00	each	$ 13,600
Skidsteer Mob & Demob	Rental	2	ea.	250.00	each	$ 500
Manlift (CBS)	Rental	2	months	2,125.00	each	$ 4,250
Manlift Mob & Demob (CBS)	Rental	2	ea.	250.00	each	$ 500
Frac Tanks (10 - 150 days ea.)	Rental	1,500	days	22.00	day	$ 33,000
Frac Tanks Mob & Demob (10 x 2 ways)	Rental	20	ea.	250.00	each	$ 5,000

Clean Harbors Colfax, LLC Closure Plan Cost Estimate - Exhibit IV

Soap For Decontamination	Purchase	825	gallons	1.25	gallon	$	1,031
Vacuum Truck Washout	Purchase	1	ea.	2,000.00	each	$	2,000
Utilities	Purchase	5	months	3,500.00	each	$	17,500
		Sub-Total				$	**77,381**
Decontamination of Rental Frac Tanks	**Description**	**Quantity**	**Unit**	**$**	**/Unit**		**Total**
Labor	Closure Coordinator	40	hrs	95.00	hr	$	3,800
Labor	Supervisor	160	hrs	72.50	hr	$	11,600
Labor	Field Technicians (2 ea.)	320	hrs	46.00	hr	$	14,720
Pickup Truck	Rental	11	days	150.00	day	$	1,650
PPE and H&S Supplies	Rental	11	days	150.00	day	$	1,650
Hoses and Small Tools	Rental	11	days	150.00	day	$	1,650
Per Diem (Man-days)	Purchase	33	man-days	150.00	day	$	4,950
Pressure Washer	Rental	11	days	376.00	day	$	4,136
Vacuum Truck	Rental	11	days	1,190.00	day	$	13,090
Vacuum Box Rental (1 ea.)	Rental	14	days	21.00	day	$	294
Vacuum Box Mob/Demob (1 ea. x 2 trips)	Transportation	2	ea.	380.00	trip	$	760
Vacuum Box Disposal - Chem Waste Carlyss	Disposal	15	cy	150.00	cy	$	2,250
Vacuum Box Transportation - Chem Waste Carlyss	Transportation	1	ea.	1,125.00	load	$	1,125
Fuel - Equipment	Purchase	11	days	250.00	day	$	2,750
Rinsate Samples	Purchase	12	ea.	405.00	each	$	4,860
Trip Blanks	Purchase	2	ea.	50.00	each	$	100
Lab Courier	Purchase	2	ea.	150.00	each	$	300
		Sub-Total				$	**69,685**
Operation of Wastewater Treatment System	**Description**	**Quantity**	**Unit**	**$**	**/Unit**		**Total**
Labor	WWTS Operator	350	hrs	46.00	hr	$	16,100
Pickup Truck	Rental	35	days	150.00	day	$	5,250
PPE and H&S Supplies	Rental	35	days	150.00	day	$	5,250
Per Diem (Man-days)	Purchase	35	man-days	150.00	day	$	5,250
LPDES Discharge Samples	Purchase	4	ea.	445.00	each	$	1,780
Lab Courier	Purchase	4	ea.	150.00	each	$	600
		Sub-Total				$	**34,230**
Decontamination of Wastewater Treatment	**Description**	**Quantity**	**Unit**	**$**	**/Unit**		**Total**
Labor	Closure Coordinator	40	hrs	95.00	hr	$	3,800
Labor	Supervisor	200	hrs	72.50	hr	$	14,500
Labor	Field Technicians (2 ea.)	400	hrs	46.00	hr	$	18,400
Pickup Truck	Rental	20	days	150.00	day	$	3,000
PPE and H&S Supplies	Rental	20	days	150.00	day	$	3,000
Hoses and Small Tools	Rental	20	days	150.00	day	$	3,000
Per Diem (Man-days)	Purchase	60	man-days	150.00	day	$	9,000
Pressure Washer	Rental	20	days	376.00	day	$	7,520
Vacuum Truck	Rental	20	days	1,190.00	day	$	23,800
Vacuum Box Rental (4 ea.)	Rental	33	days	21.00	day	$	693
Vacuum Box Mob/Demob (4 ea. x 2 trips)	Transportation	8	ea.	380.00	trip	$	3,040
Vac.Box Disposal (Sludge&Media)-Chem Waste Carlyss	Disposal	60	cy	150.00	cy	$	9,000
Vacuum Box Transportation - Chem Waste Carlyss	Transportation	3	ea.	1,125.00	load	$	3,375
Rolloff Bin (3 ea.)	Rental	17	days	10.00	day	$	170
Rolloff Bin Mob/Demob (3 ea. x 2 trips)	Transportation	6	ea.	380.00	trip	$	2,280
Disposal Tank Liner & Filter Media - Chem Waste Carlyss	Disposal	60	cy	150.00	cy	$	9,000
Transportation - Chem Waste Carlyss	Transportation	3	loads	1,125.00	each	$	3,375
Disposal Decon Waters - TMI Deer Park	Disposal	3,650	gallons	0.51	gallon	$	1,862
Transportation Decon Waters - TMI Deer Park	Transportation	1	loads	1,750.00	each	$	1,750
Fuel - Equipment	Purchase	20	days	250.00	day	$	5,000
Rinsate Samples	Purchase	26	ea.	405.00	each	$	10,530
Trip Blanks	Purchase	4	ea.	50.00	each	$	200
Lab Courier	Purchase	4	ea.	150.00	each	$	600
Foot Print/Perimeter Soil Samples	Purchase	30	ea.	625.00	each	$	18,750
Trip Blanks	Purchase	2	ea.	50.00	each	$	100
Lab Courier	Purchase	2	ea.	150.00	each	$	300
		Sub-Total				$	**156,045**
Plug & Abandon Monitoring Wells	**Description**	**Quantity**	**Unit**	**$**	**/Unit**		**Total**
Drill Crew Mob & Demob	Purchase	1	ea.	1,200.00	each	$	1,200

Clean Harbors Colfax, LLC Closure Plan Cost Estimate - Exhibit IV						
[redacted]						
Drill Crew Daily Rate	Purchase	2	days	2,800.00	days	$ 5,600
Grouting	Purchase	850	feet	6.00	foot	$ 5,100
Remove Surface Completion	Purchase	18	ea.	100.00	each	$ 1,800
Drill Crew Per Diem & Lodging	Purchase	2	crew-days	450.00	each	$ 900
		Sub-Total				**$ 14,600**
Quarterly Groundwater Monitoring	**Description**	**Quantity**	**Unit**	**$**	**/Unit**	**Total**
Sample Collection	2 Events	2	lump sum	1,500.00	each	$ 3,000
Groundwater Samples	2 Events	12	ea.	590.00	each	$ 7,080
Trip Blanks	2 Events	4	ea.	50.00	each	$ 200
Lab Courier	2 Events	2	ea.	150.00	each	$ 300
Reporting	2 Events	2	lump sum	2,500.00	each	$ 5,000
		Sub-Total				**$ 15,580**
Quarterly Tier I Soil Monitoring	**Description**	**Quantity**	**Unit**	**$**	**/Unit**	**Total**
Sample Collection	2 Events	2	lump sum	4,000.00	each	$ 8,000
Soil & Rinsate Samples	2 Events	58	ea.	625.00	each	$ 36,250
Trip Blanks	2 Events	4	ea.	50.00	each	$ 200
Lab Courier	2 Events	2	ea.	150.00	each	$ 300
Reporting	2 Events	2	lump sum	3,500.00	each	$ 7,000
		Sub-Total				**$ 51,750**
3rd Party Oversight During Closure	**Description**	**Quantity**	**Unit**	**$**	**/Unit**	**Total**
Closure Oversight	Professional Engineer	100	hrs	135.00	hr	$ 13,500
Closure Oversight-Onsite	Closure Engineer	1,250	hrs	85.00	hr	$ 106,250
Pickup Truck	Rental	125	days	150.00	day	$ 18,750
Per Diem (Man-days)	Purchase	125	man-days	150.00	day	$ 18,750
		Sub-Total				**$ 157,250**
Closure Certification Report	**Description**	**Quantity**	**Unit**	**$**	**/Unit**	**Total**
Report Preparation	Professional Engineer	60	hrs	135.00	hr	$ 8,100
Report Preparation	Closure Engineer	120	hrs	85.00	hr	$ 10,200
		Sub-Total				$ 18,300
Report Preparation	Administration @ 5%					$ 915
		Sub-Total				**$ 19,215**
Subtotal Closure						**$ 1,425,775**
	Contingency @ 10%					**$ 142,577**
Grand Total Closure						**$ 1,568,352**

TRIAL BURN PLAN

SUBPART X CLOSED DESTRUCTION TECHNOLOGY SYSTEM

EPA ID # LAD 981 055 791- OP-RN-1

PREPARED FOR:

CleanHarbors
CLEAN HARBORS COLFAX, LLC
3763 HIGHWAY 471
COLFAX, LA 71417

JANUARY 2022
FOCUS PROJECT NO. P-001467

PREPARED BY:

FOCUS

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List of Acronyms

acfm	actual cubic feet per minute
ASTM	American Society for Testing and Materials
CFR	Code of Federal Regulations
Cl^-	chloride ion
Cl_2	molecular chlorine
CHC	Clean Harbors Colfax, LLC
CDTS	Closed Destruction Technology System
CBC	contained burn chamber
CMS	continuous monitoring system
CO	carbon monoxide
DF	deactivation furnace
DNT	di-nitrotoluene
DQO	data quality objective
DRE	destruction and removal efficiency
dscf	dry standard cubic foot
dscm	dry standard cubic meter
EPA	U.S. Environmental Protection Agency
ft	foot or feet
ft^3	cubic feet
g	gram
gr	grain
HAP	hazardous air pollutant
HC or THC	total hydrocarbons
HCl	hydrogen chloride (gas) or hydrochloric acid (aqueous)
HEPA	high efficiency air particulate filter
HRGC	high resolution gas chromatography
HRMS	high resolution mass spectrometry
hr	hour
ID	induced draft
in	inch
iwc	inches water column
l or L	liter
lb	pound
LDEQ	Louisiana Department of Environmental Quality
mg	milligram
ml	milliliter
mmBtu/hr	Million British Thermal Units per hour
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NEW	Net Explosive Weight
O_2	oxygen
OPL	operating parameter limits
PAS	pollution abatement system
PEP	Propellants, Explosives and Pyrotechnics
PETP	performance evaluation test plan
POHC	Principal Organic Hazardous Constituent
ppm	parts per million
ppmvd	parts per million, dry volume
ppmv	parts per million by volume
PM	particulate matter
psi or psig	pounds per square inch, gauge
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
sec	second
SRE	system removal efficiency

List of Acronyms

SSMP	Startup Shutdown and Malfunction Plan
TNT	trinitrotoluene
TO	thermal Oxidizer
w.c.	water column
wt%	weight percent
µg or ug	microgram
µm	micrometer
ηg or ng	nanogram

1.0 INTRODUCTION

This plan describes the protocol and methodology for conducting a trial burn test of the Clean Harbors Colfax, LLC (CHC) Subpart X Closed Destruction Technology System (CDTS) located at the Colfax, Louisiana site. This Resource Conservation and Recovery Act (RCRA) test will be conducted on the CDTS which consists of a contained burn chamber (CBC), deactivation furnace (DF), and an advanced pollution abatement system (PAS). The advanced PAS includes a high-temperature thermal oxidizer (TO), cyclone, gas cooler, sorbent injection system, baghouse, HEPA filter, induced draft (ID) fan, and stack. The CDTS supplements the current open burn/open detonation (OB/OD) operations at the Colfax, LA site. The purpose of this test program is to demonstrate the Subpart X unit's performance is in compliance with relevant and appropriate United States Environmental Protection Agency (USEPA), and Louisiana Department of Environmental Quality (LDEQ), Rules, Regulations, and applicable guidance.

1.1 REGULATIONS AND GUIDANCE

The State of Louisiana regulations require operators of Subpart X units to meet federal regulations at 40 CFR Part 264, Subpart X, *Miscellaneous Units*. Subpart X requires permits for these units to *"....include those requirements of subparts I through O and subparts AA through CC of this part, part 270, part 63 subpart EEE, and part 146 of this chapter that are appropriate for the miscellaneous unit being permitted."* The proposed trial burn program will demonstrate destruction and removal efficiency (DRE) performance, and hydrochloric acid (HCl) / chlorine (Cl_2) and particulate matter emissions control.

1.2 TEST OBJECTIVES

This test plan describes the process equipment design features, process operating parameters, sampling procedures, analysis procedures, monitoring procedures, and quality assurance/quality control procedures that will be used during the test.

The objectives of this test program are to demonstrate the operation of the Subpart X unit has minimal adverse impact to human health and the environment, and to establish operating parameter limits (OPLs) to assure continued compliant operation. These objectives are summarized as follows and shown in Table 1-1:

1. Demonstrate the following performance and emissions standards;

   - Demonstrate DRE greater than or equal to 99.99% for the selected principal organic hazardous constituent (POHC).
   - Demonstrate gas particulate emissions are controlled to less than 0.08 gr/dscf @ 7%O_2 (grains per dry standard cubic foot corrected to seven percent oxygen).

- Demonstrate less than 4 pounds per hour of HCl/Cl_2 emissions when materials containing chlorine are processed. This is expected to be achieved with 90% control efficiency.

2. Establish the following OPLs:

- Minimum thermal oxidizer chamber temperature.
- Indicator of maximum combustion gas velocity through the PAS.
- Minimum pressure drop across the HEPA filter.
- Minimum sorbent feed rate when treating materials known to contain chlorine.

Table 1-1. Proposed Operations Standards

Parameter	Performance Standard or Emission Limit	
	Value	Units
Advanced Pollution Abatement System		
Destruction and Removal Efficiency	99.99	%
Particulate Matter Control	0.08	gr/dscf @ 7%O_2
HCl/Cl_2 Control	<4 (<1.8)	pounds per hour (kilograms per hour)

1.3 TEST PROTOCOL

The proposed test program is composed of two (2) test conditions with three replicate sampling runs at each set of operating conditions.

- Test Condition 1 will demonstrate DRE performance of the POHC and control of HCl/Cl_2 emissions while treating ammonium perchlorate-based propellant and operating at minimum thermal oxidizer temperature.
- Test Condition 2 will demonstrate compliance with the emissions requirement for particulate matter while feeding a typical high ash content waste material composed primarily of nitrocellulose.

Sampling and monitoring protocols for the test program are summarized as follows in Table 1-2:

Table 1-2. Sampling for Test Condition

Sample	Test Condition 1	Test Condition 2
Exhaust gas for semi-volatile organic POHC compound using SW-846 Method 0010	Yes	No
Exhaust gas for HCl/Cl_2 using EPA Method 26	Yes	No
Exhaust gas for particulate using EPA Method 5	No	Yes

1.4 TEST SPIKING

The selected POHC will be metered and vaporized to the inlet of the thermal oxidizer during Test Condition 1 to demonstrate DRE of organic compounds potentially contained in the CDTS off gas. The ammonium perchlorate-based propellant treated during this test condition will provide the chlorine source for the HCl/Cl_2 control demonstration. Typical waste with a high ash content will be processed in the system during Test Condition 2 to demonstrate PM control to the emissions standard.

1.5 TEST POHC SELECTION

The proposed POHC, naphthalene, was selected based on the difficulty of destruction as an EPA Thermal Stability Ranking Class 1 compound and also being representative of polyaromatic hydrocarbon (PAH) compounds anticipated to be potentially present in the waste feed to and associated emissions from the CDTS. The naphthalene will be metered to the thermal oxidizer inlet as ~20-25% solution in toluene.

1.6 TRIAL BURN PLAN ORGANIZATION

The Trial Burn Plan is organized into seven sections as follows:

- Section 1.0 - Introduction
- Section 2.0 - Engineering Description of the System
- Section 3.0 - Trial Burn Design and Protocol
- Section 4.0 - Sampling, Analysis, and Monitoring Procedures
- Section 5.0 - Trial Burn Schedule
- Section 6.0 - Operating Permit Objectives
- Section 7.0 - Trial Burn Report

A detailed trial burn quality assurance project plan (QAPP) is included as Appendix A.

1.7 REFERENCE DOCUMENTS

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

- American Society for Testing and Materials, "Annual Book of ASTM Standards," latest annual edition.
- Rules and Regulations of the State of Louisiana applicable to operators of Subpart X units.
- Code of Federal Regulations, 40 CFR

- EPA, "Guidance on Setting Permit Conditions and Reporting Trial Burn Results", Hazardous Waste Incineration Guidance Series (HWIGS), Volume II, 1989.
- EPA, "New Source Performance Standards, Test Methods and Procedures," Appendix A, 40 CFR 60.
- EPA, "Test Methods for Evaluating Solid Wastes Physical/Chemical Methods (SW-846), " Third Edition, 1986, revised 1990.

2.0 FEED STREAM DESCRIPTION

The types of wastes typically processed in the CDTS are classified as energetic materials. *"Energetic"* refers to a class of materials which contain a high amount of stored chemical energy which can be rapidly released at sonic or near sonic velocities. Examples of energetics includes munitions, propellants, pyrotechnics or fireworks, automobile airbag propellants, and explosives. Historically, OB/OD are practices that have been used to safely treat, destroy, or deactivate energetic wastes and energetic contaminated wastes. This CDTS technology will supplement the current OB/OD operations at the Colfax, LA site. This unit is designed to treat the following types of wastes:

- Bulk High Explosives
- Bulk Propellants
- Explosive Contaminated Debris (ECD)
- Air Bag Inflators
- Fireworks, currently requiring preparation
- Fireworks, currently requiring no preparation
- Power Charges
- Detonating Cord
- Detonators
- Igniters/Fuses
- Rocket Motors
- Shaped Charges.

Due to the high energy nature of these wastes and safety concerns, these streams are typically not sampled and analyzed for characterization, but process knowledge and material specifications are used to develop the feed characterizations of these wastes. As part of normal operations, the materials treated in the CDTS are screened to assure the continued integrity and safety of the process operation and operators. Specifically, the charge size of materials will be limited based on net explosive weight (NEW) such that the CDTS reaction chamber is not damaged nor presents undue hazard to personnel or equipment in the immediate area of operation. Some materials treated in the CDTS may be pre-processed into forms that reduce/minimize the potential for high order detonation, e.g., propellent shavings or loose (non-compacted) high order explosives, that burn very rapidly (deflagration reaction).

3.0 ENGINEERING DESCRIPTION OF CLOSED DESTRUCTION TECHNOLOGY

The technology for the Closed Destruction Technology System (CDTS) includes a Contained Burn Chamber (CBC) and a batch feed Deactivation Furnace (DF), both connected to a shared advanced Pollution Abatement System (PAS). The components as shown in Figure 3-1 are described further in the sections below and, Table 3-1.

3.1 CONTAINED BURN CHAMBER (CBC) SYSTEM

The CBC consists of a large vertically oriented cylindrical chamber that is used to contain all the gases generated during the processing of the various energetic waste materials. The CBC can be thought of as OB within an enclosure. The CBC retains the simplicity and safety of current OB procedures while protecting the environment by containing the off-gas products and allowing for their subsequent controlled rate treatment to remove pollutants.

Waste materials are treated in the CBC in batch quantities like the current OB protocol. An operator prepares a burn tray with waste materials and places the tray onto an automated feed cart system. The prepared burn tray is then inserted into the CBC remotely. The CBC is then sealed, and the waste material is remotely ignited. The waste materials are allowed to burn inside the CBC in a manner similar to OB.

The CBC is designed to contain the full volume of gases generated during the processing of each burn tray. The burn trays are similar in size and function to the burn trays currently in use at the OB facility. The chamber's annular volume is sufficient to maintain the unrestricted burn conditions currently employed with OB. This approach does not add confinement or increase the risk of detonation versus OB.

As each waste charge is combusted, the gases within the CBC are purged to the PAS. Once the charge has completed and the off-gases processed, the burn tray can then be remotely extracted from the CBC and inspected via CCTV camera. The burn tray is removed from the feed cart for cooling. A new tray is placed onto the feed cart and the cycle is repeated. Multiple trays are used to allow for process efficiency, so cooling of the previous tray and preparation of the tray for the next cycle can be performed concurrently. The tray modules are customized according to the type of waste that is to be processed (e.g., burn pans, cage shielding to contain fragments, etc.).

The CBC does not use a controlled flame burner, and therefore, the operating temperature is not controlled. Off gas temperatures of up to 600 °F are expected. The materials placed in the chamber are ignited and allowed to burn as they otherwise would during OB with the exception that emissions from wastes are contained within the chamber and directed to the PAS for treatment.

3.1.1 CBC with open top burn tray

This operating protocol identified as *"CBC with open top burn tray"* is the same as is used to process Bulk Energetics during OB operations. This method consists of a simple open tray designed to fit securely on the feed cart. This configuration allows for the burning of bulk energetics which do not produce propulsive fragments without confining them in any way, just as they are done in OB trays.

3.1.2 CBC with covered burn tray

The *"CBC with cover burn tray"* operating protocol incorporates a cover or cage placed over the waste in the burn tray similar to current OB methods. The system is designed to direct airflow into the waste to promote efficient and complete combustion, which is an improvement in control versus the current OB protocol.

The gases generated during the burning event are captured inside the CBC and are directed to the PAS for treatment prior to release to the atmosphere. The gases may be routed through the DF before being directed to the PAS.

3.2 DEACTIVATION FURNACE (DF)

The DF processing technology consists of a chamber similar to a car bottom furnace. The DF chamber, or flashing chamber, has a door that can be opened to provide access to the interior of the chamber.

The DF process replicates another current OB protocol where the waste materials are held in a steel container and heated. In the OB protocol, a pool fire is used to generate the heat necessary to initiate energetic material activation. The DF replicates this process using fuel-fired burners to provide the heat for material activation instead of a pool fire used in the OB process. The burners provide the required activation heat within an enclosed chamber in a more controlled manner. The burners are fueled with natural gas eliminating the need to directly mix diesel with the waste, except for those waste streams which are soaked in diesel as a preparation step, which also reduces potential emissions. The DF typically is expected to operate between 600 °F and 1,000 °F.

Wastes that will be processed in the DF are placed into a ventilated container (a strongbox with a heavy cover if propulsive fragments are possible) and loaded into the DF. The door is closed, the DF burners are ignited, and the chamber is heated to a setpoint temperature for the required cycle time. At the end of the cycle, the DF burners are turned off, the access door can then be opened, and the container removed. The cycle is then repeated.

After treatment, the container is allowed to cool, and the ash is removed so the container can be utilized again for processing. To improve throughput efficiency, multiple containers are used to allow for concurrent cooling, cleanout, and loading.

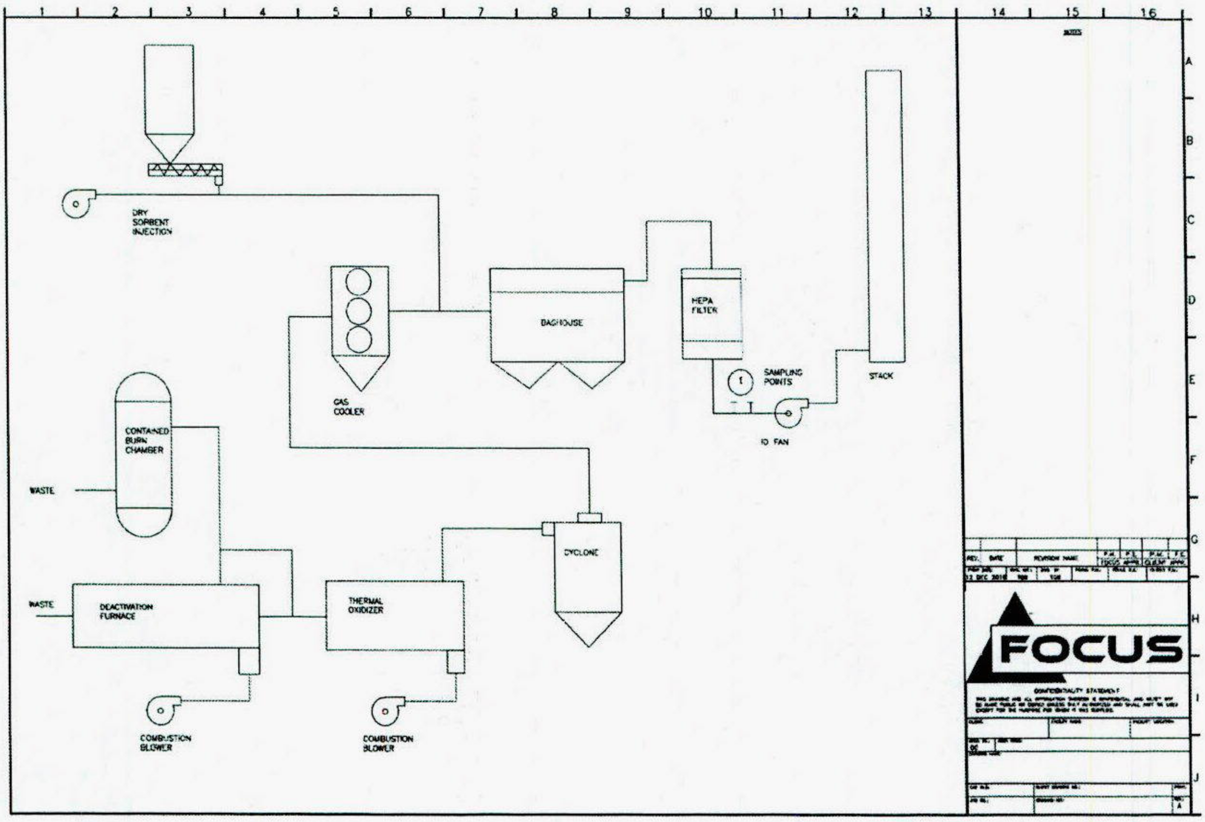

Figure 3-1. Process Flow Diagram

Table 3-1. Subpart X Closed Disposal Technology System Specifications

Parameter	Value	Units
Contained Burn Chamber (CBC)		
Manufacturer	El Dorado Engineering	NA
Model No.	NA; custom design	NA
Thermal Rating	NA	MM Btu/hr
Fuel	NA	NA
Chamber		
Configuration	Vertical	NA
Approximate Chamber Body Length (external)	75	ft
Approximate Chamber Body Diameter (external)	15	ft
Chamber Material of Construction	Steel	NA
Refractory Thickness	NA	in
Approximate Chamber Volume (internal)	11,450	ft^3
Pressure Rating	150	psi
Deactivation Furnace (DF)		
Manufacturer	El Dorado Engineering	NA
Model No.	NA; custom design	NA
Burner		
Manufacturer	TBD	NA
Model No.	NA; custom design	NA
Thermal Rating	6	MM Btu/hr
Fuel	Natural Gas	NA
Chamber		
Configuration	Horizontal	NA
Approximate Chamber Body Length (external)	23	ft

Table 3-1. Subpart X Closed Disposal Technology System Specifications

Parameter	Value	Units
Approximate Chamber Body Diameter (external)	9 (square)	ft
Chamber Material of Construction	Steel	NA
Refractory Thickness	8	in
Chamber Volume (internal)	1,020	ft^3
Pressure Rating	NA	Psi

Note: NA – Not Applicable

3.3 ADVANCED POLLUTION ABATEMENT SYSTEM (PAS)

The PAS includes a high-temperature thermal oxidizer, cyclone, gas cooler, cry sorbent injection, baghouse, HEPA filter, induced draft (I.D.) fan, and stack. The PAS is designed to remove/reduce particulate matter (PM), carbon monoxide (CO), and hydrocarbons (HC) emissions.

Table 3-2. Advanced Pollution Abatement System Specifications

Parameter	Value	Units
Thermal Oxidizer		
Manufacturer	TBD	NA
Model No.	NA; custom design	NA
Burner		
Manufacturer	TBD	NA
Model No.	NA; custom design	NA
Thermal Rating	TBD	MM Btu/hr
Fuel	Natural Gas	
Chamber		
Configuration	Horizontal	
Chamber Body Length (external)	23	ft
Chamber Body Diameter (external)	9 (square)	ft
Refractory Thickness	8	inches
Chamber Volume (internal)	1,020	ft^3

Table 3-2. Advanced Pollution Abatement System Specifications

Parameter	Value	Units
Chamber Gas Residence time	2 seconds	
Cyclone		
Cyclone Chamber Height	TBD	ft
Cyclone Chamber Diameter	TBD	ft
Gas Cooler		
Inlet Temperature	1200	°F
Outlet Temperature	400	°F
Air induced	TBD	scfm
Dry Sorbent Injection		
Sorbent	TBD	NA
Sorbent Addition Rate	up to 150	lb/hr
Carrier Fluid	Air	NA
Carrier Fluid Volume	200	scfm
Baghouse		
Manufacturer	TBD	NA
Model Number	TBD	NA
Number of Chambers	1	NA
Number of Bags	TBD	NA
Air to Cloth ratio	minimum 4:1	ft^3/ft^2
Cleaning Method	On-line Pulse	NA
Bags		
Manufacturer	TBD	NA
Number of bags	TBD	NA
Material	Aramid w/ PTFE membrane	NA
Size - diameter	TBD	in
Size - length	TBD	in
HEPA		
Manufacturer	TBD	NA

Table 3-2. Advanced Pollution Abatement System Specifications

Parameter	Value	Units
Model Number	TBD	NA
Number of Chambers	1	NA
Number of Filters	8	NA
HEPA Filter Media Area (Total)	TBD	ft^2
ID Fan & Stack		
Manufacturer	TBD	NA
Model Number	TBD	NA
ID Fan Design Flow	11,070	acfm
Stack Diameter	30	in
Stack Height	50	Ft

Notes:
NA – Not Applicable
TBD – To be determined

3.4 THERMAL OXIDIZER

The thermal oxidizer is a high-temperature unit designed to heat the CBC and DF exhaust gas stream at temperature, residence time, and excess oxygen sufficient to ensure complete combustion of carbon monoxide (CO) and hydrocarbon (HC) generated from the deactivation of the energetic material. The thermal oxidizer is expected to operate at 1,600 °F. In the thermal oxidizer, CO and HC emissions are reduced to near-zero levels. The thermal oxidizer is an off-gas treatment device; no waste is introduced into the thermal oxidizer.

3.5 CYCLONE

The PAS includes a cyclone to remove larger particulate matter. Cyclones typically achieve >99% efficiency for particulate matter 5-10 microns in size. Particulate is collected below the cyclone automatically through a hopper and into a sealed disposable drum for convenient disposal.

3.6 GAS COOLER

The gas cooling system is designed to indirectly remove heat from the gases to a temperature appropriate to the downstream PAS devices (e.g., baghouse). The gas cooler uses ambient air to indirectly cool the gases. The gas cooler internals are designed with a well proven automated clearing system, designed specifically for challenging applications to prevent bridging or plugging of the gas cooler with particulate.

Particulate automatically removed from the gas cooler is collected in a sealed disposable drum for convenient disposal.

3.7 DRY SORBENT INJECTION

A dry sorbent injection system is used as needed to inject a powdered sorbent, such as lime, upstream of the baghouse. The powder is mixed in the exhaust stream duct and carried to the baghouse where it coats the exterior of the bags. Acid gases are neutralized on the surface of the bags creating a solid salt. The baghouse cleaning system removes these salts and excess sorbent from the surface of the bags during normal cleaning cycles. Acid gas removal efficiencies of approximately 90% or greater are typically achieved with this type of scrubber. The dry sorbent system operation is limited to operational cycles when the waste material being treated in the CDTS is known, based on waste profile data, to contain chlorine-based materials. The dry sorbent system is turned off when not required or between cycles when treating consecutive batches of chlorine containing materials

3.8 BAGHOUSE

The baghouse is a fabric-filtration collector, used for efficient particulate removal from the gas stream. Baghouse particulate removal efficiencies are typically greater than 99.9% for 0.3-0.5 microns. Larger particulate is removed at nearly 100% efficiency. The baghouse is automatically cleaned via a reverse pulse air jet to ensure proper operation and low maintenance. Particulate is collected below through a hopper in a sealed disposable drum for convenient disposal. The fabric bags require periodic replacement; the interval for replacement is typically 1-3 years.

3.9 HEPA FILTER

A HEPA filter is located downstream of the baghouse to provide ultra-high efficient (99.97-99.99 % control of 0.3 micron particulate. The HEPA filter removes particulate matter to levels below what normally exists in a home or office atmosphere. This type of filtration is used in manufacturing clean rooms and hospitals and far exceeds regulatory standards. The HEPA filter also acts as a backup control in case of a baghouse leak.

3.10 ID FAN/STACK

The Induced Draft (ID) fan provides negative pressure throughout the entire system and draws exhaust gases through the pollution control system and out the stack. With the fan located by design at the end of the equipment train, all ductwork, joints, and equipment in the PAS operate at a negative pressure relative to ambient which eliminates the potential for fugitive emissions. If there is a leak present in any of these components, fresh air leaks into the system instead of fugitive emissions leaking to the atmosphere.

The stack is designed to eliminate personnel exposure to exhaust gases. The treated exhaust stream is primarily composed of carbon dioxide, water vapor, excess oxygen, and nitrogen. The duct from the baghouse to the ID fan is equipped with sample ports to allow for emissions testing.

4.0 TEST DESIGN AND PROTOCOL

4.1 REGULATORY REQUIREMENTS

This test plan is submitted in accordance with the requirements Louisiana Air Quality Regulations (LAC 33:III), Louisiana Hazardous Waste Regulations (LAC 33:V), 40 CFR 60 Test Methods, and 40 CFR 264 Subpart X.

4.2 TEST OBJECTIVES

The objectives of this test program are to demonstrate compliance with the DRE performance standard, control of PM and HCl/Cl_2 emissions, and establish OPLs to demonstrate the operation of the Subpart X unit has minimal adverse impact to human health and the environment. These are summarized as follows and shown in Table 4-1:

1. Demonstrate the following performance and emissions standards;
   - Demonstrate DRE greater than or equal to 99.99% for the selected POHC.
   - Demonstrate particulate emissions control to less than 0.08 gr/dscf @ 7%O_2
   - Demonstrate less than 4 pounds per hour of HCl/Cl_2 emissions when materials containing chlorine are processed. This is expected to be achieved with 90% control efficiency.
2. Establish the following OPLs:
   - Minimum thermal oxidizer chamber temperature
   - Indicator of maximum combustion gas velocity through the PAS
   - Minimum pressure drop across the HEPA filter
   - Minimum sorbent feed rate when treating materials known to contain chlorine.

Table 4-1. Target Operational Values

Parameter	Inst ID	Min Value	Target Value	Max Value	Units	Notes
TO Chamber Temperature	TI-500 A, B	1,550	1,600	1,800	°F	
TO Chamber Pressure	PIT-600	TBD	TBD	TBD	iwc	
HEPA Filter Pressure Drop	dPI-XXX PIT-631 - PIT-700	TBD	TBD	TBD	iwc	
Combustion Gas Velocity Indicator – based on ID Fan amperage	TBD	TBD	TBD	TBD	amps	
Sorbent Flow	TBD	TBD	TBD	TBD	Lb/hr	

Parameter	Inst ID	Min Value	Target Value	Max Value	Units	Notes

Notes: TBD – To be determined. Engineering has not been completed and this data is not available at this time. This table will be updated when engineering is completed, and values are determined.

4.3 TEST PROTOCOL

The objective of the test program is to demonstrate compliance of the CDTS with the relevant and appropriate state/federal rules. The test program will be composed of two (2) test conditions with three replicate sampling runs each.

- Test Condition 1 will demonstrate DRE performance of the selected POHC and control of HCl/Cl_2 emissions while treating ammonium perchlorate-based propellant and operating at minimum thermal oxidizer temperature.
- Test Condition 2 will demonstrate compliance with the emissions requirement for particulate matter while feeding a typical high ash content waste material, containing nitrocellulose.

Sampling and monitoring protocols for the test are summarized as follows in Table 4-2:

Table 4-2. Sampling and Analysis Summary

Sample	Test Condition 1	Test Condition 2
Exhaust gas for the selected semivolatile organic POHC (naphthalene) using SW-846 Method 0010	Yes	No
Exhaust gas for HCl/Cl_2 using EPA Method 26	Yes	No
Exhaust gas for particulate using SW-846 Method 5	No	Yes

4.4 WASTE FEED CHARACTERISTICS

Waste streams from different sources received at the Colfax facility provide the feed to the Subpart X unit.

4.4.1 Waste Stream Source and Description

Table 4-3 provides the wastes that were selected to represent the general list of the types of energetic materials that may be treated in the CDTS. These wastes were selected as they are chemically representative of what will be processed and they represent some of the major waste streams processed on site. The characterizations of these materials are based on process knowledge and waste stream records. Table 4-3 notes the waste emissions constituents most likely to be formed from combustion of each material.

Table 4-3. Wastes Expected to be Routinely Treated in the CDTS

Material	Major Constituent(s)	Potential Emissions
Nitrocellulose Propellant	Organics, Ash	CO, HC, PM
Ammonium Nitrate Propellant	Organics, Chlorine	CO, HC, HCl/Cl_2

4.4.2 POHC Selection Rationale

Naphthalene was selected as the target POHC based on its difficulty of destruction and being similar in nature to potential PAH compounds in the wastes treated in the CDTS. The POHC chosen for the test is naphthalene.

It is important to demonstrate DRE using compounds that are difficult to destroy. EPA has developed a thermal stability ranking system based on laboratory studies conducted under low oxygen conditions in a non-flame environment. The thermal stability ranking system has divided organic compounds into seven thermal stability classes, with Class 1 compounds being the most stable, and Class 7 compounds being the least thermally stable. When the system is successful in destroying thermally stable compounds, it is appropriate to assume that other, less stable compounds will be destroyed at efficiencies equal to or greater than the efficiencies demonstrated for the stable compounds. Naphthalene was selected as the target POHC because it ranks in the highest class (Class 1) on the thermal stability index and is similar to components in the waste streams received. Demonstration of DRE using this Class 1 POHC will show the CDTS thermal oxidizer is capable of destroying potential organic emission from all types of energetic waste materials that may be treated.

4.4.3 Waste Feed Specification for Test

For Test Condition 1, the proposed material to be processed is 200-pound charges of ammonium perchlorate-based (NH_4ClO_4, 30 wt% Cl) propellant. This material will provide the chlorine necessary to demonstrate HCl/Cl_2 control. Because naphthalene is being used as the selected POHC and will be metered to the inlet of the thermal oxidizer, no credit is taken for organic destruction in the upstream process devices and is not impacted by the nature or amount of material charge being processed.

For Test Condition 2, the proposed material to be processed is 600-pound charges of nitrocellulose-based propellant. This material will provide the typical ash loading to demonstrate PM control.

4.4.4 Waste Feed Spiking

Naphthalene will be metered to the inlet of the thermal oxidizer by vaporizing a 20-25% solution of naphthalene dissolved in toluene. The proposed nominal feed rate is 3-5 pounds per hour net naphthalene. Refer to Appendix C for the demonstrable DRE at this feed rate. The amount of POHC will be adequate to demonstrate greater than 99.99% DRE.

5.0 SAMPLING, ANALYSIS, AND MONITORING PROCEDURES

5.1 GENERAL

This section describes the planned sampling, the associated analytical procedures, and process monitoring procedures pertinent to the collection of test data.

5.2 TEST SAMPLING AND ANALYSIS PROTOCOL

The test program involves sampling and analysis of emissions for naphthalene, PM, and HCl/Cl_2. The sampling and analytical protocols are summarized in Table 5-1.

Sampling during testing is limited to the exhaust gas emissions only. The waste constituent feed rates (ash and chlorine) will be determined through calculation based on the constituents' contents in the waste and the waste feed charge sizes. Data on constituent content in each waste feed will be obtained from the process knowledge and/or the waste profiles. No waste sampling will be conducted. The emissions sampling and analysis are discussed in more detail in the following sections.

5.2.1 Emissions Sampling Location

For safety reasons, the feed charges and the removal of residue after treatment are controlled remotely. When material is charged into the CBC or DF, and until its complete reaction/destruction, all personal must remain outside the minimum safe distance perimeter limits, nominally 100 yards (300 feet). Therefore, the manual sampling trains must also be operated remotely. The cycle time per charge is nominally one (1) hour.

The emissions sampling will be performed from the ports located on the system exhaust duct from the baghouse to the ID fan. The sampling ports are located at the outlet of the control devices and prior to any releases to the atmosphere.

The requirement to operate the manual sampling trains remotely dictates some operational modifications/adaptations. Isokinetic sampling traverses cannot be performed; single point isokinetic sampling will be required. The proposed approach is for the sampling team to perform velocity traverses of the duct concurrent with the pre-sampling cyclonic flow checks when the thermal oxidizer is operating only on auxiliary fuel. A single sampling point will be selected based on these traverses. During testing, the isokinetic sampling train probe will be positioned at the selected sampling point. The sampling train ice bath will be charged with the maximum possible amount of ice moments before the CDTS charge is introduced. The sampling team will then withdraw to the safe distance where they will operate the meter box with umbilical connection to the sampling probe. This arrangement is analogous to sampling a stack port with the meter boxes positioned and operated at ground level.

Emissions sampling will be coordinated with the CDTS operators. The sampling train will be started commensurate with the ignition of the charge and operated through completion of the reaction cycle, nominally one hour. When given the "all clear" by the CDTS operators, the sampling team will move to the sampling train, drain water from the ice bath, recharge with ice for the next treatment cycle, and then withdraw again to the minimum safe distance. For the three (3) hour sampling trains, e.g., Method 0010, this process will be repeated three (3) times to complete a test run. If the cycle time is slightly longer than one (1) hour, e.g., one hour and 15 minutes, the sampling team will plan to operate the sampling train the same amount of time with each cycle, e.g., 3 X 1:15 = 3:45.

Table 5-1. CDTS Sampling and Analysis Methods

Sample Name	Sampling Location/ Access	Sampling Reference Method [1]	Sampling or Measurement Equipment	Sample Size/Frequency	Analytical Parameters	Analytical Reference Method [1]	Demonstrated by Testing Condition	
							1	2
Exhaust Gas	Isokinetic Port	EPA Method 0010	Isokinetic Sampling Train	Nominal 3-hour composite sample performed with three ~1-hour cycle times constituting a run; target sampled volume is 3 dscm [2,3]	Naphthalene	GC/MS with selective ion monitoring (SIM) SW846-0010/8270	X	
Exhaust Gas	Non-Isokinetic Port	Method 26	Non-Isokinetic Sampling Train	Nominal 3-hour composite sample performed with three ~1-hour cycle times constituting a run; target sampled volume is 2-3 dscm [2]	HCl/Cl2	EPA Method 26 SW846 – Method 9056/9057	X	
Exhaust Gas	Isokinetic Port	Method 5	Isokinetic Sampling Train	Nominal 1-hour composite sample performed with one ~1-hour cycle time constituting a run; target sampled volume is 1 dscm [2,3]	Filterable Particulate	EPA Method 5		X

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

[2] The exact volume of gas sampled will depend on the isokinetic sampling rate.

[3] Isokinetic sampling trains include:

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

5.2.2 Emissions Sampling Procedures

The system will be operated without waste, burning only auxiliary fuel in the thermal oxidizer in order to perform EPA Methods 1 – 4. This will be used to determine the suitability of the test location, identify the test location to be used for sampling, verify there is no cyclonic flow in the stack, determine stack velocity, and CO_2, O_2, and moisture concentrations.

The emissions sampling methods are briefly described below. Where EPA and SW846 methods are referenced, the current version of the method will be used.

5.2.2.1 Method 0010 for Naphthalene (POHC)

A SW-846 Method 0010 sampling train will be used during Test Condition 1 to determine the emissions of the naphthalene. Sampling will be conducted isokinetically at a single point for a total of three (3) CDTS 1-hour cycle times with a target volume of three (3) dry standard cubic meters (dscm) of exhaust gas. Three (3) CDTS cycle times shall constitute a test run.

5.2.2.2 Method 26 (HCl/Cl_2)

During Test Condition 2, the exhaust gas will be sampled non-isokinetically for HCl/Cl_2 according to EPA Method 26. Since this unit does not use a wet scrubber or similar wet gas cleaning technology, but uses a dry gas cleaning system; the acid is expected to be in gaseous form, not acid particulate matter; and therefore amenable to sampling using this non-isokinetic method. Sampling will be conducted concurrent with the Method 0010 sampling for a total of three CDTS 1-hour cycle times constituting a test run.

5.2.2.3 Method 5 (Particulate Matter)

During Test Condition 2, the exhaust gas will be sampled isokinetically at a single point for particulate matter according to EPA Method 5 with a target volume of 1.0 dscm. Sampling will be conducted for a minimum of one hour per sampling run, a 1-hour CDTS cycle time constituting a test run.

5.2.3 Analytical Procedures

Analytical methods planned for the test are summarized in Table 5-1 and Quality Assurance and Quality Control Procedures. Appendix A contains the Quality Assurance Project Plan (QAPP) that has been prepared according to EPA Guidance. The QAPP delineates the QA/QC procedures for the test sampling and analyses.

5.2.3.1 Naphthalene DRE

The Method 0010 samples will be analyzed for naphthalene via gas chromatograph/mass spectrometry (GC/MS) SW-846 Method 8270, with selected ion monitoring (SIM). Refer to Section 7.5.5 of Method

8270C or Section 11.5.5 of Method 8270D. The SIM analysis approach used is comparable to isotope dilution high resolution GC/MS (HRGC/HRMS) approach normally used for dioxin/furan analysis. The SIM approach provides for detection limits approximately two (2) orders of magnitude lower than the normal GC/MS analysis. The SIM approach significantly reduces the naphthalene spiking rate necessary to effectively demonstrate DRE.

5.2.3.2 HCl/C_2 Emissions

HCl/Cl_2 emissions will be determined via ion chromatography analysis of the Method 26 sampling train acid and basic impinger contents for chloride ion via ion chromatography (IC) SW-846 Method 9056/9057.

5.2.3.3 Particulate Emissions

Particulate matter emissions will be determined via gravimetric analysis of the filter and acetone probe rinse in accordance with EPA Method 5.

5.3 MONITORING PROCEDURES

The pertinent process parameters listed in Table 4-1 will be monitored during the test.

6.0 TEST SCHEDULE

6.1 GENERAL TEST SCHEDULE

The testing of the Subpart X Closed Destruction Technology System is expected to occur over a four (4) calendar day period. The schedule below assumes up to 2 runs per day for Test Condition 1 and three runs per day for Test Condition 2. Prior to the test, process instruments will be calibrated. The planned daily activities for the test are as follows:

- Test Day 1 – The sampling team will mobilize to the test site, participate in required site-specific safety training, and set-up equipment. A coordination meeting will be conducted.
- Test Day 2 - The system will be operated through six (6) treatment cycles. These six (6) cycles shall constitute Test Condition 1, Runs 1 and 2.
- Test Day 3 –The system will be operated through three (3) treatment cycles. These three (3) cycles shall constitute Test Condition 1, Run 3.
- Test Day 3–The system will be operated through three (3) treatment cycles. These three (3) cycles shall constitute Test Condition 2, Runs 1, 2, and 3.
- Test Day 4 – Contingency day. The sampling team recovers remaining sampling trains, equipment, and test samples. The sampling team departs the test site.

The above proposed schedule of testing is a general schedule and will be adjusted as necessary to meet the site conditions during the test. Preparation of the test report will begin following completion of the on-site testing. The final test report will be submitted within 90 days after completion of the test.

6.2 DURATION OF EACH TEST CONDITION

The CDTS is a batch process with a nominal cycle time of one (1) hour. The PAS operates continuously throughout each cycle and between cycles. Each test condition is constituted of three (3) test runs. For Test Condition 1, a test run shall be composed of three (3) 1-hour CDTS cycles. For Test Condition 2, a test run shall be composed of one (1) 1-hour CDTS cycle.

6.3 TEST RUN COMPLETION

For Test Condition 1 where three (3) 1-hour CDTS cycles constitute a test run, timing and operational factors could preclude completing all three cycles of a test run in a single stretch. For example, five cycles on one day would constitute one complete test run and 2/3 of a second test run. If this or similar situation were to occur, the incomplete sampling trains will be discarded. The following day, the sampling trains will be restarted with a fresh setup to complete the test run with three additional CDTS cycle(s).

7.0 OPERATING PERMIT OBJECTIVES

7.1 CONTROL PARAMETERS

Based on the results of the testing, Clean Harbors Colfax will propose operating limits in the Subpart X CDTS test report. These operating limits will reflect operation a batch charge operated contained burn system recognizing that once is a charge is made there are no control parameters that can be changed to affect the charge treatment. If the required performance objectives of the testing are achieved, the CDTS should be allowed to operate under the conditions proposed in this section. Table 7-1 summarizes the expected operating limits.

Table 7-1. Summary of Established Operating Limits

Operational Parameter	Units	Limit	Waste Charge Permissive	Method of Setting Limit
Maximum Waste Charge Weight or Net Explosive Weight (NEW)	NA	NA	No	Manufacturer's Specifications
Minimum Thermal Oxidizer TO Exit Temperature	°F	1,550	Yes	Average of the Test Condition 1 run averages
Maximum Combustion Gas Velocity (Based on Induced Draft Fan Current)	Amps	TBD	Yes	Lesser of the average of the Test Condition 1 or Test Condition 2 run averages
Maximum System Pressure	iwc	0.0	Yes	Manufacturer's Specifications
Minimum HEPA Pressure Drop	iwc	1.0	Yes	Manufacturer's Specifications
Maximum HEPA Pressure Drop	iwc	10.0	Yes	Manufacturer's Specifications
Minimum Sorbent Injection Rate	lb/hr	TBD	Yes, for chlorine containing materials only	Average of the Test Condition 1 run averages

Note: TBD – To be determined. Engineering has not been completed and this data is not available at this time. This table will be updated when engineering is completed, and values are determined.

7.2 MAXIMUM WASTE AND NEW FEED RATES

The CDTS is operated in a batch manner. Therefore, it is not meaningful to have a continuous measurement or a rolling average value for maximum waste or NEW feed rate. Clean Harbors expects this parameter will be handled in an administrative manner limiting the size of each batch and requiring recording the weights of each charge and summing these for the reporting time periods.

7.3 MINIMUM THERMAL OXIDIZER TEMPERATURE

The minimum thermal oxidizer temperature operating limit is established for maintaining compliance with the organic DRE performance standard. Test Condition 1 will be conducted to demonstrate the minimum thermal oxidizer operating temperature. The limit will be based on the average of the test run average temperatures. Thermal oxidizer operating temperature will be monitored on a continuous basis.

7.4 MAXIMUM COMBUSTION GAS VELOCITY INDICATOR

The maximum combustion gas velocity will be demonstrated for maintaining compliance with the organic DRE performance standard, and HCl/Cl_2 and particulate emissions control. ID fan operation will be maximized during both test conditions. As an indicator of maximum combustion gas velocity, the maximum ID fan current limit will be established based on the average values demonstrated during the three runs of the respective test conditions. The final limit will be established as the lesser of the average value from the three runs of the respective test conditions.

7.5 MAXIMUM SYSTEM PRESSURE

The CBC and DF chambers are sealed chambers when operating. The chambers are opened to be charged with waste and to be emptied at the end of each cycle. During the operational cycle, the CBC pressure is positive. The DF and PAS operate with a slight negative draft pressure at all times. Draft pressures are monitored as a chamber loading/unloading interlock. The pressure must be less than atmospheric to allow opening of the chamber. This operational limit will preclude fugitive emissions from the chambers when they are being loaded or unloaded.

7.6 HEPA MINIMUM AND MAXIMUM PRESSURE (HEPA PERFORMANCE)

Minimum and maximum HEPA differential pressure limits will be established as indicators of HEPA performance. The proposed minimum and maximum HEPA pressure limits are based upon manufacturer's recommendations.

7.7 MINIMUM SORBENT INJECTION RATE

When processing material known to contain chlorine, a condition of operation shall be sorbent injection rate. The sorbent injection system will only be operated as needed. The minimum sorbent feed rate will be based on the average rate demonstrated during Test Condition 1.

7.8 WORK PRACTICE IN LIEU OF CONTINUOUS EMISSIONS MONITORING

In lieu of continuous emission monitoring for carbon monoxide (CO) or hydrocarbon (HC) emissions as an indicator of good combustion, Clean Harbors is proposing a work practice of conducting a biennial burner tune up on the thermal oxidizer similar to what is required for process heaters by Subpart DDDDD of Part 63—*Work Practice Standards*.

The measurement of pressure drop across the HEPA filter has been added to provide an indication of loading of the HEPA filter which is expected to occur over time with normal operation but can also be an indicator of poor performance of the system if loading occurs more frequently than is expected. Upon change out of the filters, the contaminants collected will be visually inspected for indications of poor system performance.

8.0 TEST REPORT

The final test report will be submitted within 90 days after completion of the test unless a time extension is requested. The final test report will include a discussion of the test objectives; sampling, analysis, and QA/QC activities performed; summaries of process operating conditions; the results of the test determinations; and proposed permit conditions. The planned outline of the test report is shown in Table 8-1.

The report format presented in Table 8-1 includes data reporting and data evaluation sections summarized below:

- Section 1.0 will be an executive summary that focuses on the target performance objectives relative to the actual performance and will pronounce a pass/fail for each compliance performance standard. The proposed operating limits will also be presented in Section 1.0.
- Section 2.0 will give a very brief description of the unit tested, a summary of the test targets and objectives, and the chronology of the test execution relative to the planned testing program.
- Section 3.0 will present the test waste feed material composition data and process operating conditions.
- Section 4.0 will present a parameter-by-parameter comparison of the measured performance demonstrated relative to the compliance performance standards and will determine a pass/fail.
- Section 5.0 will discuss the results of QA/QC activities, specifically the impacts on the performance evaluations of any data that fall outside the data quality objective (DQO) limits.
- Section 6.0 will present the proposed operating limits and will follow the methodology delineated in Section 7.0 of this test plan.

The balance of the report will be composed of appendices of the supporting documentation and data.

Table 8-1. Example Test Report Outline

- **1.0** EXECUTIVE SUMMARY
- **2.0** TEST PROGRAM SUMMARY
  - **2.1** Engineering Description
  - **2.2** Summary of Test Plan and Objectives
  - **2.3** Test Implementation Summary
- **3.0** PROCESS OPERATIONS
  - **3.1** Process Operating Conditions
  - **3.2** Waste Feed Material Characteristics
- **4.0** RESULTS
  - **4.1** Destruction and Removal Efficiency
  - **4.2** HCl/Cl_2 Emissions
  - **4.3** Particulate Emissions
- **5.0** QUALITY ASSURANCE/QUALITY CONTROL RESULTS
  - **5.1** QA/QC Activities and Implementation
    - **5.1.1** QA Surveillance
    - **5.1.2** Sample Collection
    - **5.1.3** Sample Analysis
    - **5.1.4** Process Instrumentation
    - **5.1.5** Emissions Sampling Equipment
    - **5.1.6** Laboratory Analytical Instrumentation
  - **5.2** Audits and Data Validation
  - **5.3** Calculations
  - **5.4** Conclusions
- **6.0** ANTICIPATED PERMIT OPERATING CONDITIONS
  - **6.1** Development of Operating Limits
  - **6.2** Specific Control Parameters

APPENDICES

A. Process Operating Data
B. Test Manager's Log
C. Process Instrument Calibration Data
F. Sampling Report
G. List of Samples
H. Analytical Report
I. Calculations
J. Data Validation Report
K. Corrective Action Requests
L. CMS Performance Evaluation Report

Appendix A – Quality Assurance Project Plan

TRIAL BURN QUALITY ASSURANCE PROJECT PLAN

SUBPART X CLOSED DESTRUCTION TECHNOLOGY SYSTEM

EPA ID # LAD 981 055 791- OP-RN-1

PREPARED FOR:

CLEAN HARBORS COLFAX, LLC
3763 HIGHWAY 471
COLFAX, LA 71417

JANUARY 2022
FOCUS PROJECT NO. P-001467

PREPARED BY:

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1.0 QUALITY ASSURANCE PROJECT PLAN APPROVAL FORM AND DISTRIBUTION LIST

Project Title: Clean Harbors Colfax, LLC (CHC) (CDTS)
Trial Burn for Subpart X Closed Destruction Technology System
Colfax, Louisiana

Expected Trial Burn Date: TBD

Project Approvals:

Name/Function/Organization	Signature	Date
Facility Manager Clean Harbors Colfax, LLC		
Test Coordinator Focus Environmental, Inc.		
Emissions Sampling Team Leader TBD		
Laboratory Analysis Coordinator Test America, Inc.		
Quality Assurance Officer Focus Environmental, Inc.		

QAPP Approval Statement: The individuals listed above:

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

2) Agree that no testing methods will be modified. If modifications do occur to any sampling and analytical methods as specified in the associated trial burn plan, they are to be identified and explained in the sampling and analytical narratives and discussed in the body of the test report. Approval for modifications to the test program specified sampling and analytical methods will be requested as appropriate from the U.S. EPA Region 6 if the modification is minor or intermediate, and Research Triangle Park (RPT) if the modification is major.

QAPP Distribution List

Project Organization Title	Organization/Name
Test Project Manager	Clean Harbors Colfax, LLC
Test Coordinator	Focus Environmental, Inc.
Emissions Sampling Team Leader	TBD
Laboratory Analysis Coordinator	Test America, Inc.
Quality Assurance Officer	Focus Environmental, Inc.
Louisiana Department on Environmental Quality	LDEQ

The QAPP was distributed to these individuals, was read by the individuals, and they agree to the appropriate information pertaining to their project responsibilities as listed and provided in this QAPP.

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ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing Materials
B.P.	Boiling point
CAR	Corrective action request
CBC	Contained Burn Chamber
CDTS	Closed Destruction Technology System
CF	Calibration factor
CFR	Code of Federal Regulations
CHC	Clean Harbors Colfax LLC
CLP	Contract Laboratory Program
CMS	Continuous monitoring system
COC	Chain of Custody
DF	Deactivation Furnace
DI	Deionized (water)
DQO	Data quality objective
DRE	Destruction and removal efficiency
dscf	Dry standard cubic foot
dscfm	Dry standard cubic feet per minute
dscm	Dry standard cubic meter
dscmm	Dry standard cubic meters per minute
EPA	U.S. Environmental Protection Agency
g	grams
gr	Grains
GC/MS	Gas chromatograph/mass spectrometry
HRGC/HRMS	High resolution gas chromatograph/high resolution mass spectrometry
ICV	Initial calibration verification
ID	Induced Draft Fan
inwc	inches water column
kg	Kilograms
L	Liter
LAC	Laboratory Analysis Coordinator
lb or lbs	Pounds
LCS	Laboratory control standard
LDEQ	Louisiana Department on Environmental Quality
MDL	Method detection limit
mg	Milligrams
µg or ug	Micrograms
NA	Not applicable
ND	Not detected
ηg or ng	Nanograms
OB/OD	Open Burn / Open Detonation
PAS	Pollution Abatement System
PE	Performance evaluation
POHC	Principal organic hazardous constituent
ppm	Parts per million
ppmv or ppmdv	Parts per million dry volume
QA	Quality assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality control
RCRA	Resource Conservation and Recovery Act
RF	Response factor
RFA	Request for analysis
RPD	Relative percent difference

RSD	Relative standard deviation
SIM	selected ion monitoring
SOP	Standard operating procedure
TO	Thermal Oxidizer
USEPA	US Environmental Protection Agency

3.0 PROJECT DESCRIPTION

3.1 GENERAL

This Quality Assurance Project Plan (QAPP) delineates the quality assurance/quality control (QA/QC) procedures for the trial burn of the Clean Harbors Colfax, LLC's (CHC) Subpart X Closed Destruction Technology System (CDTS) located at the Colfax, Louisiana site. This section of the QAPP provides a summary of the trial burn program. The trial burn plan describes the test protocol in detail. This QAPP is intended for use in conjunction with the trial burn plan.

The CDTS is a Subpart X unit under the Resource Conservation and Recovery Act (RCRA). The CDTS consists of a contained burn chamber (CBC), deactivation furnace (DF), and an advanced pollution abatement system (PAS). The advanced PAS includes a high-temperature thermal oxidizer (TO), cyclone, gas cooler, dry sorbent injection system baghouse, HEPA filter, induced draft (ID) fan, and stack. The CDTS supplements the current open burn/open detonation (OB/OD) operations at the Colfax, LA site. The purpose of this test program is to demonstrate the Subpart X unit's performance is in compliance with relevant and appropriate United States Environmental Protection Agency (USEPA) and Louisiana Department of Environmental Quality (LDEQ) rules, regulations, and applicable guidance.

3.2 TEST OBJECTIVES

The objectives of this test program are to demonstrate the operation of the Subpart X unit has minimal adverse impact to human health and the environment, and to establish operating parameter limits (OPLs) to assure continued compliant operation. These objectives are summarized as follows and shown in Table 3-1:

1. Demonstrate the following performance and emissions standards;

   - Demonstrate destruction and removal efficiency (DRE) greater than or equal to 99.99% for the selected principal organic hazardous constituent (POHC).
   - Demonstrate gas particulate emissions are controlled to less than 0.08 gr/dscf @ 7%O_2 (grains per dry standard cubic foot corrected to seven percent oxygen)
   - Demonstrate 90% control efficiency of HCl/Cl_2 emissions when materials containing chlorine are processed.

2. Establish the following OPLs:

   - Minimum thermal oxidizer chamber temperature
   - Indicator of maximum combustion gas velocity through the PAS
   - Minimum pressure drop across the HEPA filter
   - Minimum sorbent feed rate when treating materials known to contain chlorine.

Table 3-1. Target Operational Standards

Parameter	Performance Standard or Emission Limit	
	Value	Units
Advanced Pollution Abatement System		
Destruction and Removal Efficiency	99.99	%
Particulate Matter Control	0.08	gr/dscf @ 7%O_2
HCl/Cl_2 Control	90	% control efficiency

3.3 TEST PROTOCOL

The proposed test program is composed of two (2) test conditions with three replicate sampling runs at each set of operating conditions.

- Test Condition 1 will demonstrate DRE performance of the POHC and control of HCl/Cl_2 emissions while treating ammonium perchlorate-based propellant and operating at minimum thermal oxidizer temperature.
- Test Condition 2 will demonstrate compliance with the emissions requirement for particulate matter while feeding a typical high ash content waste material.

The proposed POHC, naphthalene, was selected based on the difficulty of destruction as an EPA Thermal Stability Ranking Class 1 compound and also being representative of polyaromatic hydrocarbon (PAH) compounds anticipated to be potentially present in the waste feed to and associated emissions from the CDTS. The naphthalene will be metered to the thermal oxidizer inlet as ~20-25% solution in toluene. Sampling and monitoring protocols for the test program are summarized in Table 3-2.

3.4 QUALITY ASSURANCE PROJECT PLAN SCOPE

This QAPP presents the organization, objectives, functional activities and specific Quality Assurance (QA) and Quality Control (QC) activities for the trial burn to be performed at the Clean Harbors facility. This QAPP describes the specific QA/QC protocols that will be followed for sampling, sample handling and storage, chain-of-custody, and laboratory analysis during the test program. The QAPP is an integral part of the trial burn plan and is used in conjunction with the trial burn plan.

All QA/QC procedures will be in accordance with applicable professional technical standards, government regulations and guidelines, and specific project goals and requirements. This QAPP has been prepared in accordance with EPA QAPP guidance documents, in particular the following:

1. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans (QAMS-005/80)
2. Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration, EPA/625/6-89/023, January 1990.

3. EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5 EPA/240/B-01/003), March 2001.

4. American Society for Testing and Materials, "Annual Book of ASTM Standards," latest annual edition.

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

6. EPA, "Test Methods for Evaluating Solid Wastes Physical/Chemical Methods (SW-846)," Third Edition, 1986 and updates (December 1997).

7. Rules and Regulations of the State of Louisiana applicable to operators of Subpart X units.

8. Code of Federal Regulations, 40 CFR 264

9. EPA, "Guidance on Setting Permit Conditions and Reporting Trial Burn Results", Hazardous Waste Incineration Guidance Series (HWIGS), Volume II, 1989.

Table 3-2. CDTS Sampling and Analysis Methods

Sample Name	Sampling Location/ Access	Sampling Reference Method [1]	Sampling or Measurement Equipment	Sample Size/Frecuency	Analytical Parameters	Analytical Reference Method [1]	Demonstrated by Testing Condition	
							1	2
Exhaust Gas	Isokinetic Port	EPA Method 0010	Isokinetic Sampling Train	Nominal 3-hour composite sample performed with three ~1-hour cycle times constituting a run; target sampled volume is 3 dscm [2,3]	Naphthalene	GC/MS with selective ion monitoring (SIM) SW846-0010.8270	X	
Exhaust Gas	Non-Isokinetic Port	Method 26	Non-Isokinetic Sampling Train	Nominal 3-hour composite sample performed with three ~1-hour cycle times constituting a run target sampled volume is 2-3 dscm [2]	HCl/Cl_2	EPA Method 26	X	
Exhaust Gas	Isokinetic Port	Method 5	Isokinetic Sampling Train	Nominal 1-hour composite sample performed with one ~1-hour cycle time constituting a run; target sampled volume is 1 dscm [2,3]	Filterable Particulate	EPA Method 5		X

Notes:

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

[2] The exact volume of gas sampled will depend on the isokinetic sampling rate.

[3] Isokinetic sampling trains include:

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

4.0 ORGANIZATION OF PERSONNEL, RESPONSIBILITIES, AND QUALIFICATIONS

4.1 GENERAL

The project organization for this test is summarized in Figure 4-1. The Clean Harbors Facility Manager is responsible for oversight of all activities performed at the Clean Harbors site. During the testing, the Clean Harbors Facility Manager and other staff members will be available to lend support to the testing program where needed.

During the test, the Clean Harbors Test Project Manager, on behalf of the Clean Harbors Facility Manager, will be responsible for ensuring that the processes run properly and that the tested unit achieves the desired test conditions on each test day. As such, the Clean Harbors Test Project Manager, working through the Clean Harbors Facility Manager, will assign responsibilities the unit operations. The Clean Harbors Test Project Manager will be responsible for ensuring that all the applicable process data are collected during each of the test runs. The Clean Harbors Test Project Manager will also be responsible for supervising all the contractors associated with the program and will serve as the official communication link between Clean Harbors and the respective contractors and regulatory observers.

The Test Coordinator and Quality Assurance Officer from the Test Management Contractor are experienced in the technical coordination and QA/QC associated with the testing of combustion systems. The Emissions Sampling Contractor is experienced in conducting the emissions sampling called for in the trial burn plan and will conduct the emissions sampling for this project. The analytical laboratory is experienced in the analysis of emissions and process samples, and will provide analytical services for this project.

4.2 TEST COORDINATOR

The Test Coordinator is responsible for the execution of the trial burn plan, QAPP, preparation of the final test report, and interpretation of the test results. During the test, the Test Coordinator is responsible for the overall implementation of the test program. The Test Coordinator will serve as the focal point between the Clean Harbors Test Project Manager and the emissions sampling and spiking contractors on testing related matters, and will coordinate activities among various project team members. Specific Test Coordinator responsibilities include:

- Ensuring compliance with the trial burn plan and the QAPP by all project team members during the test
- Documenting testing activities in a field logbook
- Providing sample checklists, labels, and request for analysis (RFA) and chain of custody (COC) forms for use by the Emissions Sampling Contractor
- Assisting the Clean Harbors Test Project Manager in interfacing with the regulatory observers and/or oversight contractors during the test

- Providing coordination between the Clean Harbors Test Project Manager and the sampling and spiking teams during the test, especially regarding decisions to start, stop, hold, or repeat sampling runs
- Performing inspections of the process equipment, process controls, process operations, data acquisition and recording systems, and sampling activities for compliance with this QAPP and the trial burn plan
- Providing field review of process operating logs, and completed sample collection sheets, emissions sampling logs, COC forms, and RFA forms
- Interfacing with the Laboratory Analysis Coordinator while samples are being analyzed
- Interfacing with the other testing contractors while the emissions sampling, spiking, and other test data are being reduced
- Supervising production of the test reports
- Certifying the overall test results and the final test reports
- Preparing operating specifications for the system based on the results of the test.

4.3 QUALITY ASSURANCE OFFICER

The Quality Assurance Officer's (QAO's) responsibilities include the following:

- Assuring all individuals included in the QAPP Distribution List receive current copies of revisions as applicable
- Reviewing the emissions sampling and analytical reports for completeness and accuracy
- Conducting or coordinating any required audits of the data reduction or laboratory procedures to ensure compliance with the QAPP
- Conducting validation of the analytical data generated for completeness of the reports including documentation of the required QA/QC analyses and corrective actions.
- Preparing a report of the QA/QC activities that summarizes the findings, including a statement for inclusion in the trial burn report executive summary regarding if any of the test data are invalid or unusable.

4.4 SPIKING CONTRACTOR

The Spiking Contractor will have responsibility for the spiking the selected POHC to the thermal oxidizer inlet during the trial burn. The Spiking Contractor has the following responsibilities:

- Preparing and shipping the spiking equipment and materials to the test site
- Preparing and calibrating the spiking equipment
- Spiking the POHC to the thermal oxidizer inlet in accordance with the trial burn plan
- Recording spiking system operating data
- Notifying the Test Coordinator immediately of any difficulties or interruption of the spiking system operation
- Reducing spiking data and performing all calculations and QA activities required by the trial burn plan and QAPP
- Preparing a draft and final report of spiking activities.

4.5 EMISSIONS SAMPLING TEAM LEADER

The Emissions Sampling Team Leader will have overall responsibility for the collection and handling of all exhaust gas related samples. The Emissions Sampling Team Leader has the following oversight responsibilities:

- Preparing and shipping emissions sampling equipment to the test site
- Preparing and calibrating emissions sampling equipment
- Directing and/or participating in emissions sampling activities
- Recording field test data required by the emissions sampling methods
- Reviewing and approving emissions sample collection sheets and emissions sampling field data sheets
- Overseeing recovery of emissions sampling-related samples and preservation of those samples
- Taking custody of all emissions samples
- Notifying the Test Coordinator of all samples collected
- Initiating the COC and RFA documentation.
- Reducing emissions sampling data and performing all calculations and QA activities required by the emissions sampling methods
- Preparing a draft and final report of emissions sampling activities.

4.6 CLEAN HARBORS SYSTEM OPERATORS

The Clean Harbors system operators will be responsible for the operation of the CDTS. Their duties will include:

- Maintaining the CDTS unit within specified target limits
- Maintaining logs of process data as required
- Downloading and providing the CDTS operating data to the Test Coordinator in Microsoft Excel or ASCII format.

4.7 LABORATORY ANALYSIS COORDINATOR

The Laboratory Analysis Coordinator will have overall responsibility for the analysis of the exhaust gas samples. The Laboratory Analysis Coordinator has the following responsibilities:

- Receiving, verifying, and documenting that incoming field samples correspond to the sample chain of custody information
- Notifying the Emissions Sampling Team Leader, QAO, Test Coordinator and Clean Harbors Test Project Manager of any discrepancies or problems in the COC and RFA information, preservation, or sample condition
- Maintaining records of incoming samples
- Tracking samples through processing, analysis, and disposal
- Designating QC samples for analysis during the project

- Verifying that laboratory personnel are trained and qualified in specified laboratory QC and analytical procedures
- Verifying that laboratory QC and analytical procedures are being followed as specified in this QAPP, the laboratory specific QA/QC Plan, and the laboratory specific analytical standard operating procedures (SOPs)
- Reviewing QC and sample data during analysis and determining if repeat analyses are needed
- Submitting certified QC and sample analysis results and data packages to the Test Coordinator
- Notifying the QAO and Test Coordinator of any QC excursions during the preparation and analysis of the field samples or associated QC samples
- Archiving analytical data
- Preparing a statement of the analysis activities for inclusion in the trial burn report executive summary regarding if any of the test data are invalid or unusable.

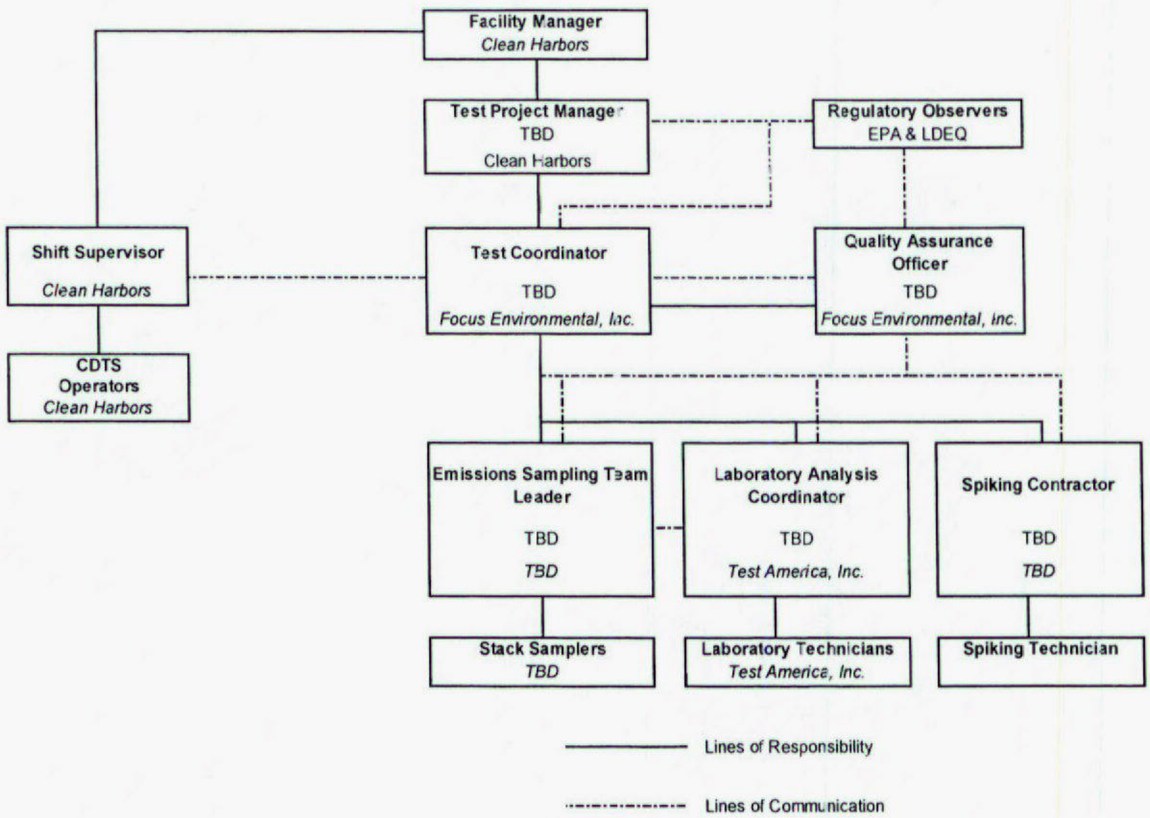

Figure 4-1. Clean Harbors Test Project Organization and Responsibility

5.0 QUALITY ASSURANCE OBJECTIVES AND QUALITY CONTROL OBJECTIVES

5.1 GENERAL

The project objectives are summarized in Section 3.0 of this QAPP. The selected emissions sampling contractor and the contract laboratory are well experienced in the types of sampling and analyses represented by this test program. The analytical laboratory will provide method detection limits and reporting limits for each analysis. The laboratory will provide the best and lowest detection limits for all testing parameters. Where analytical test methods are referenced, the current version of the test will be used.

The overall quality assurance objective is to produce a complete data set that can be used to fully assess and validate the operation of the Clean Harbors CDTS relative to the relevant and appropriate performance and emissions standards. This includes a number of quality indicators necessary to assess the precision and accuracy of all the test data.

The field and laboratory data obtained during this test will be reviewed by the QAO. The data quality will be discussed with respect to meeting each of the data quality objectives (DQOs) and the overall project objective. Data that are outside of the target DQO limits will be evaluated relative to the impact(s) on the overall project objective of assessing CDTS performance. The data evaluation and validation will be included in the final test report.

Table 5-1 presents target DQOs for precision and accuracy for each type of analysis that will be performed during the test program. QA/QC objectives for precision, accuracy, representativeness, completeness and comparability are defined in this section. Procedures and formulas for determining accuracy and precision are presented in Section 13.0 of this document. The following definitions briefly describe the meaning of each QA/QC objective:

Precision: A measure of mutual agreement among individual measurements of the same property, usually under "prescribed similar conditions." Various measures of precision exist depending on the prescribed similar conditions. If the number of samples is less than three, the precision is described as range percent or relative percent difference (RPD) from the average of replicate measured values for analysis of the same parameter. If the number of samples is three or greater, precision is best described in terms of relative standard deviation (RSD).

Accuracy: The degree of agreement of a measurement (or an average of measurements of the same parameter) X, with an accepted reference or true value, T. Accuracy is usually expressed as the difference between the two values, X - T, or the difference as a percentage of the reference or true value, 100 (X - T)/T, and sometimes expressed as a ratio, X/T. In some cases, accuracy is described as the percentage recovery of a known quantity of material added to a sample prior to analysis. Accuracy is a measure of the bias in a system.

Completeness: A measure of the amount of valid data obtained compared to the amount expected to be collected under normal conditions. Completeness is usually expressed as a percentage.

Representativeness: The degree to which data accurately and precisely represent a characteristic of a population, parameter variation at a sampling point, process condition, or an environmental condition.

Comparability: The confidence with which one set of data can be compared to another.

5.2 PRECISION AND ACCURACY

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

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

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

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

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

5.2.1 Method 0010 Naphthalene

A SW-846 Method 0010 sampling train will be used to sample the exhaust gas for emissions of the target POHC naphthalene. All of the XAD-2 resin traps prepared for use in the Method 0010 sampling train are spiked with an isotopically-labeled semivolatile sampling surrogate compound as noted in Table 5-1. Two of the XAD-2 resin traps prepared for this project will also have semivolatile matrix spikes applied and are retained by the laboratory. These two spiked XAD resin traps are then included with the field samples when they are returned to the laboratory for analysis. The recoveries of the semivolatile isotopically-labeled sampling surrogate and matrix spike compounds from these two retained XAD resin trap samples provide an accuracy assessment of the Method 0010 analytical methodology. The recovery of the isotopically-labeled sampling surrogates spiked onto every field-use XAD resin sample provides a field through analysis accuracy assessment of the Method 0010 methodology. Table 5-1 notes the RPD and RSD values for the Method 0010 analyses.

5.2.2 Exhaust Gas Particulate and Particle Size Distribution

Method 5 particulate matter samples desiccated to constant weight. The gravimetric analysis of the samples includes replicate weighings to assess analysis precision, reproducibility, and consistency. The analytical balance accuracy is verified using Class S weights.

5.2.3 Method 26 Chloride

The analysis of the Method 26 samples for chloride by Method 9056/9057 includes a system of MS/MSD analyses to evaluate the precision and accuracy of the ion chromatography analytical methodology.

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

5.2.4 Waste Feed Spiking

The delivered feed rates of various spiking materials are determined via the concentrations of the species in the spiking materials, and the rates that the spiking materials are linefeed to the TO. The spiking contractor must provide documentation of the spiking material compositions. Acceptable forms of documentation include the chemical manufacturer's certified assay and/or the preparer's certified composition or assay. This information must be brought to the site at the time of testing so the spiking rates can be verified against the test targets. The spiking material composition data shall also be included in the spiking report.

If the scales and differential weights methodology is utilized in measuring the feed rates of the spiking materials, the scales used shall be accurate to ± 0.1 pound (lb). The precision of individual scale readings/measurements shall also be to ± 0.1 lb. If continuous mass flow metering systems connected to a computer methodology is utilized, the mass flow instruments must be accurate to ± 0.1 lb with corresponding precision of individual readings/measurements of ± 0.1 lb.

5.3 DETECTION LIMITS AND REPORTING

How the detection limits will be used in data reduction and reporting is described in Section 11.0. The laboratory report will provide both the MDL and the laboratory specified reporting limit (RL). The laboratory will maintain on records documenting the MDL, and the RL determinations.

> *Reporting limits (RLs) are regarded as limits of quantitation, and are supported by a low standard. Standards may be used in the calibration that are lower than the RL, but no RL is reported that is not supported by a standard at an equivalent or lower concentration.*
>
> *Method detection limits (MDLs) are determined statistically based on analysis of low concentration spikes of the appropriate matrix that are*

then processed in the same manner as the samples. MDLs are determined using all the sample preparation and analysis steps as the samples. In addition, statistical analysis of method blanks is performed, and the highest result from either the MDL from the spiked matrix or statistical method blank data is used to set the MDL. If the statistical MDL does not support the RL, then the RL will be raised.

Generally, all non-detects for target analytes will be reported and assessed at the RL. If an analyte is detectable at some value between the MDL and the RL, the detected value will be reported and flagged as estimated. If matrix interference(s) occurs or sample dilutions are necessary, a sample specific MDL or sample quantitation limit (SQL) may be reported. If a sample specific MDL or SQL is applicable, the documentation of the serial dilutions or other measures taken to arrive at the SQL will be documented in the analytical report. The analytical report of any target analyte that is non-detect shall include the MDL and the RL, as appropriate.

For isotope dilution organic analysis methods, the non-detects for the isotope dilution methods will be determined using the SW-846 Method 8290 definition of an estimated detection limit (EDL) without the use of empirical factors or other mathematical manipulations specific to the laboratory.

5.3.1 Exhaust Gas Naphthalene

Sampling for naphthalene emissions for DRE determinations will be via Method 0010. The Method 0010 sampling train XAD-2 resin traps will be pre-spiked with an isotopically labeled sampling surrogate compound. The recoveries of the isotopically labeled surrogate spikes will demonstrate the required accuracy performance. The Method 0010 sampling train extracts for naphthalene via Method 8270D [gas chromatography/mass spectrometry (GC/MS)] with selected ion monitoring (SIM). (Refer to Section 7.5.5 of Method 8270C or Section 11.5.5 of Method 8270D.)

The normal naphthalene reporting limit (RL) for Method 8270D is 10 micrograms (ug) per semivolatile sampling train fraction, resulting in a sampling train total of 30 ug for the three distinct fractions (front-half, back-half, and condensate) that comprise the semivolatile organic sampling train analysis. The 10 ug per sampling train fraction is based on there being no splitting of the sampling extracts; the entire sample extract is used only for semivolatile analysis.

The SIM approach for naphthalene substantially reduces the naphthalene spiking rates necessary to demonstrate DRE, often to nominal rates. This is due to the greatly reduced in-gas detection limit. GC/MS analysis with SIM is comparable to HRGC/HRMS analysis for chlorinated dioxins/furans. The SIM approach is possible because naphthalene does not present any particular analysis difficulties and is highly distinguishable as a target analyte. Native naphthalene is normally present in the XAD-2 resin as an artifact of the manufacturing process detectable typically at 50-100 ng. Accounting for the expected background naphthalene level in the XAD-2, the planned trial burn naphthalene spiking rates are based on a sampling train detection limit of 120 ng (100 ng for the back-half fraction that in includes the XAD-2 resin, and 21 ng each for the front-half and condensate fractions). For a 105.9 dry standard cubic foot (dscf) [three (3) dry standard cubic meter (dscm)] exhaust gas sample, the in-gas detection limit is 0.040 ug/dscm (40 ng/dscm).

5.4 COMPLETENESS

Data completeness represents the percentage of valid data collected from the total number of valid tests conducted. Completeness is usually expressed as a percentage and calculated based on the number of samples reaching the laboratory for analysis. The completeness objective for the test will be met (100% completeness) if three valid test runs are obtained for each test condition. Samples resulting from test runs that are judged invalid based on field performance indicators or aborted runs will not be submitted to the laboratory for analysis. Because the possibility exists that a sample may be lost or broken, the data from each individual analytical parameter may not be 100 percent complete for all test runs. The impact of any occurrence of sample loss will be assessed with regard to the objective of obtaining valid runs and will be discussed in the test report. The completeness objective of this test program is to generate sufficient data for the regulatory agencies to judge the performance of the system. An overall completeness objective is to meet at least 90% of the total data quality objectives established in the QAPP. Contingency samples have been incorporated into the sampling design in an effort to gather complete data. Archive samples of most feeds and residues are collected as a contingency for breakage or analytical difficulties.

5.5 REPRESENTATIVENESS, SENSITIVITY AND COMPARABILITY

The sampling procedures chosen for the test are, wherever possible, approved EPA or SW-846 sampling methods that are typically employed on thermal treatment tests. The use of standard sampling methods affirms sample representativeness.

Sensitivity for this test is a function of the sample matrix, the sample size, and the analytical detection limit. The sample sizes chosen for each sample matrix are such that the collected sample is greater than the sample volume/mass required for each analytical method to obtain an acceptable quantitation limit for the project. Calculations have been provided as part of the test plan to indicate that the selected sample sizes and analytical methods are appropriate for critical test determinations.

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

Table 5-1. Test Analytical Data Quality Objectives

Parameter	QC type	Precision	Accuracy
Method 0010 Sampling Train Naphthalene			
Method 0010 Naphthalene	Spiked Resin Blanks	≤ 25% RPD	75-125%
	Semivolatile Sampling Surrogate Spike	≤ 35% RSD	Note b
	Semivolatile Surrogate Spikes	≤ 35% RSD	Note a
	Semivolatile Matrix Spikes	≤ 35% RSD	70-130%
Method 5 Sampling Train, Particulate			
Particulate Matter	Replicate Weighings	± 0.5 mg	± 0.5 mg
Method 26 Sampling Train, HCl/Cl_2			
Hydrogen Chloride/Chlorine	Duplicates	≤ 35% RPD	---
	Matrix Spikes	≤ 35% RPD	± 30%
	Laboratory Control Sample	---	± 10%
Temporary Continuous Emissions Monitors			
Carbon Dioxide	Method 3A	---	± 0.5% CO_2 for Three Point Calibration
Oxygen	Method 3A	---	± 0.5% O_2 for Three Point Calibration
POHC Spiking			
Spiking Materials Composition/Concentration	Preparation Documentation/Certified Composition/Manufacturers' Specifications	± 1 % of expected final concentration/purity	± 1 % of expected final concentration/purity
Scales (for differential weights approach)	Pre- & Post-Test Calibration	± 0.1 lb up- and downscale check	± 0.1 lb
Continuous Mass Flow Metering Systems (if used)	Pre- & Post-Test Calibration	± 0.1 lb	± 0.1 lb

Note a: Internal Standard Compound Spike Recoveries (Method 8270 with SIM)

Compound	Filter/Probe Rinse Target Recovery	Solid, XAD-2 Resin Target Recovery	Aqueous Target Recovery
Naphthalene-d_8	30-140%	30-140%	30-140%

Note b: Method 0010 Semivolatile Sampling Surrogate Compound Recovery (Method 8270 with SIM)

Compound	Solid, XAD-2 Resin Target Recovery
$^{13}C_6$Naphthalene	30-140%

Grav – gravimetric
QC - quality control
RPD - relative percent difference
RSD - relative standard difference

6.0 SAMPLING AND MONITORING PROCEDURES

6.1 GENERAL

The objectives of this test program are the collection of representative exhaust gas samples that will demonstrate compliance of the CDTS with the relevant and appropriate performance and emissions standards. To meet these objectives requires minimizing the potential sources sample contamination or bias imparted to the samples by the sampling equipment, ambient conditions, handling, and preservation. The test program samples will be collected using the methods summarized in Table 6-1. The total numbers of field samples expected to be generated during the performance demonstration test is summarized in Table 6-1.

Guidelines followed to determine sampling equipment to be used, sampling points, and the frequency at which samples are to be taken are presented in Section 5.0 of the trial burn plan, and are incorporated here by reference. The reference sources for the standard sampling method references include: Appendix A to 40 CFR 60, *Test Methods and Procedures, New Source Performance Standards*, 40 CFR 60 (EPA) and the *Test Methods for Evaluating Solid Waste*, SW-846, Third Edition, 1986 and updates (SW-846). Regulatory observer approval will be requested if significant deviations from planned procedures are encountered during the testing.

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

Process samples will be collected using dedicated sampling equipment at each sampling location, thus eliminating the potential for cross contamination from one sample matrix to another. New sampling containers are used for each test run. During the test program, the CDTS will be operated and tested at the conditions specified in the trial burn plan. The following samples will be collected during the test:

- Exhaust Gas Samples
  - SW-846 Method 0010 for Naphthalene
  - EPA Method 26 for Hydrogen Chloride, and Chlorine
  - EPA Method 5 for Particulate Matter.

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

6.2 FIELD SAMPLING METHODS

6.2.1 Exhaust Gas Samples

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

EPA Method 1 and cyclonic flow checks will be used to select the single point isokinetic sampling location. Documentation of the Method 1 and cyclonic checks will be included in the emissions sampling report. EPA Method 2 will be used to determine the exhaust gas flow rate.

EPA Method 3A, continuous sampling, will be used to determine the exhaust gas concentrations of oxygen and carbon dioxide for dry gas molecular weight determination. Certified calibration gases containing at least 5 percent volume carbon dioxide and/or at least 5 percent volume oxygen may be used as reference standards for the analyzers. Ambient air may be used as a reference standard for the oxygen analyzer.

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

6.2.1.1 Method 0010

A Method 0010 sampling train will be used to sample exhaust gas for naphthalene. During each test run, the Method 0010 sampling train will be assembled and leak checked. As required by Method 0010, the sampling train will be operated to sample a minimum of 105.9 dry standard cubic feet (dscf) [3.0 dry standard cubic meters (dscm)] of exhaust gas during each sampling run. At the end of each run, the sampling train will be disassembled and all train samples collected. The recovery of the sampling train includes consecutive rinses of acetone (in-lieu-of methanol) and methylene chloride. The acetone and methylene chloride rinses are collected together.

The extracts from the Method 0010 sampling train will be analyzed for naphthalene via Method 8270D GC/MS with selected ion monitoring (SIM). (Refer to Section 7.5.5 of Method 8270C or Section 11.5.5 of Method 8270D.) The Method 0010 sampling train front half, back half, and condensate components are prepared and analyzed as separate fractions.

The first fraction, the front-half fraction, consists of the solvent probe rinses and the particulate filter. The particulate filter and front half acetone/methylene chloride rinse samples will be combined. Isotopically labeled naphthalene is spiked directly onto the filter before the Soxhlet extraction. The sample is then Soxhlet extracted for 18 hours using methylene chloride and the methylene chloride extract is recovered.

The second fraction consists of the XAD-2 resin and condenser rinses. The XAD-2 resin and condenser acetone/methylene chloride rinse samples will be combined. Isotopically labeled naphthalene is directly onto the XAD-2 resin before the Soxhlet extraction. The sample is then Soxhlet extracted for 18 hours using methylene chloride and the methylene chloride extract is recovered.

The third fraction consists of the condensate impinger catch and rinses. The condensate impinger catch is volumetrically or gravimetrically measured in the field, and this information is added to the emissions sampling data sheet to calculate the moisture content of the exhaust gas. In the laboratory, the condensate impinger sample is placed in a separatory funnel and isotopically labeled naphthalene surrogate is added. The sample is then separatory funnel extracted using methylene chloride and deionized water.

6.2.1.2 EPA Method 26

An EPA Method 26 sampling train will be used to sample for HCl and Cl_2, during each test run. The exhaust gas is sampled by bubbling the gas through impingers containing 0.1N H_2SO_4 (acid) and 0.1N NaOH (basic) solutions in series. In the acid impinger solution, HCl gas is captured. Any Cl_2 passes through to the acid impinger and is captured in the basic impinger solution. The chloride concentrations of the acidic and basic impinger samples are analyzed separately for chloride ion by SW 846 Method 9056/9057, and are reported as HCl and Cl_2 catches respectively. Precision for these samples is determined through the use of duplicate analyses of calibration standards, QC samples, and field samples. Accuracy is determined by matrix spike/ matrix spike duplicate analyses. Additional matrix specific quality control is provided by separate matrix specific calibrations being analyzed prior to sample analysis.

6.2.1.3 EPA Method 5

An EPA Method 5 sampling train will be used to sample the exhaust gas for particulate. The exhaust gas filterable particulate emissions are determined by separate analysis of the Method 5 sampling train tare weighed filter and the front-half acetone probe rinses.

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

The acetone probe rinse and impinger water fractions are analyzed separately. Each fraction is transferred to separate tare weighed flasks, evaporated and dried to constant weight to the nearest 0.1 mg. Constant weights shall mean a difference between two consecutive weighings of no more than 0.5 mg.

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

The Method 5 analyses include acetone reagent and de-ionized water reagent blanks to assess blank contamination. Precision for the particulate analyses is determined via replicate weighings. Accuracy is determined by using Class-S weight to verify the scale accuracy.

6.2.2 Spiked Resin Blanks

Two XAD-2 resin traps prepared for the Method 0010 sampling train will be spiked with sampling surrogates and internal standards. These samples will be extracted and analyzed for naphthalene by the XAD-2 trap preparation laboratory to demonstrate the resin is free of background contamination, and to confirm that efficient surrogate recoveries are achievable.

6.2.3 Blank Trains and Reagent Blanks

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

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

Table 6-1. Sample Collection Methods, Equipment, and Frequency
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Sample Name	Sampling Reference Method	Sample Container	Analysis	General Procedure/Frequency	Test 1	Test 2	Field QC	Total Field Samples
POHC Spike	ASTM D-4057, E-300-86	100 mL glass sample bottle	Naphthalene	Collect one 100 mL bottle of once during each test run	3	--	--	3
Method 0010 Particulate Filter	SW846 Method 0010	Petri Dish	Naphthalene	Collect integrated sample for Naphthalene during each test run. Sample for a minimum 180 minutes to sample a minimum of 3.0 dry standard cubic meters of exhaust gas.	3	--	1-blank train	4
Method 0010 Front Half Acetone and Methylene Chloride Rinses		500 mL glass sample bottle	Naphthalene		3	--	1-blank train	4
Method 0010 XAD-2 Resin		Resin Trap	Naphthalene		3	--	1-blank train	4
ethod 0010 Back Half :etone and Methylene hloride Rinses		500 mL glass sample bottle	Naphthalene		3	--	1-blank train	4
Method 0010 Condensate		1-liter glass sample bottle	Naphthalene		3	--	1-blank train	4
Method 0010 Acetone Reagent Blank	SW846 Method 0010	250 mL glass sample bottle	Naphthalene	Reagent Blank	--	--	1	1
Method 0010 Methylene Chloride Reagent Blank	SW846 Method 0010	250 mL glass sample bottle	Naphthalene	Reagent Blank	--	--	1	1
Method 5 Particulate Filter	EPA Method 5	Petri Dish	Particulate	Collect integrated sample for particulate during each test run.	--	3	--	3
Method 5 Front Half Acetone Rinses		250 mL glass sample bottle	Particulate		--	3	--	3

Table 6-1. Sample Collection Methods, Equipment, and Frequency

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Sample Name	Sampling Reference Method	Sample Container	Analysis	General Procedure/Frequency	Test 1	Test 2	Field QC	Total Field Samples
Method 5 Particulate Filter Reagent Blank	EPA Method 5	Petri Dish	Particulate	Reagent Blank	--	--	1	1
Method 5 Acetone Reagent Blank	EPA Method 5	250 mL glass sample bottle	Particulate	Reagent Blank	--	--	1	1
Method 26 Sulfuric Acid Impingers and Rinses	Method 26	1-liter glass sample bottle	Chloride Ion	Collect integrated sample for HCl/Cl2 during each test run.	3	--	--	3
Method 26 Sodium Hydroxide Impingers and Rinses		500 mL glass sample bottle	Chloride Ion		3	--	--	3
Method 26 Deionized 'ater Reagent Blank	Method 26	250 mL glass sample bottle	Chloride Ion	Reagent Blank	--	--	1	1
ethod 26 Sulfuric Acid eagent Blank	Method 26	250 mL glass sample bottle	Chloride Ion	Reagent Blank	--	--	1	1
Method 26 Sodium Hydroxide Reagent Blank	Method 26	250 mL glass sample bottle	Chloride Ion	Reagent Blank	--	--	1	1
Carbon Dioxide and Oxygen	EPA Method 3A	Temporary Continuous Emissions Monitor	Carbon Dioxide and Oxygen	Continuous during each test run	--	--	--	--
TOTAL SAMPLES								42

7.0 SAMPLE HANDLING, TRACEABILITY, AND HOLDING TIMES

7.1 SAMPLE CUSTODY AND SECURITY

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

During the test, sample custody will be the responsibility of the Emissions Sampling Contractor until the samples arrive at the analytical laboratory. When overnight couriers are utilized, the air bill will serve to document the transfer of custody from the Emissions Sampling Team Leader to the courier. The courier's air bill becomes part of the chain of custody (COC) record. Upon transfer of the samples from the courier to the analytical laboratory, sample custody will be maintained by the analytical laboratory performing the analyses.

Samples for organic analysis (Method 0010, etc.) will be kept on ice (4 ± 2°C) and shipped to the analytical laboratory in sealed, insulated shipping containers. All ice used for shipping samples shall be double bagged in Ziplock® bags to prevent leakage of water during shipping. "Blue ice" may also be used to chill samples. Samples not requiring chilling (particulate, chloride, etc.) may be shipped in sealed shipping containers without ice.

7.2 SAMPLE IDENTIFICATION

Refer to Figure 7-1. In consultation with the Test Coordinator, the Laboratory Analysis Coordinator will prepare the master sample list for the test program. Once the master sample list is set, the alpha-numeric sample numbers will be assigned to every sample. The sample numbers are used to track individual samples from collection through analysis. From the master sample list, the analytical laboratory will prepare the pre-labeled EPA Class III clean sample containers for field use and the XAD-2 resins according to the specifications of the methods as described in the test plans. These items will be shipped to the test site in sealed transport containers. The emissions sampling contractor will provide the sampling reagents for field use.

7.3 EXHAUST GAS SAMPLE COLLECTION FORMS

While emissions sampling is being performed, the sampling technician will complete an emissions sampling record. An example emissions sampling record for isokinetic sampling is presented as Figure 7-2. The emissions sampling record will be completed in its entirety for every sampling train. This will provide information necessary to perform the emissions calculations. The sampling technician shall provide the completed emissions sampling record to the Emissions Sampling Team Leader at the completion of each sampling run.

7.4 SAMPLE LABELING

An example sample label format is presented in Figure 7-3. Each sample container will be labeled to show the source of the sample as Clean Harbors; the project identification; sampler's initials; laboratory to which the sample will be shipped; the unique alphanumeric sample number; date and time; sample description; test number; and run number. If a single sample requires multiple containers, the number of the container and the total number of containers will be noted on the label. Project samples will be tracked via the assigned unique alphanumeric sample numbers. The sample number will appear on the sample label, the request for analysis (RFA), and the chain of custody (COC).

7.5 SAMPLE COLLECTION CHECKLIST

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

7.6 REQUEST FOR ANALYSIS/CHAIN OF CUSTODY

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

7.7 SAMPLE SHIPMENT

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

Prior to shipping any samples, the Emissions Sampling Team Leader will verify the condition of the samples: sample temperatures for organic analyses samples, condition of all containers, level of sample within all containers (to be marked on the outside of the container), and type of packing material used. RFA/COCs will be checked to verify there is a RFA and COC for every sample being shipped. Before shipping the samples from the site, the Emissions Sampling Team Leader shall make a photocopy set of all the RFA/COCs to remain with the Test Coordinator or QAO.

7.8 SAMPLE DELIVERY

Upon receipt of samples at the laboratory, the receiver will accept custody for the shipment by an exchange of signatures with the delivering agent. The shipping containers will be opened by the Laboratory Analysis Coordinator or his designee and inspected. The container contents will verified against the accompanying RFA/COC. Any damage to the contents of the shipping container or deviations from the original shipment documents will be noted on the COC. A labeled temperature blank (labeled container vial with water) will be shipped in every container with samples for organic analysis expressly for the purpose of determining sample temperatures. <u>The Laboratory Analysis Coordinator or designee will, immediately upon opening the sample packaging, open the temperature blank and measure the temperature of the water inside the temperature blank using a thermometer.</u> This temperature will be recorded on the COCs and any applicable laboratory documentation (sample receipt log).

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

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

7.9 SAMPLE PRESERVATION

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

XAD-2 traps and other train sample components for the Method 0010 trains will be preserved after sampling by placing them in a cooler on double bagged ice or blue ice. Condensate and solvent samples from these sampling trains may be stored and shipped with the XAD-2 traps.

All process samples will be stored separately and away from the exhaust gas samples, and shipped in separate packages to preclude possible contamination of the exhaust gas samples.

For non-organic analysis exhaust gas samples (particulate, chloride, etc.), sample preservatives (if applicable, refer to Table 7-1) will be used as required by the target analyte. These samples will be stored in dedicated sample packaging or coolers. These samples do not require chilling.

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

Parameter	Sample Name/Matrix	Sample Containers	Preservation	Maximum Holding Time
Naphthalene Spike	Naphthalene in Toluene	100 mL bottle	Chill to 4°C	14 days
Exhaust Gas Naphthalene	Exhaust Gas Method 0010 filter	Glass petri dish	Chill to 4°C	14 days until extraction, 30 days after extraction
	Exhaust Gas Method 0010 sorbent tube	Standard cartridge wrapped in aluminum foil and sealed in plastic bag	Chill to 4°C	14 days until extraction, 30 days after extraction
	Exhaust Gas Method 0010 solvents	Amber glass Boston round bottles with Teflon-lined caps	Chill to 4°C	14 days until extraction, 30 days after extraction
	Exhaust Gas Method 0010 condensate	Amber glass Boston round bottles with Teflon-lined caps	Chill to 4°C	14 days until extraction, 30 days after extraction
Exhaust Gas Particulate	Method 5 filter	Glass or plastic petri dish	NA	180 days
	Method 5 probe rinses	Amber glass Boston round bottles with Teflon-lined caps	NA	180 days
Exhaust Gas Chloride	Method 26 impinger liquids	Amber glass Boston round or with Teflon-lined caps or polyethylene bottles	NA	28 days

Table Notes:

[a] Reference: Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration, EPA/625/6-89/023, January, 1990 and promulgated method.

Clean Harbors CDTS Trial Burn
Colfax, LA
Focus Project No. P-001467

Test America, Knoxville, TN

Trial Burn MASTER SAMPLE LIST

Field Sample No.		Test No.	Run No.	RFA/COC No.	Sample Source	Sample Description	Sample Container	Analytical Parameters	Analytical Laboratory	QC Analysis
K-	3010	1	1	001	PCHC Spiking System	Naphthalene Spike	100 mL bottle	Metals & Hg	TA, Knoxville	
K-	3011	1	1	002	Method 0010	Particulate Filter	Petri dish	Naphthalene	TA, Knoxville	
K-	3012	1	1	002	Method 0010	Front-half Acetone & MeCl Rinses	250 mL amber bottle	Naphthalene	TA, Knoxville	
K-	3013	1	1	002	Method 0010	XAD-2 resin trap	Resin trap	Naphthalene	TA, Knoxville	
K-	3014	1	1	002	Method 0010	Back-half Acetone & MeCl Rinses	250 mL amber bottle	Naphthalene	TA, Knoxville	
K-	3015	1	1	002	Method 0010	Condensate	1-liter amber	Naphthalene	TA, Knoxville	
K-	3016	1	1	003	Method 26	H2SO4 Impingers	500 mL amber bottle	Chloride Ion	TA, Knoxville	DUP
K-	3017	1	1	003	Method 26	NaOH Impingers	500 mL amber bottle	Chloride Ion	TA, Knoxville	DUP
K-	3018	1	2	001	PCHC Spiking System	Naphthalene Spike	100 mL bottle	Metals & Hg	TA, Knoxville	
K-	3019	1	2	002	Method 0010	Particulate Filter	Petri dish	Naphthalene	TA, Knoxville	
K-	3020	1	2	002	Method 0010	Front-half Acetone & MeCl Rinses	250 mL amber bottle	Naphthalene	TA, Knoxville	
K-	3021	1	2	002	Method 0010	XAD-2 resin trap	Resin trap	Naphthalene	TA, Knoxville	
K-	3022	1	2	002	Method 0010	Back-half Acetone & MeCl Rinses	250 mL amber bottle	Naphthalene	TA, Knoxville	
K-	3023	1	2	002	Method 0010	Condensate	1-liter amber	Naphthalene	TA, Knoxville	
K-	3024	1	2	003	Method 26	H2SO4 Impingers	500 mL amber bottle	Chloride Ion	TA, Knoxville	DUP
K-	3025	1	2	003	Method 26	NaOH Impingers	500 mL amber bottle	Chloride Ion	TA, Knoxville	DUP
K-	3026	1	3	001	PCHC Spiking System	Naphthalene Spike	100 mL bottle	Metals & Hg	TA, Knoxville	
K-	3027	1	3	002	Method 0010	Particulate Filter	Petri dish	Naphthalene	TA, Knoxville	
K-	3028	1	3	002	Method 0010	Front-half Acetone & MeCl Rinses	250 mL amber bottle	Naphthalene	TA, Knoxville	
K-	3029	1	3	002	Method 0010	XAD-2 resin trap	Resin trap	Naphthalene	TA, Knoxville	
K-	3030	1	3	002	Method 0010	Back-half Acetone & MeCl Rinses	250 mL amber bottle	Naphthalene	TA, Knoxville	
K-	3031	1	3	002	Method 0010	Condensate	1-liter amber	Naphthalene	TA, Knoxville	
K-	3032	1	3	003	Method 26	H2SO4 Impingers	500 mL amber bottle	Chloride Ion	TA, Knoxville	DUP
K-	3033	1	3	003	Method 26	NaOH Impingers	500 mL amber bottle	Chloride Ion	TA, Knoxville	DUP
K-	3034	1	QC	002	Method 0010	Particulate Filter	Petri dish	Naphthalene	TA, Knoxville	BT
K-	3035	1	QC	002	Method 0010	Front-half Acetone & MeCl Rinses	250 mL amber bottle	Naphthalene	TA, Knoxville	BT
K-	3036	1	QC	002	Method 0010	XAD-2 resin trap	Resin trap	Naphthalene	TA, Knoxville	BT
K-	3037	1	QC	002	Method 0010	Back-half Acetone & MeCl Rinses	250 mL amber bottle	Naphthalene	TA, Knoxville	BT
K-	3038	1	QC	002	Method 0010	Condensate	1-liter amber	Naphthalene	TA, Knoxville	BT
K-	3039	1	QC	002	Method 0010	Acetone reagent blank	250 mL amber bottle	Archive	TA, Knoxville	RB
K-	3040	1	QC	002	Method 0010	MeCl reagent blank	250 mL amber bottle	Archive	TA, Knoxville	RB
K-	3041	1	QC	003	Method 26	H2SO4 reagent blank	250 mL amber bottle	Chloride Ion	TA, Knoxville	RB
K-	3042	1	QC	003	Method 26	NaOH reagent blank	250 mL amber bottle	Chloride Ion	TA, Knoxville	RB
K-	3043	1	QC	003	Method 26	DI water reagent blank	250 mL amber bottle	Chloride Ion	TA, Knoxville	RB

Figure 7-1. Example Master Sample List

Isokinetic Stack Sample Data Collection Sheet

Contract No.	P-001467	Method: Mehoc 0010				Page 1 of 2	
Facility	Clean Harbors, Colfax, LA	Initial Leak Rate (ft^3 @ in.Hg)	<0.010 @ 10"			Operator	MJK
Source	CDTS	Final Leak Rate (ft^3 @ in.Hg)	<0.010 @ 10"			Pitot No.	K-004
Date		Start Time	0800	Meter No.	1442	PTCF	0.84
Condition No.	3	End Time	1315	DGMCF	1.004	Init. Pitot Leak Check	0.0
Run No.	1	Duration (min)	180	ΔH@	1.645	Final Pitot Leak Check	0.0
Stat. Press. (in. H_2O)	-0.94	Bar. Press. (in.Hg)	29.73	Nozzle Dia.( )	0.251	Kf	2.3

Point	Time	Volume	ΔP	ΔH	Temperatures (°F)							Vacuum
No.	(24 Hr)	(ft^3)	(in. H_2O)	(in. H_2O)	Flue Gas	Probe	Filter	Impingers	Meter in	Meter Out	Cond. Exit	(in. Hg)
1	0800	704.25	0.78	1.79	294	225	258	68	103	105	NA	6.0
2	0805	707.88	0.78	1.79	294	260	257	67	105	104		6.0
3	0810	711.50	0.74	0.17	294	257	261	66	106	104		6.0
4	0815	714.96	0.74	1.7	294	261	258	66	107	104		6.0
5	0820	718.09	0.68	1.56	292	258	257	64	108	104		6.0
6	0825	721.50	0.68	1.56	292	257	258	63	109	104		6.0
7	0830	725.36	0.77	1.77	292	258	258	67	104	104		6.0
8	0835	729.35	0.77	1.77	292	258	256	67	109	103		6.0
9	0840	733.20	0.77	1.7	293	258	259	61	110	104		6.0
10	0845	737.10	0.77	1.7	289	256	258	61	108	104		6.0
11	0850	740.67	0.74	1.43	285	259	255	62	106	105		6.0
12	0855	744.12	0.74	1.43	290	258	255	62	105	103		6.0
STOP	0900	747.21										
1	0915	747.42	0.62	1.77	292	255	259	66	96	95		7.0
2	0920	750.94	0.62	1.77	292	259	257	65	96	95		7.0
3	0925	754.76	0.77	1.43	293	257	257	62	99	95		7.0
4	0930	758.21	0.77	1.29	289	257	258	62	102	95		6.0
5	0935	761.52	0.62	1.04	285	258	257	62	104	97		6.0
6	0940	764.52	0.56	1.1	290	257	253	61	106	99		7.0
7	0945	767.79	0.45	1.5	296	257	257	63	109	100		6.0
8	0950	767.92	0.56	1.5	296	253	258	64	111	101		6.0
9	0955	774.51	0.45	0.99	296	257	259	61	112	103		6.0
10	1000	777.52	0.44	0.94	297	258	258	60	112	104		5.5
11	1005	780.47	0.65	0.85	297	259	258	61	113	105		5.5
12	1010	783.17	0.65	0.85	294	258	257	61	112	105		5.5
STOP	1015	785.94										
Comments: 2/3 one-hour cycles of CDTS												

Figure 7-2. Example Exhaust Gas Sampling Record

Clean Harbors CDTS Trial Burn
Colfax, LA
Focus Project No. P-001467

Sample Type:	Method 0010 Filter	**Sample No.:**	**K-3011**
Test No. 1	**Run No.** 1	**Container(s):**	1 of 1
Analysis Required:	Naphthalene		
Analysis Laboratory:	Test America, Knoxville, TN		
Date:		**Initials:**	MJK
Time:	1415	**Preservation:**	NA

Figure 7-3. Example Sample Label Format

Request for Analysis/Chain of Custody No. 002
Clean Harbors CDTS Trial Burn
Colfax, LA
Focus Project No. P-001467

Project Description:	CDTS Trial Burn Program
Client Project No.:	P-001467
Test America Project No:	XXXXXXX
Client Project Mgr:	Chris McBride 865-692-8662
Test America Contact:	Courtney Adkins 865-291-3019
Test America Project Mgr:	Dr. William C. Anderson 865-291-3080

Laboratory Deliverable Requirements

Analytical Due Date: 21 days from lab receipt

Data Package Due Date: 30 days from lab receipt

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

Laboratory Destination:
Laboratory Destination
Test America-Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
(865)-291-3000
Courier: Hand deliver

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

Holding Time Requirements:	
Extraction	14 days
Analysis after extraction	30 days

Field Sample No.		Test No.	Run No.	Sample Collection Date/Time	Sample Container	Sample Description	Analysis Specifications	Project QC Requirements
K-	3011	1	1		Petri dish	Method 0010 Train Particulate Filter	Combine this sample with the corresponding front half solvent rinses, Sample No. K-3012. Soxhlet extraction and analysis for Naphthalene by Method 8270 with selective ion monitoring (SIM)	
K-	3012	1	1		250 mL amber bottle	Method 0010 front half solvent rinses	Combine this sample with the corresponding filter, Sample No. K-3011.	
K-	3013	1	1		Resin trap	Method 0010 XAD-2 Resin	Combine this sample with the corresponding back half solvent rinses, Sample No. K-3014. Soxhlet extraction and analysis for Naphthalene by Method 8270 with selective ion monitoring (SIM)	
K-	3014	1	1		250 mL amber bottle	Method 0010 back half solvent rinses	Combine this sample with the corresponding XAD-2 resin, Sample No. K-3013.	
K-	3015	1	1		1-liter amber	Method 0010 condensate	Separatory funnel extraction and analysis for Naphthalene by Method 8270 with selective ion monitoring (SIM)	

Figure 7-4. Example Request for Analysis

Request for Analysis/Chain of Custody No. 002
Clean Harbors CDTS Trial Burn
Colfax, LA
Focus Project No. P-001467

Sample Receipt Log and Condition of the Samples Upon Receipt

Please fill in the following information: Comments

(Please write "NONE" if no comment is applicable.)

(1) Record the identities of any samples that were listed on the Request for Analysis form but were not found in the sample shipment ______________________

(2) Record the sample shipping cooler temperature of all coolers transporting samples listed on the Request for Analysis form. ______________________

(3) Record any apparent sample loss or breakage.

(4) Record any unidentified samples transported with this shipment of samples. ______________________

(5) Indicate if all samples were received according to the project's required specifications (i.e, no non-conformances). ______________________

Custody Transfer

Relinquished by: ______________________
Name Company Date/Time

Accepted by: ______________________
Name Company Date/Time

Relinquished by: ______________________
Name Company Date/Time

Accepted by: ______________________
Name Company Date/Time

Relinquished by: ______________________
Name Company Date/Time

Accepted by: ______________________
Name Company Date/Time

Figure 7-5. Example Chain of Custody

8.0 SPECIFIC CALIBRATION PROCEDURES AND FREQUENCY

8.1 GENERAL

Equipment and instruments used to generate data for determining compliance with performance requirements or to establish quantitative allowable operating limits will be calibrated according to the manufacturer's instructions, prior to and/or during the test as necessary. The calibration procedures are separated into groups according to the personnel who will perform them. Clean Harbors operations personnel will calibrate the process instruments. Emissions sampling equipment will be calibrated by the emissions sampling contractor. Analytical instruments will be calibrated by the contracted laboratory personnel. Spiking system scales and metering systems will be calibrated by the spiking contractor. The calibration procedures for process instrumentation, exhaust gas sampling, laboratory analytical instruments, and spiking measurement systems are described in the following subsections.

8.2 PROCESS INSTRUMENTATION

The parameter continuous monitoring system (CMS) (thermocouples, flow meters, pressure transducers, etc.) will be calibrated in accordance with Clean Harbors SOPs based on manufacturer recommendations.

8.3 EMISSIONS SAMPLING EQUIPMENT

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

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

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

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

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

8.3.1 Pitot Tubes

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

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

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

8.3.2 Differential Pressure Gauges

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

8.3.3 Digital Temperature Indicator

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

8.3.4 Dry Gas Meter and Orifice

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

8.3.4.1 Dry Gas Meter

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

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

8.3.4.2 Orifice

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

8.3.5 Barometer

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

8.4 LABORATORY ANALYTICAL EQUIPMENT

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

8.5 SPIKING METERING SYSTEMS

The delivered feed rates of various spiking materials are determined via the concentrations of the species in the spiking materials, and the rates that the spiking materials are transferred to the waste feed line.

If the scales and differential weights methodology is utilized, the differential weights will be recorded at no less than every 10 minutes during the course of testing. Differential feed rates shall be reported to the nearest 0.1 lb. Up- and downscale calibration checks of the scales will be performed as part of the spiking equipment setup, and at the conclusion of their use before the scales are recovered for transport from the site or relocated for testing of another on-site unit. The scale checks must include zeroing and range up to at least 50 pounds over the maximum weight of any container of spiking material that may be placed on the scale. The up- and downscale calibration check increments shall not exceed 100 pounds. The pre- and post-test calibrations of each scale used during testing must be documented and the documentation included in the spiking report.

If continuous mass flow metering systems connected to a personal computer methodology is utilized, the mass flows and differential weights will be electronically recorded at no less than every minute during the course of testing. Differential feed rates shall be reported to the nearest 0.1 lb. Pre- and post-test calibrations of each mass flow metering system used during testing must be performed. Calibrations may be performed at the spiking contractor's shop or on-site. Calibrations shall be performed using a system of scales and containers with each mass flow meter operated collecting data for a minimum of 30 minutes. Electronically recorded mass transfer calibration check data shall be compared to the calibration measurements via scales and differential weights. Up- and downscale calibration checks shall be performed on the scales used in the mass flow metering system calibrations. The scale checks must include zeroing and range up to at least 50 pounds over the final weight of either the service or catch container used for the calibration check. The up- and downscale scale calibration check increments shall not exceed 100 pounds. The continuous mass flow metering system calibration checks, and the up- and downscale scale calibration checks, must be documented and the documentation included in the spiking report.

Table 8-1. Sampling Equipment Calibration Requirements

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

Table 8-1. Sampling Equipment Calibration Requirements

Emissions Sampling Equipment	Acceptance Criteria	Measurement Frequency	Action If Criteria Are Not Met
Assembled isokinetic sampling train leakage	0.02 cfm (0.00057 m^3/min) at vacuum of ≥ 10 inches Hg (250 mm Hg) before the start of emissions sampling, and ≥ maximum vacuum value recorded during sampling run for post sampling leak checks	Just prior to start of first sampling traverse (required); after first sampling traverse (recommended); after moving sampling train from first traverse port to second traverse port (recommended); end of second sampling traverse (required).	Before emissions sampling or at post port change: Isolate and repair leak point(s); repeat leak check. End of first traverse or end of second traverse: Determine leak rate; If <4% of sampling rate, correct sample volume per procedures in Section 6.3 of Method 5. If >4% of sampling rate, invalid test sample; discard sample and repeat sampling run for invalid train.
Tedlar bags	Any water manometer displacement after 10 minutes when inflated to 2 to 4 inches (5 to 10 cm) water column pressure	Every bag	Discard bag
Oxygen and carbon dioxide analyzers used for Method 3A analyses	3-point Calibration Error Test: ± 0.5 vol% 2-point Calibration Drift Check: ± 0.5 vol% 2-point System Bias Check: ≤ 0.5 vol%)	Calibration Error: Beginning of each test day Calibration Drift: Before and after each test run System Bias: Before and after each test run	Calibration Error: Repair or replace Monitor Calibration Drift: Void test run; re-calibrate or repair/replace monitor System Bias: Void test run; re-calibrate or repair/replace monitor
Analytical balance (for moisture)	± 1 mg of Class-S weights	Check with Class-S weights upon receipt and daily	Adjust or repair
Sampling Train Heating Systems and Thermocouples			
Probe heating system (isokinetic sampling trains)	Capable of maintaining 248° ± 25°F (120°C ± 14°C) at a flow of 0.75 cfm (21.2 L/min)	Calibrate initially by APTD-0576(11) or use published calibration curves	Repair, or replace, and then verify the calibration

Table 8-1. Sampling Equipment Calibration Requirements

Emissions Sampling Equipment	Acceptance Criteria	Measurement Frequency	Action If Criteria Are Not Met
Probe nozzle (isokinetic sampling trains)	Average of three ID measurements of nozzle within 0.001 inches (0.0025 mm); difference between high and low 0.002 inches (0.0050 mm)	Use a micrometer to measure to nearest 0.025 mm (0.001 in.); check before and after field test	Recalibrate, reshape, and sharpen when nozzle becomes nicked, dented, or corroded
Thermocouples (exhaust gas meters and final impinger)	Impinger thermocouple ± 1°C (2°F) [Method 5]; dry gas thermocouple ± 3°C (5.4°F) [Method 0010]; exhaust gas thermocouple within ± 1°C(± 2°F) of absolute temperature.	Calibrate prior to test against a mercury thermometer	Adjust; determine a correction factor or reject

Sources:

Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, EPA-600/R-94/038c, September 1994.
Maintenance, Calibration, and Operation of Isokinetic Source Sampling Equipment, APTD-0576, U.S. EPA, Office of Air Programs, March 1972.
Construction of Isokinetic Source Sampling Equipment, APTD-0581, U.S. EPA Office of Air Programs, April 1971.
Determination of Particulate Emissions from Stationary Sources, U.S. EPA, Test Methods and Procedures, New Source Performance Standards, 40 CFR 60, Appendix A.

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

Parameter/Method	Quality Control Check	Method of Determination	Frequency	Acceptance Criteria	Corrective Action
Semivolatile organics GC/MS (SW846 8270D)	Initial calibration	5 standards bracketing expected concentrations. Critical level should be at least 10 times higher than lowest standard	Prior to sample analysis	Variability of average RRF less than or equal to 30% RSD for CCCs. SPCCs greater than or equal to 0.05.	Recalibrate
	Continuing calibration	Midlevel standard	Prior to sample analysis, then every 12 hours or after sample set	RRF for CCCs within 20% of initial calibration average RRF. SPCCs greater than or equal to 0.05.	Reanalyze standard. If second analysis does not meet criteria recalibrate and reanalyze samples or justify acceptance of sample results since the last successful check.
	Consistency in chromatography	For MS methods, monitor internal standard retention time and area. For non-MS methods, monitor retention time window for compounds of interest.	Every sample, standard, and blank	Retention time within 30 seconds of last calibration check. Area within -50 to +100% of last calibration check	Perform calibration standard check. Reanalyze sample if possible, or flag data.
	Calibration check	Analysis of independent calibration check standard	In association with each initial calibration	Within 3 std. deviations of historical mean (laboratory specific)	Recalibrate and recheck.
	Method Blank	Analysis of blank	Analyze one with each analytical batch	Results less than method detection limit	Flag data and discuss in the case narrative.
Particulate and Particle Size Distribution by Gravimetric Analysis (EPA Method 5)	Calibration check	Calibration of balance with standardized weights	Prior to analysis, between each group of sample weighings, and at the end of each day.	99 – 101% of theoretical value	Recalibrate and recheck sample weights.
Chloride by Ion Chromatography	Initial Calibration	4 standards bracketing expected concentrations Note: Separate calibrations are required for the acid and alkaline samples	Prior to sample analysis	Linear correlation coefficient >0.995	Recalibrate

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

Parameter/Method	Quality Control Check	Method of Determination	Frequency	Acceptance Criteria	Corrective Action
Chloride by Ion Chromatography (continued)	Retention time check for ion identification	Determine average retention time for ions of interest or relative retention time of several ions for every calibration curve	Prior to sample analysis	Average Retention Time - Sample identification is positive if results are within retention time window of standards Relative Retention Time – Sample identification is positive if results are within 3 SD of average RRT	Ions of interest are not present if criteria are not met.
	Control check sample	Midlevel independent standard analyzed in duplicate	Beginning and end of each analysis period and after every 10 samples	90 – 110% of theoretical value	Repeat calibration check. If second check fails criteria, regenerate analytical system and reanalyze all samples since last acceptable calibration check.
	Reagent blank (ICB and CCBs)	Analysis of blanks	Immediately following the ICV and following each CCV.	Less than 1 mg/L	Contamination source must be found and corrected. All samples analyzed since the last acceptable CCB must be reanalyzed
	Reagent blank (ICB and CCBs)	Analysis of blanks	Immediately following the ICV and following each CCV.	Less than 1 mg/L	Contamination source must be found and corrected. All samples analyzed since the last acceptable CCB must be reanalyzed
	Calibration standard response factors	5 standards bracketing expected concentrations	Each day, prior to analysis	%RSD of the mean RF of the calibration standard should be no greater than ± 20%	Perform system check. If calibration check does not meet criteria, recalibrate. If recalibration does not meet criteria, new calibration standards must be made.
	Calibration Verification	One or more calibration standards	Verified each day before and after analyses are performed.	Response factor ± 15% of original RF of each analyte	System must be recalibrated

9.0 ANALYTICAL PROCEDURES

The following is a list of the analytical reference methods for the procedures presented in Table 9-1:

- Test Methods for Evaluating Solid Waste, SW-846 (SW-846), Third Edition, November 1986 and Updates
- Sampling and Analysis Methods for Hazardous Waste Incineration, EPA 600/8-84-002.
- Appendix A, Test Methods and Procedures, New Source Performance Standards, 40 CFR 60.

Tables 9-2 presents the expected exhaust gas naphthalene detection limits for the Method 0010 samples.

Table 9-3 presents the expected detection limits for exhaust gas particulate, HCl, and Cl_2 for the Method 5 and Method 26 samples.

During the course of sampling and analysis, situations may still arise that require modifying the specific sampling or analytical procedures included or referenced in the test plans or this QAPP. The laboratory SOPs, which include a number of procedures for special circumstance, will be followed. In cases where the laboratory finds it necessary to make adjustments to the analysis methods, the changes will be documented following the corrective action procedures noted in Section 14.0 of the QAPP. Any such changes must be approved by the test-designated Quality Assurance Officer (QAO).

Table 9-1. Summary of trial burn Analytical Procedures and Methods

Analysis	Sample Name	Sample Matrix	Analytical Procedure	Reference Method
Process Samples				
Naphthalene	POHC Spike	Organic	Dilution, liquid/liquid extraction, GC/MS	SW846 3580A, 8270D, 8015B
Exhaust Gas Samples				
Naphthalene	Method 0010 train particulate filter & front half solvent rinses	Particulate filter & front half acetone/methylene chloride solvent rinses	Soxhlet extraction, GC/MS	SW846 3542, 8270D
	Method 0010 train XAD-2 resin & back half solvent rinses	XAD-2 resin & front half acetone/methylene chloride solvent rinses	Soxhlet extraction, GC/MS	SW846 3542, 8270D
	Method 0010 condensate	Aqueous liquid	Liquid/liquid extraction, GC/MS	SW846 3542, 8270D
Particulate	Method 5 filter, acetone probe rinses, and impinger water	Particulate filter, acetone probe rinses, and impinger water	Gravimetric	EPA Method 5
Hydrogen Chloride (HCl)	Method 26 sulfuric acid impinger solutions	0.1N sulfuric acid	Ion chromatography	EPA Method 26; SW846 9056/9057
Chlorine (Cl_2)	Method 26 sodium hydroxide impinger solutions	0.1N sodium hydroxide	Ion chromatography	EPA Method 26; SW846 9056/9057

Table 9-2. Exhaust Gas Naphthalene Detection Limit using GC/MS with SIM Analysis

Compound	CAS No.	Front-Half Reporting Limit (ug)[a]	Back-Half Reporting Limit (ug)[a]	Condensate Reporting Limit (ug)[a]	Train Reporting Limit (ug/m3)[a,b]
Naphthalene by SIM	91-20-3	0.010	0.100	0.010	0.040

Notes:
[a] Reporting limits (RLs) are based on previous similar Method 0010 sampling and Method 8270C analysis using selective ion monitoring analysis. RLs are based on analysis of the separate front-half, back-half, and condensate extracts.
[b] Based on three cubic meters of exhaust gas sampled.

Table 9-3. Exhaust Gas Particulate and HCl/Cl_2

Parameter	Probe Rinse (mg)	Filter (mg)	Train Detection Limit (mg/m3)[c]	Train Detection Limit (gr/dscf)[c]
Particulate Matter [b]	0.5	0.5	1.3	0.00058

Parameters	H_2SO_4 Impinger Method Detection Limit (ug)	NaOH Impinger Method Detection Limit (ug)	Train Method Detection Limit (ug/m^3)[c]	H_2SO_4 Impinger Reporting Limit (ug)	NaOH Impinger Reporting Limit (ug)	Train Reporting Limit (ug/m^3)[c]
			HCl/Cl_2			
Hydrogen Chloride [b]	2000	NA	2667	3500	NA	4667
		ug/m^3 as HCl:	2742		ug/m^3 as HCl:	4798
		ppm as HCl:	1.8		ppm as HCl:	3.2
Chlorine [b]	NA	300	400	NA	525	700
		ug/m^3 as Cl_2:	400		ug/m^3 as Cl_2:	700
		ppm as Cl_2:	0.14		ppm as Cl_2:	0.24
Total as Cl^- [b]	2000	300	3067	3500	525	5367
		ug/m^3 as Cl^-:	3067		ug/m^3 as Cl^-:	5367
		ppm as Cl^-:	2.1		ppm as Cl^-:	3.6

Notes:

[a] For particulate, the measurement is of differential weight, EPA Method 5. The detection limit accuracy for gravimetric is ±0.5 mg or ±50 ug for each of the two fractions, the filter and the probe rinse. The exhaust gas concentration limit is based on 0.75 cubic meters of exhaust gas sampled using a Method 5 or 26 sampling train.

[b] Detection limits are for chloride ion via Ion Chromatography (IC) analysis, SW-846 Method 9056A. The exhaust gas concentration limit is based on 0.75 cubic meters of exhaust gas sampled using a Method 26 sampling train. Method detection limit (MDL) and reporting limit (RL) are based on previous similar testing.

10.0 SPECIFIC INTERNAL QUALITY CONTROL CHECKS

10.1 DEFINITIONS

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

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

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

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

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

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

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

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

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

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

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

Contingency Sample An archived portion of a field sample from the same location as other field samples that is collected and held in case of breakage or QA/QC failure during the handling or analysis of the primary sample. This type of sample is sometimes referred to as an "archive sample."

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

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

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

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

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

Performance Evaluation (PE) Sample See Audit Sample.

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

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

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

Spike, Field See Audit Sample.

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

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

10.2 SPECIFIC QUALITY CONTROL CHECKS AND ACCEPTANCE CRITERIA

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

10.2.1 Field Activities

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

- Standard forms and/or standard field notebooks will be used to document field activities and for data collection. The data collection forms and field notebooks will be reviewed routinely by senior staff for accuracy, completeness, and internal consistency.
- The strict adherence to detailed operating procedures as documented in the various project controlling documents and related SOPs will be enforced by experienced senior technical staff.
- Project personnel will be selected based on appropriate levels of training and experience and will receive site-specific training prior to working on-site. The site-specific training will include health and safety requirements; security requirements; briefings on overall project goals, objectives, and schedules; and, specific technical training related to their assigned tasks.
- Routine calibration will be performed on measurement systems and sampling equipment including metering systems, thermocouples, barometers, rotameters, and pitot tubes. Guidance related to equipment calibration is provided in Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods and Quality Assurance/Quality Control Procedures for Hazardous Waste Incinerators, Appendix A. The detailed specifications, acceptance criteria, and corrective action requirements are presented in Section 8.0 of this QAPP. All calibrations will be documented and the documentation maintained in the project files.
- Leak checks will be performed according to method specifications before and after sampling.
- Field QC samples will be routinely submitted including audit (PE) samples, field blanks, media blanks, reagent blanks, trip blanks, and contingency samples. The frequency of submittal for these field QC samples and other field samples are provided in Tables 5-1 and 8-2.
- Field audits/surveillance will be performed periodically by the QAO to assess conformance to specifications. If nonconforming conditions are noted, the corrective action provisions of the QA plan will be invoked.

10.2.2 Laboratory Activities

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

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

Table 10-1. Summary of Test Program Analyses

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Analysis	Sample Matrix	Field Samples[a]			Reference Preparation Method	Reference Analytical Method	QC Analysis	QC Analysis Frequency [a]	QC Analyses	Total Analyses [b]
		Test 1	Test 2	Field QC						
Naphthalene	POHC Spike	3	--	--	Waste Dilution (SW-846 Method 3580A/8270D/8015B)	GC/MS (SW-846 Method 8270D); GF/FID (SW-846 Method 8015B)	Duplicate	One per unit tested	1	4
	Analytical system QC	NA	NA	NA	NA	GC/MS (SW-8270D)	LCS	One per batch/ matrix specific	2 or more	2
							Method Blank	One per batch/ matrix specific	2 or more	2
Naphthalene by SW846 Method 0010	Method 0010 front half composite; filter, and front half of filter holder and probe rinses.	3	--	1	Soxhlet extraction (SW-846 Methods 0010/3542A) (cont'd)	GC/MS with SIM for Naphthalene (SW-846 Method 8270D)	Semivolatile surrogate spikes	Every sample	4	4
							Semivolatile internal standard surrogate spikes	Every sample	4	
Naphthalene by SW846 Method 0010	Method 0010 back half composite; XAD-2 resin, and back half of filter holder and condenser rinses.	3	--	1	Soxhlet extraction with MeCl2 (SW-846 Methods 0010/3542A)	GC/MS with SIM for Naphthalene (SW-846 Method 8270D)	Pre-sampling surrogate spikes	Every XAD-2 resin tube before sampling	4	4
							Semivolatile surrogate spikes	Every sample	4	
							Semivolatile internal standard surrogate spikes	Every sample	4	

Table 10-1. Summary of Test Program Analyses
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Analysis	Sample Matrix	Field Samples[a]			Reference Preparation Method	Reference Analytical Method	QC Analysis	QC Analysis Frequency [a]	QC Analyses	Total Analyses [b]
		Test 1	Test 2	Field QC						
Naphthalene by SW846 Method 0010	Method 0010 Condensate Impinger	3	--	1	Separatory funnel extraction (SW-846 Method 3542A)	GC/MS (SW-846 Method 8270D)	Semivolatile surrogate spikes	Every sample	4	4
							Semivolatile internal standard surrogate spikes	Every sample	4	
						GC/MS with SIM for Naphthalene (SW-846 Method 8270D)	Semivolatile surrogate spikes	Every sample	4	4
							Semivolatile internal standard surrogate spikes	Every sample	4	
Naphthalene by SW846 Method 0010	Method 0010 acetone reagent blank	--	--	1	NA	GC/MS with SIM for Naphthalene (SW-846 Method 8270D)	Semivolatile surrogate spikes	Every sample	1	1
							Semivolatile internal standard surrogate spikes	Every sample	1	
Naphthalene by SW846 Method 0010	Method 0010 methylene chloride reagent blank	--	--	1	NA	GC/MS with SIM for Naphthalene (SW-846 Method 8270D)	Semivolatile surrogate spikes	Every sample	1	1
							Semivolatile internal standard surrogate spikes	Every sample	1	

Table 10-1. Summary of Test Program Analyses
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Analysis	Sample Matrix	Field Samples[a] Test 1	Test 2	Field QC	Reference Preparation Method	Reference Analytical Method	QC Analysis	QC Analysis Frequency [a]	QC Analyses	Total Analyses [b]
Naphthalene by SW846 Method 0010	Method 0010 spiked XAD-2 resin blank	--	--	2	Soxhlet extraction (SW-846 Methods 0010/3542A)	GC/MS with SIM for Naphthalene (SW-846 Method 8270D)	Pre-sampling surrogate spikes	Every XAD-2 resin tube before sampling	2	2
							Semivolatile surrogate spikes	Every sample	2	
							Semivolatile internal standard surrogate spikes	Every sample	2	
Naphthalene by SW846 Method 0010	Analytical system QC	NA	NA	NA	NA	GC/MS with SIM for Naphthalene (SW-846 Method 8270D)	Method blank	1 per analytical batch	1 or more	1
							Blank spike	2 per analytical batch	2	2
Particulate by Method 5	Method 5 particulate filter	--	3	--	Desiccate to constant mass	Gravimetric (Method 5)	Replicate weighing to constant weight	Every sample	3	3
	Method 5 probe and filter holder acetone rinses	--	3	--	Evaporate/Desiccate to constant mass	Gravimetric (Method 5)	Replicate weighing to constant weight	Every sample	3	3
	Method 5 filter reagent blank	--	--	1	Desiccate to constant mass	Gravimetric (Method 5)	Replicate weighing to constant weight	Every sample	1	1

Table 10-1. Summary of Test Program Analyses
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Analysis	Sample Matrix	Field Samples[a]			Reference Preparation Method	Reference Analytical Method	QC Analysis	QC Analysis Frequency [a]	QC Analyses	Total Analyses [b]
		Test 1	Test 2	Field QC						
Particulate by Method 5 (con'd)	Method 5 acetone reagent blank	--	--	1	Evaporate/Desiccate to constant mass	Gravimetric (Method 5)	Replicate weighing to constant weight	Every sample	1	1
HCl by Method 26	Method 26 H2SO4 impingers	3	--	--	NA	Ion chromatography (EPA Method 26)	Duplicate	One per test	1	6
							MS/MSD analyzed in duplicate [d]	1 per batch (assuming all samples batched together)	2	
	Method 26 H2SO4 reagent blank	--	--	1	NA	Ion chromatography (EPA Method 26)	Reagent Blank	One for test program	1	1
2 by Method 26	Method 26 NaOH impingers	3	--	--	NA	Ion chromatography (EPA Method 26)	Duplicate	One per test	1	6
							MS/MSD analyzed in duplicate [d]	1 per batch (assuming all samples batched together)	2	
	Method 26 NaOH reagent blank	--	--	1	NA	Ion chromatography (EPA Method 26)	Reagent Blank	One for test program	1	1

Table 10-1. Summary of Test Program Analyses
Page 5 of 5

Analysis	Sample Matrix	Field Samples[a]			Reference Preparation Method	Reference Analytical Method	QC Analysis	QC Analysis Frequency [a]	QC Analyses	Total Analyses [b]
		Test 1	Test 2	Field QC						
Cl- ion by Method 26	Method 26 deionized water reagent blank	--	--	1	NA	Ion chromatography (EPA Method 26)	Reagent Blank	One for test program	1	1
Cl- ion chromatography	Analytical system QC	NA	NA	NA	NA	Ion chromatography (EPA Method 26)	LCS/LCSD	1 per batch following initial calibration (separate calibration for each matrix)	1	2
							Method Blank	One per batch/ matrix specific - analyzed in duplicate	1	
TOTAL										**56**

Notes:

[a] Each test condition is comprised of three replicate sampling runs.

[b] Total laboratory analyses includes field sample analyses and laboratory QC analyses

[c] Surrogate spikes are applied to all samples. Refer to Table 5-1 notes for the surrogate compounds.

[d] MS = Matrix spike
MSD = Matrix spike duplicate

[e] Refer to Table 5-1 notes for the matrix spike compounds.

11.0 DATA REDUCTION, DATA VALIDATION, AND DATA REPORTING

11.1 DATA REDUCTION

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

11.1.1 Project Reporting Format

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

11.1.2 Detection Limit Definitions

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

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

Component 2 of the EPA Region 6 Hazardous Waste Combustion Unit Permitting Manual uses the term sample quantitation limit (SQL). The SQL is the matrix-specific MDL. The SQL may be equal to the laboratory-specific MDL or some factor greater than (e.g., 5X-10X) the laboratory-specific MDL that takes into consideration matrix specific interferences or sample serial dilutions.

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

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

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

11.1.3 Detection Limits and Data Reduction

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

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

11.1.4 Other Quality Control Data Reporting

Other quality control data that are included in the analytical reports and may be discussed or commented on in the final test reports are:

- Sample holding times
- Sample surrogate recovery results
- Duplicate results
- MS/MSD results

- Blank train results
- Reagent blank results (if analyzed)
- Trip and field blank results
- RPD and RSD evaluations of accuracy or precision

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

11.1.5 Final Case Files

At a minimum, the following documents will be retained upon the completion of the project in the final case file, which must be maintained for a period at least three years:

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

11.2 ORGANIC ANALYSES

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

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

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

Where: CF = Calibration Factor

R = Response or Area of the GC Peak

M = Mass Injected (in nanograms)

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

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

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

σ = Standard Deviation of the Calibration Factors

$avg\ CF$ = Average Calibration Factor

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

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

Where: RF = Response Factor

A_s = Response for the Analyte

A_{is} = Response for the Internal Standard

C_s = Concentration of the Analyte

C_{is} = Concentration of the Internal Standard

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

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

$$M_x = A_x \times CF$$

Where: M_x = The Mass of Analyte in the Sample

A_x = The Response of the Analyte in the Sample

CF = The Calibration (or Response) Factor

Samples containing a concentration of an analyte exceeding the concentration the instrument is calibrated for, will have a dilution performed, if such a dilution is practical given the sample preparation method. In that case M_x is multiplied by the dilution factor to arrive at the final result. If, under the circumstances of the method, a dilution is not possible, the analytical result must be considered estimated.

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

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

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

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

V = The Volume of Gas Sampled

11.3 CHROMATOGRAPHY

For chromatography analyses using a system comprising separator columns, guard columns, and eluents, the system is calibrated using a minimum of 3 points and the calibration is verified with a mid-range standard. Samples are quantitated in the same manner as described above.

11.4 DIRECT READING INSTRUMENTS

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

11.5 ANALYTICAL DATA PACKAGES

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

- Cover Page—Identifies the laboratory-assigned lot number, project identification, laboratory project manager, and issue date.
- Table of Contents—Organization of the data package.
- Sample Summary—Cross reference to project sample identifications and laboratory sample identifications.
- Analytical/Preparation Methods Summary—Identifies the methods used to prepare and analyze the samples.
- Narrative— Summarizes the project-specific information and any pertinent information concerning data quality. The narrative documents sample delivery and condition upon receipt, and any analytical difficulties or anomalies encountered during sample preparation and analysis.
- QC Data Association Summary—Comparison of sample results to the project and laboratory DOQs and association of project samples to laboratory QC.
- Analytical Data Report—Summarized analytical data for all samples and associated quality assurance samples including as appropriate: data flags, duplicate analysis

results, surrogate recovery results, method blank results, laboratory control sample results, and matrix spike/matrix spike duplicate/post digestion spike (MS/MSD/PDS) results.

- Chain-of-custody (COC) documentation

Each analytical data package will include the identification and signature or initials of each analyst who handles the test samples. The Laboratory Analysis Coordinator will certify via signature the contents of each analytical data package.

11.5.1 Organic Analyses

The organic analytical data packages will include the following:

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

11.5.2 Non-Metal Inorganic Analyses

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

- Sample Results
- QC Summary
  - Method Blank Report
  - Sample Duplicate report
  - MS/MSD Data and Evaluation Report(s)
  - Laboratory Control Sample Data and Evaluation Report
- • Raw Data
  - Data Review Checklist
  - Sample, Standards, and Quality Control Data
  - Distillation, Extraction, and Sample Preparation Sheets
  - Standards Preparation Logs
  - Run Logs

11.6 DATA VALIDATION

The results of all sample analysis and all QA/QC sample analysis (100% of the laboratory data) will be compared to the specifications given in Tables 5-1 and 8-2. The data validation criteria outlined in: USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, (2001); USEPA Analytical Operations/Data Quality Center (AOC) National Functional Guidelines for Chlorinated Dioxin/Furan Review (2002); and USEPA Contract Laboratory National Functional Guidelines for Inorganic Data Review, (2004); prepared by USEPA Data Review Work Group will be followed as applicable to the individual methods used. Any sample data associated with a QC check that fails to meet the target criteria established in these tables will be flagged in the final report, and an assessment of the impact, if any, of missing the target data quality objective will be provided. Additional guidance will be found in the analytical methods and EPA/625/6-89/023, Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration.

The method detection limit (MDL) or laboratory specified reporting limit (RL) will be reported for all non-isotope dilution method compounds. Results reported between the MDL and the RL will be flagged as estimated. Non-detects for the isotope dilution methods will be determined using the SW-846 Method 8290A definition of an estimated detection limit (EDL) without the use of empirical factors or other mathematical manipulations specific to the laboratory. The laboratory must include with each data package any calculations or statistical methods sample dilution corrections. The laboratory must maintain on file documentation for the reported detection limits.

Particular attention will be paid to the results of blank data. Analytical data will not be routinely corrected for contamination. They are however evaluated on a case-by-case basis for possible blank correction. Samples associated with contaminated blanks will be flagged so that this information may be assessed in the final report.

The output from the data validation process will be a summary comparison of the QA/QC results to the specified data quality objectives, a review and discussion of any deficiencies identified in the data assessments of laboratory performance, and, overall precision and accuracy, representativeness and completeness of the data set.

Detailed procedures for the internal review of data in the laboratory are found in the laboratories QA Manuals and related standard operating procedures (SOPs).

•

Figure 11-1. Example Test Report Outline

1.0 EXECUTIVE SUMMARY

2.0 TEST PROGRAM SUMMARY
- 2.1 Engineering Description
- 2.2 Summary of Test Plan and Objectives
- 2.3 Test Implementation Summary

3.0 PROCESS OPERATIONS
- 3.1 Process Operating Conditions
- 3.2 Waste Feed Material Characteristics
- 3.3 POHC Spiking

4.0 EMISSIONS COMPLIANCE RESULTS
- 4.1 POHC Destruction and Removal Efficiency
- 4.2 Particulate Emissions
- 4.3 Hydrogen Chloride and Chlorine Control Efficiency

5.0 QUALITY ASSURANCE/QUALITY CONTROL RESULTS
- 5.1 QA/QC Activities and Implementation
  - 5.1.1 QA Surveillance
  - 5.1.2 Sample Collection
  - 5.1.3 Sample Analysis
  - 5.1.4 Process Instrumentation
  - 5.1.5 Emissions Sampling Equipment
  - 5.1.6 Laboratory Analytical Instrumentation
- 5.2 Audits and Data Validation
- 5.3 Calculations
- 5.4 Conclusions

6.0 ANTICIPATED PERMIT OPERATING CONDITIONS
- 6.1 Development of Operating Limits
- 6.2 Specific Control Parameters

APPENDICES

A. Process Operating Data
B. Test Manager's Log
C. Spiking Report
D. Process Instrument Calibration Data
E. Emissions Sampling Report
F. Analytical Report
G. Example Calculations
H. CMS Performance Evaluation Report

12.0 ROUTINE MAINTENANCE PROCEDURES AND SCHEDULES

12.1 SAMPLING EQUIPMENT

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

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

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

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

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

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

12.2 LABORATORY INSTRUMENTS

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

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

12.3 PROCESS INSTRUMENTS

On-site personnel perform regular maintenance on all process instrumentation. Routine and preventive maintenance programs are used. Where appropriate, manufacturers' recommendations for maintenance of process instruments are followed. Operators conduct daily reviews of process instrumentation by noting suspicious or inconsistent readings. Maintenance logs are used to record the frequency and type of repairs necessary for process instruments. Process instruments used to demonstrate compliance with operating limits will be calibrated prior to the test. Records of these calibrations will be included in the final test report.

Figure 12-1. Example Equipment Inspection Record Form

Equipment Inspection Record

Date/Time of inspection: ____________________

Equipment Inspected:

1) ______________________________

Condition: Good See Problems Section Below

2) ______________________________

Condition: Good See Problems Section Below

3) ______________________________

Condition: Good See Problems Section Below

4) ______________________________

Condition: Good See Problems Section Below

5) ______________________________

Condition: Good See Problems Section Below

Problems Noted:

____

____

____

____

Action Taken

____

____

____

Inspector's Signature____________________

13.0 ASSESSMENT PROCEDURES FOR ACCURACY, PRECISION, & COMPLETENESS

13.1 GENERAL

The QA activities implemented in this study will provide a basis for assessing the accuracy and precision of the analytical measurements. Section 3.0 discusses the QA activities that will generate the accuracy and precision data for each sample type. The generalized forms of the equations that will be used to calculate accuracy and precision are presented below.

13.2 ACCURACY

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

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

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

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

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

13.3 PRECISION

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

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

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

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

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

13.4 COMPLETENESS

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

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

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

14.0 AUDIT PROCEDURES, CORRECTIVE ACTION, AND QA REPORTING

14.1 PERFORMANCE AND SYSTEM AUDITS

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

14.1.1 Field Audits

The QAO assigned to the project will conduct audits of the operations at the site to ensure that work is being performed in accordance with the various project controlling documents and associated standard operating procedures. A checklist appropriate to the activities scheduled during the audit will be used. The audit will cover, but not necessarily be limited to, such areas as:

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

These audits will occur at the start or end of each significant phase of the project.

14.1.2 Performance Evaluations

At the time of this test plan publication, EPA's Stationary Source Audit Sample Program (SSASP) is suspended. At the time of this test program, one of the two previously EPA-approved providers has withdrawn from the program. In accordance with the regulations, EPA has suspended the SSASP until such time a second vendor is qualified and audit samples from at least two vendors are made available (Federal Register, Volume 84, No. 176, Page 47882, September 11, 2019).

However, audit sample availability for Method 26 will be determined at the time of testing and samples obtained as possible. If obtained, audit samples will be included with the other emissions samples for analysis by the selected analytical laboratory. Audit samples have not been previously offered for Method 5 or Method 0010 samples.

14.1.3 Office Audits

The QAO will also conduct periodic audits of the case files. These audits will assess the completeness of the files and verify that all of the appropriate information is included in the files.

14.1.4 Laboratory Audits

Clean Harbors or its appointed representative may choose to audit the laboratories at any time during the course of the project on an as-required basis to assess the laboratory's ability to successfully perform the work and to ensure mutual agreement between Clean Harbors and the laboratory with regard to the scope of work, QA/QC requirements, and deliverable requirements. Reasonable notice will be provided prior to any on-site inspection of the laboratory.

14.2 CORRECTIVE ACTION

The following procedures have been established to ensure that nonconforming conditions, such as malfunctions, deficiencies, deviations and errors are promptly investigated, documented, evaluated and corrected. Every person employed in the test is expected to function as a QC inspector to ensure the quality of the final product. Quality, as it relates to this project, is defined as "performing the work according to the agreed upon specifications contained in the trial burn plan and relevant SOPs or causing the specification to be changed *in a controlled manner*." Each individual is encouraged to identify any condition adverse to the successful completion of the work or any modification to the specifications that might result in a better end product. These improvements might be framed in terms of higher quality, greater safety, greater efficiency, and/or lower cost. However, it cannot be stressed strongly enough, that only documented and approved changes to the specifications are allowable.

14.2.1 Field Corrective Actions

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

A Corrective Action Request (CAR), as shown in Figure 14-1, should be used to identify the adverse condition or opportunity for improvement, reference document(s) and recommended corrective action(s). The CAR is directed to the Test Coordinator. The Test Coordinator affixes his signature and the date to the corrective action block that states the cause of the condition(s) and corrective action(s) to be taken. The Test Coordinator is responsible for first notifying the regulatory agency representative of any problems or deviations from the QAPP, or trial burn plan identified in the CAR. The Test Coordinator then forwards the requested response to the QAO for follow-up and filing. The QAO maintains the log for status control of CARs and responses confirms the adequacy of the intended corrective action(s) and verifies its implementation. The QAO will issue and distribute copies of completed CARs to the originator, Test Coordinator, Clean Harbors Test Project Manager, and the involved contractor(s) if any. CARs are transmitted to the project file for future reference, and are incorporated into the Final Test Report.

14.2.2 Laboratory Corrective Actions

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

14.3 QA REPORTS TO MANAGEMENT

The QAO will provide a written report to the Test Coordinator. This report will address:

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

Upon project completion, a Final QA Report will be issued, assessing the overall degree of project conformance to specifications and the impact of any nonconforming conditions on data quality that may affect management decisions. This report will be incorporated into the final test report.

The nature of the laboratories' Quality Assurance reports is provided in their respective Laboratory Quality Assurance Manuals and SOPs. Where no other specifications exist, the laboratory must conform to the provisions given in this section.

Figure 14-1. Example Corrective Action Request Form

Corrective Action Request

Number:
Date:
File Name:
Client:

REQUEST

To:

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

Condition:

Reference Documents:

Recommended Corrective Actions:

Originator	Date	Approval	Date	Approval	Date

RESPONSE

Cause of Condition:

Resolution:

Prevention:

Affected Documents:

Test Manager Date

Quality Assurance Officer Date

QAO Follow-up Date

ATTACHMENT A

RESUMES OF KEY INDIVIDUALS

TEST COORDINATOR

QUALITY ASSURANCE OFFICER

EMISSIONS SAMPLING TEAM LEADER

SPIKING CONTRACTOR

LABORATORY ANALYSIS COORDINATOR

Appendix B – Continuous Monitoring System Performance Evaluation Test Plan

CONTINUOUS MONITORING SYSTEM PERFORMANCE EVALUATION TEST PLAN

SUBPART X CLOSED DESTRUCTION TECHNOLOGY SYSTEM

EPA ID # LAD 981 055 791- OP-RN-1

PREPARED FOR:

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JANUARY 2022
FOCUS PROJECT NO. P-001467

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REVISION RECORD			
REV	DATE	CHANGE DESCRIPTION	Prepared By
A	August 2021	Initial DRAFT	Focus Environmental Inc.
0	September 2021	Final for Submission	Focus Environmental Inc.
1	January 2022	Revised in response to LDEQ comments	Focus Environmental Inc.
2	January 2022	Revised in response to LDEQ comments	Focus Environmental Inc.

List of Acronyms

acfm	actual cubic feet per minute
ASTM	American Society for Testing and Materials
CBC	contained burn chamber
CHC	Clean Harbors Colfax, LLC
CDTS	Closed Destruction Technology System
CFR	Code of Federal Regulations
CMS	continuous monitoring system
CMS PET	continuous monitoring system performance evaluation test
CO	carbon monoxide
CPMS	continuous parametric monitoring system
DQO	data quality objective
DF	deactivation furnace
DRE	destruction and removal efficiency
dscf	dry standard cubic foot
dscm	dry standard cubic meter
EPA	U.S. Environmental Protection Agency
fps	feet per second
ft	foot
g	gram
gpm	gallons per minute
gr	grain
HAP	hazardous air pollutant
hr	hour
ID	induced draft
in	inch
l or L	liter
LDEQ	Louisiana Department of Environmental Quality
lb	pound
mg	milligram
ml	milliliter
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NEW	net explosive weight
NIST	National Institute for Standards and Testing
OB/OD	Open Burn / Open Detonation
OPL	operating parameter limits
PAS	pollution abatement system
PEP	Propellants, Explosives and Pyrotechnics
PETP	performance evaluation test plan
PLC	programmable logic controller
ppm	parts per million
ppmvd	parts per million, dry volume
ppmv	parts per million by volume
PM	particulate matter
psig	pounds per square inch, gauge
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
sec	second
SRE	system removal efficiency
TBP	Trial Brun Plan
TO	thermal oxidizer
USEPA	U.S. Environmental Protection Agency

List of Acronyms

w.c.	water column
wt%	weight percent
µg or ug	microgram
µm	micrometer
ηg or ng	nanogram

1.0 INTRODUCTION

Clean Harbors Colfax, LLC (CHC) is proposing to operate a Closed Destruction Technology System (CDTS) at its Colfax, Louisiana facility to supplement the Open Burn / Open Detonation (OB/OD) operations performed there. The CDTS is a Subpart X unit as defined at 40 CFR 264, Subpart X of the Resource Conservation and Recovery Act (RCRA) rules and regulations. The permit application is required to include a Trial Brun Plan (TBP) demonstrating the performance of the system. As part of the TBP, the Louisiana Department of Environmental Quality (LDEQ) has requested the plan include a continuous monitoring system performance evaluation test (CMS PET).

The CDTS consists of a contained burn chamber (CBC), deactivation furnace (DF), and an advanced pollution abatement system (PAS). The advanced PAS includes a high-temperature thermal oxidizer (TO), cyclone, gas cooler, dry sorbent injection system, baghouse, HEPA filter, induced draft (ID) fan, and stack. The primary purpose of the Trial Burn is to demonstrate the Subpart X unit's performance is in compliance with the relevant and appropriate United States Environmental Protection Agency (USEPA), and State of Louisiana, Rules and Regulations and applicable guidance.

The CMS Performance Evaluation Test Plan is divided into eight sections. Section 2 provides the CMS performance test objectives. Section 3 provides a description of the continuous monitoring system. Section 4 summarizes the methods that will be used to calibrate and certify the CMS instruments and provides the instrument performance criteria and data quality objectives. Section 5 describes the CMS integration with the waste feed permissives and interlock system and summarizes the interlock testing procedure. A tentative CMS performance evaluation test schedule is provided in Section 6. Section 7 of the plan presents the internal and external quality assurance program, Section 8 describes the CMS performance evaluation test documentation.

CHC will conduct the CMS PET commensurate with the execution of the TBP.

2.0 PERFORMANCE EVALUATION TEST OBJECTIVES

The CMS performance evaluation test will verify the instruments used to demonstrate continuous compliance with the relevant and appropriate RCRA requirements are calibrated and properly integrated with the CDTS waste feed permissives interlock system. Since no performance specifications exist for the continuous parameter monitoring system (CPMS), CHC will follow the manufacturer's recommended calibration procedures, CHC standard operating procedures (SOPs), or process knowledge. CHC will also verify that the waste feed permissives interlock system is tested to confirm that an alarm is triggered, and the waste feed is prevented if the control system records a regulatory operating parameter is outside the established setpoint has been performed in accordance with the established verification schedule identified in maintenance procedures.

The CDTS is not equipped with any Continuous Emissions Monitors.

Table 1. Operating Parameters Limits

Parameter	Instrument Location on Block Diagram	Max or Min	Units	Averaging Time
Thermal Oxidizer Outlet Temperature	T1	Minimum	°F	Hourly Average
System Pressure	P1	Maximum	iwc	Instantaneous with 30-second delay
Induced Draft Current (as indicator of Combustion Gas Velocity)	A1	Maximum	amps	Hourly Average
Bag Leak Detector	A2	Maximum	TBD	NA; operational
HEPA Pressure Drop	P2	Maximum	inches water	Hourly Average
HEPA Pressure Drop	P2	Minimum	inches water	Hourly Average
Sorbent Feed Rate	F1	Minimum	Lb/hr	Hourly Average

Table 2. Regulatory Instrumentation

Instrument	Measurement Units	Process Component	Instrument Manufacturer[1]	Model No.[1]	Operating Range	Accuracy	Calibration Procedure[1]
Thermocouple	°F	Thermal Oxidizer	TBD	TBD	-328 to 2282°F	+/- 1% of span	TBD
Pressure Transmitter	inches water	System pressure	TBD	TBD	0-10 inch wg	+/- 1% of span	TBD
Ammeter	Amps	ID Fan	TBD	TBD	TBD	+/- 1% of span	TBD
Pressure Transmitter	inches water	HEPA pressure drop	TBD	TBD	0-10 inch wg	+/- 1% of span	TBD
Sorbent Flow	Lb/hr	Sorbent feed system	TBD	TBD	TBD	+/- 1% of span	

Notes:

1 System has not been fabricated yet, therefore manufacturer and model number are not currently available and the required calibration procedure has not been established.

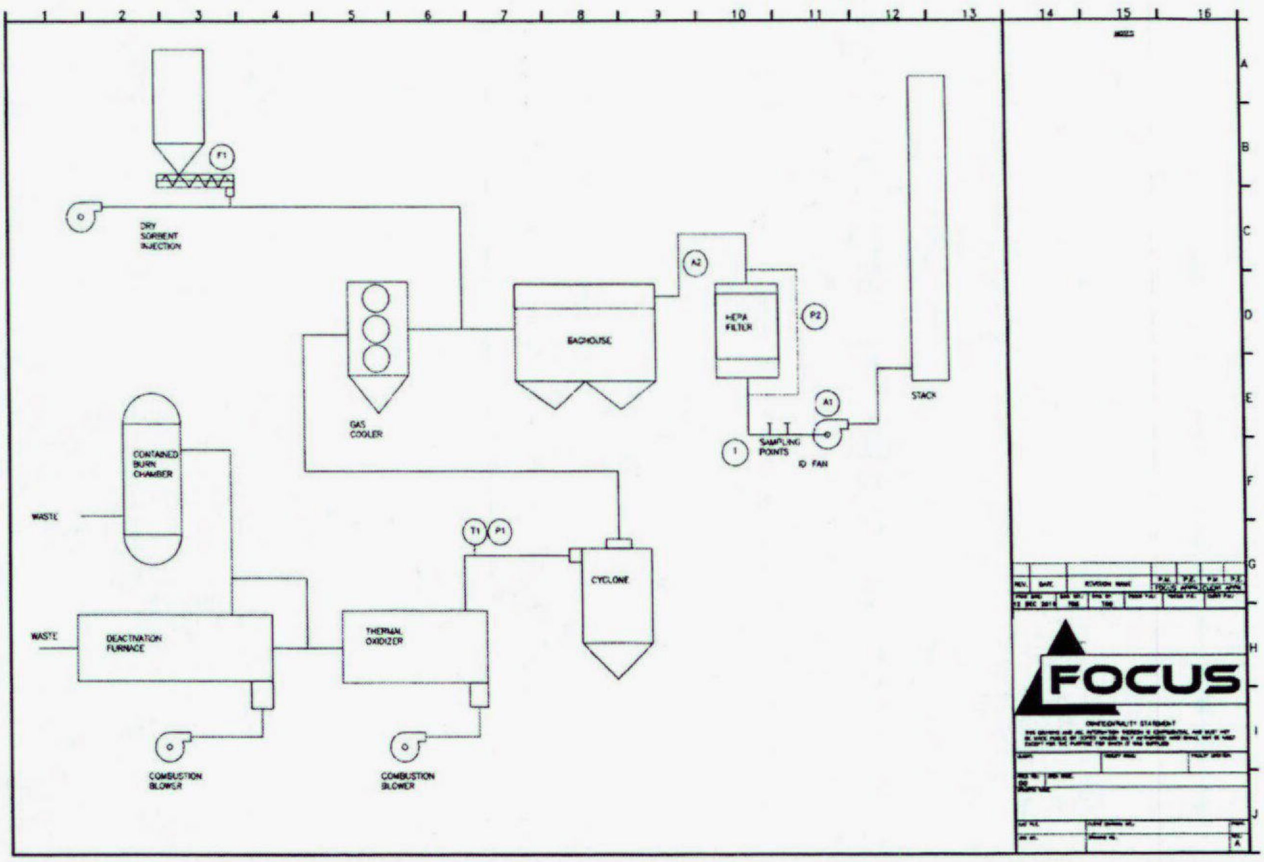

Figure 1. Process Diagram Showing Regulatory Instruments

3.0 CONTINUOUS MONITORING SYSTEM DESCRIPTION

The continuously measured operating parameters are presented in Table 1 along with the specific parameter averaging times. The instruments that measure the operating parameter data are listed in Table 2. Table 2 also includes the instrument range and accuracy.

Figure 1 shows the general locations of the instruments. Further description on the CPMS is provided below.

3.1 CONTINUOUS PARAMETER MONITORING SYSTEMS

As previously mentioned, CPMSs are instruments that continuously monitor and evaluate parameter data from the operations of the CDTS. CPMSs utilized on the CDTS to demonstrate regulatory compliance include the instruments listed in Table 2.

3.2 DATA ACQUISITION AND RECORDING

The CDTS control system configuration includes a programmable logic controller (PLC). The PLC is used as the main system controller and has the capability to control PAS equipment in a programmed sequence, make decisions based on sensor input, and provide a totally automated operation. The plant PLC also performs all averaging calculations and initiates safety interlocks as well as the waste feed permissive if the CDTS data exceed established setpoints. Data from the PLC is held for data storage and reporting.

4.0 PERFORMANCE EVALUATION PROGRAM SUMMARY

To calibrate the system instruments, CHC will follow procedures defined in accordance with manufacturer's recommendations for those devices that do not have promulgated performance specifications. The performance evaluation test of the CMS components will consist of three parts:

- Verification of instrument calibration in accordance with the SOP schedule
- Verification of functional testing of the waste feed permissive interlock system and associated alarms, and
- Audit of CMS data reduction and recording functions.

4.1 CONTINUOUS PARAMETER MONITORING SYSTEMS

As EPA has not promulgated any performance specifications for CPMSs, CHC will use manufacturer's procedures and working knowledge of specific instruments to conduct the calibrations. The Parameter CMS instruments and the systems that control these instruments will be calibrated using the calibration procedures outlined in CHC's Calibration Program. These calibration procedures are referenced in Table 2. During calibration, CHC will verify the CPMSs are reading data within the accuracies listed on Table 2. CHC's continuous monitoring system utilizes transmitters that send process readings via electronic signal (analog and / or digital) from the continuous monitoring devices to the plant PLC. As part of the CHC Calibration Program loop testing is performed by inducing a parameter value from each CMS transmitter to the PLC and verifying the reading. As part of the CMS performance evaluation test, CHC will verify that loop testing has been performed in accordance with SOP calibration schedules and tests are current for all CPMS instruments.

4.1.1 Instrument Location

All CMSs shall be installed such that representative measurements of process parameters from the source are obtained. All CPMSs are located so that they measure representative process. As previously mentioned, general instrument locations are provided in Figure 1 .

4.2 DATA QUALITY OBJECTIVE SUMMARY

CHC expects the data measured by the continuous monitoring devices to be precise, accurate, and complete. The CMS will be calibrated using manufacturer's procedures or standard accepted procedures. The expected accuracies of the continuous parameter monitoring instruments are presented in Table 2.

5.0 INTERLOCK SYSTEM INTEGRATION AND TESTING

The PLC controls the waste feed permissive interlock system that prevents the loading the CDC or DF when a measured parameter exceeds the established setpoint. The interlocks for the CTDS are set below permitted ceiling levels such that the waste feed can be stopped and/or other appropriate actions can be taken before a permit exceedance occurs, as a safety measure, and to prevent excess emissions. The CPMSs described in this plan will be integrated with the interlock system. The control system compares the hourly average values to the corresponding permissive setpoint. Upon exceedance of an interlock setpoint, the system triggers an alarm and activates the waste feed permissive interlock.

6.0 TEST SCHEDULE

The performance evaluation testing of the CMS is expected to take place during the normal instrument calibration schedule specified by SOP. For the CMS PET, the instrument calibration records will reviewed prior to the Trial Burn test to verify that the instruments are in compliance with the acceptable parameters defined for the instrument.

The performance evaluation of the CPMSs will be conducted commensurate with the Trial Burn.

7.0 QUALITY ASSURANCE

The CMS Performance Evaluation Test Plan should include an internal and external quality assurance (QA) program. A description is provided below:

7.1 INTERNAL QA

The quality of data generated by the system will be assured by implementing internal quality control procedures. The internal QA program will include the activities planned by routine analysts and operators to assess the CMS performance. The routine activities include the following:

- Field verification of the CMS instrument location, condition, and installation.
- Scheduled calibration on the CPMS.
- Scheduled preventive maintenance on the CPMS.

7.2 EXTERNAL QA

CHC's external QA program shall include systems audits that include the opportunity for on-site evaluation of instrument calibration, data validation, sample logging, and documentation of quality control data and field maintenance activities. The QA program implementation will verify conformance via:

- Testing and other quality assurance checks of parameter CMS.
- Reviews of calibration procedures in the CMS Performance Evaluation Plan.
- Reviews of data sheets to ensure completeness and accuracy.
- Examinations of facility records documenting the data verification and data reduction/calculation procedures performed for compliance purposes.
- Annual corporate audit to thoroughly inspect in-house records and checklists completed by the facility when calibrations are performed. These records are inspected for completion; timeliness and if all rectification was accomplished for any deficiencies noted on the records or checklists. They compare completed records to procedures to ensure that daily maintenance checklists and corresponding corrective action follow procedures.

Once the CMS Performance Evaluation Test is completed, the quality of data generated by the CMS will be assured by implementing the quality control procedures. This program addresses all aspects of quality control for the process parameter monitors.

8.0 DOCUMENTATION

Results of the performance evaluations will be summarized on data sheets. Copies of applicable data sheets, calculations, CMS system data records, and calibration or reference material certification will be included in the Trial Burn Test Report. This report will be submitted as required and will be maintained as part of the Operating Record.

Appendix C – Test DRE Calculations

SEMI-VOLATILE POHC SPIKING DATASHEET

Evaluates POHC feed/spiking rate needed for desired DRE demonstration, and accounts for PICs/background

Client:	Clean Harbors Colfax, LLC.	Proj. No.:	P-001467
Facility:	Colfax, LA	By:	TGB
Case:	Subpart X Closed Disposal Technology System Testing	Date:	06-Aug-21
		Worksheet:	NAPHPOHC.XLS

Input Data

	POHC Name	Naphthalene	
	POHC Molecular Weight	128.19	
	Dry Stack Gas Flow Rate (dscfm)	6,516	
Eq 2	DRE Requirement (%)	99.99	
Eq 2	Expected DRE (%)	99.999	
	Lower Quantitation Limit (ug/sample)	0.020	20 ng/sample
	Lower Quantitation Limit (ug/sample) X 3 Sampling Train Fractions	0.060	60 ng/train
	Upper Quantitation Limit (ug/sample)	4.00	4 000 ng/sample
	Sample Volume (dscf)	106	
	Actual POHC Feed/Spiking (lb/hr)	5	
	Analytical Safety Factor	20	
	Fraction of Sample Extract for POHC Analysis	1.00	
	POHC Background Concentration in Stack Gas (ug/l)	0	
	POHC Contamination in Sample Train (ug/sample)	0.100	100 ng/sample

Minimum Emissions and Feed/Spiking Required to Demonstrate Regulatory DRE

	% DRE (Regulatory Limit)	99.99
Eq 3	Stack Emission Rate Required for Detection (lb/hr)	4.9E-07
Eq 4	Min. Stack Conc. to Demonstrate DRE (ug/dscf)	5.7E-04
Eq 5	Min. Stack Conc. to Demonstrate DRE (ppbvds)	0.0038
Eq 6	Min. Feed/Spiking Rate to Demonstrate DRE (lb/hr)	0.005
Eq 7	Feed/Spiking Rate With Analytical Safety Factor Applied (lb/hr)	0.10

Minimum Emissions and Feed/Spiking Required to Demonstrate Expected DRE

	% DRE (Expected Performance)	99.999
Eq 3	Stack Emission Rate Required for Detection (lb/hr)	4.9E-07
Eq 4	Min. Stack Conc. to Demonstrate DRE (ug/dscf)	5.7E-04
Eq 5	Min. Stack Conc. to Demonstrate DRE (ppbvds)	0.0038
Eq 6	Min. Feed/Spiking Rate to Demonstrate DRE (lb/hr)	0.05
Eq 7	Feed/Spiking Rate With Analytical Safety Factor Applied (lb/hr)	1.0

Potential Emissions and DRE Demonstration Capability at Actual Feed/Spiking Rate

	Feed/Spiking Rate (lb/hr)	5	
Eq 8	POHC Emission at Regulatory DRE (lb/hr)	5.0E-04	
Eq 9	POHC in Stack Gas at Regulatory DRE (ug/dscf)	5.8E-01	
Eq 10	POHC in Stack Gas at Regulatory DRE (ppbvds)	3.8450	
Eq 8	POHC Emissions at Expected DRE (lb/hr)	5.0E-05	
Eq 9	POHC in Stack Gas at Expected DRE (ug/dscf)	5.8E-02	
Eq 11	Train Loading at Regulatory DRE (ug/train)	61.5	61,492 ng/sample
Eq 11	Train Loading at Expected DRE (ug/train)	6.15	6,149 ng/sample
Eq 2	Max. DRE Demonstrated at Feed/Spiking Rate (%)	99.999990	

Impact of Sample/Combustion Gas PICs and Background POHC Concentration

Eq 8	Emissions at Regulatory DRE from Actual Spiking (lb/hr)	5.0E-04
Eq 12 + Eq 13	Emissions Equivalent from PICs/Background (lb/hr)	8.1E-07
Eq 8 + Eq 12 + Eq 13	Apparent Total Emissions w/PICs & Background (lb/hr)	5.0E-04
Eq 2	Apparent DRE at Reg. DRE w/PICs & Background (%)	99.9900
	Added Sample Train Loading from PICs/Background (ug)	0.100
Eq 2	DRE Required to Counter PICs/Background (%)	99.99002

Note: Naphthalene will be dissolved at ~22% in toluene for vaporization into TO inlet duct.

Equations

Equation 1

$$1\,ug = 1000\,ng$$

Equation 2

$$DRE\% = (m_{POHC\,in} - m_{POHC\,out})/m_{POHC\,out} x\,100$$

Where:

- DRE% - Destruction and Removal Efficiency (percent)
- $m_{POHC\,in}$ – Mass of principal organic hazardous constituent fed into the system (lb/hr)
- $m_{POHC\,ouy}$ – Mass of principal organic hazardous constituent emitted out the stack (lb/hr)

Equation 3

$$SER_{Required} = \frac{(LQL\ x\ Q\ x\ 60)}{(V_{Sample} x\ 1e6\ x\ 453.6)\ x\ f}$$

Where:

- $SER_{Required}$ – Stack Emission Rate Required for Detection (lb/hr)
- LQL – Lower Quantitation Limit (ug / train)
- Q – Dry Stack Gas Flow Rate (dscfm)
- 60 – minutes per hour
- V_{Sample} – Sample Volume (dscf)
- 1 e6 – Conversion of ug to gram
- 453.6 – gram per pound
- f – Fraction of Sample Extract for POHC Analysis

Equation 4

$$C_{Stack\,ug} = \frac{LQL}{(V_{Sample}\,x\,f)}$$

Where:

- $C_{Stack\,ug}$ – Stack POHC Concentration (ug/dscf)
- LQL – Lower Quantitation Limit (ug / train)
- V_{Sample} – Sample Volume (dscf)
- f – Fraction of Sample Extract for POHC Analysis

Equation 5

$$C_{Stack\,ppb} = \frac{SER_{Required} * R\,x\,T\,x\,1e9}{(MW_{POHC}\,x\,P_{Atm}\,x\,Q\,x\,60\,xf)}$$

Where:

- $C_{Stack\,ppb}$ – Stack POHC Concentration (ppb_{vds})
- $SER_{Required}$ – Stack Emission Rate Required for Detection (lb/hr)
- R – gas Constant (10.73)
- T – Temperature Absolute (68 + 460 R)
- 1 e 9 – conversion of ng to gram
- MW_{POHC} – Molecular Weight of POHC
- P_{Atm} – Atmospheric Pressure (14.7 psia)
- Q – Dry Stack Gas Flow Rate (dscfm)
- 60 – minutes per hour
- f – Fraction of Sample Extract for POHC Analysis

Equation 6

$$FR_{POHC\,DRE} = \frac{SER_{Required}}{1-(\frac{DRE\%}{100})}$$

Where:

- $FR_{POHC\,DRE}$ – Feed / Spiking Rate to Demonstrate DRE (lb/hr)
- $SER_{Required}$ – Stack Emission Rate Required for Detection (lb/hr)
- DRE% - Destruction and Removal Efficiency (percent)

Equation 7

$$FR_{POHC\,SF} = FR_{POHC}\,x\,SF_{Analytical}$$

Where:

- $FR_{POHC\,SF}$ – Feed / Spiking Rate to Demonstrate DRE with Analytical Safety Factor Applied (lb/hr)
- FR_{POHC} – Feed / Spiking Rate to Demonstrate DRE (lb/hr)
- $SF_{Analytical}$ - Analytical Safety Factor

Equation 8

$$SER_{Potential} = FR_{POHC}\,x\,1-(\frac{DRE\%}{100})$$

Where:

- $SER_{Potential}$ – Stack Emission Rate Potential at DRE (lb/hr)
- FR_{POHC} – Feed / Spiking Rate (lb/hr)
- DRE% - Destruction and Removal Efficiency (percent)

Equation 9

$$SER_{Potential\,ug} = (SER_{Potential}\ x\ 453.6\ x\ 1e6)/(Q\ x\ 60)$$

Where:

- SER $_{Potential\ ug}$ – Stack Emission Rate Potential at DRE (ug/dscf)
- SER $_{Potential}$ – Stack Emission Rate Potential at DRE (lb/hr)
- Q – Dry Stack Gas Flow Rate (dscfm)
- 453.6 – gram per pound
- 1e6 – gram per ug
- 60 – minutes per hour

Equation 10

$$SER_{Potential\,ppb} = (SER_{Potential}\ x\ R\ x\ T\ x\ 1e9)/(MW_{POHC}\ x\ P_{Atm}\ x\ Q\ x\ 60)$$

Where:

- SER $_{Potential}$ – Stack Emission Rate Potential at DRE (lb/hr)
- R – gas Constant (10.73)
- T – Temperature Absolute (68 + 460 R)
- 1 e 9 – conversion of ng to gram
- MW $_{POHC}$ – Molecular Weight of POHC
- P $_{Atm}$ – Atmospheric Pressure (14.7 psia)
- Q – Dry Stack Gas Flow Rate (dscfm)
- 60 – minutes per hour

Equation 11

$$Train_{Loading} = SER_{Potential\,ug}\ x\ V_{Sample}$$

Where:

- Train $_{Loading}$ – Train Loading (ug/train)
- SER $_{Potential\ ug}$ – Stack Emission Rate Potential at DRE (ug/dscf
- V $_{Sample}$ – Sample Volume (dscf)

Equation 12

$$SER_{Background} = (C_{POHC\,Background}\ x\ 28.316\ x\ Q\ x\ 60)/(1e6\ x\ 453.6)$$

Where:

- SER $_{Background}$ – Stack Emission Rate Equivalent from Background (lb/hr)
- C $_{POHC\ Background}$ - POHC Background Concentration in Stack Gas (ug/l)
- 28.316 – liter per ft^3
- Q – Dry Stack Gas Flow Rate (dscfm)
- 60 – minutes per hour
- 453.6 – gram per pound

- 1e6 – gram per ug

Equation 13

$$SER_{Contamination} = (POHC_{Train\ Contamination}\ x\ Q\ x\ 60)/(V_{Sample}\ x\ 1e6\ x\ 453.6)$$

Where:

- SER $_{Contamination}$ – Stack Emission Rate Equivalent from Sample Train Contamination (ug/sample)
- POHC $_{Train\ Contamination}$ –
- Q – Dry Stack Gas Flow Rate (dscfm)
- 60 – minutes per hour
- V $_{Sample}$ – Sample Volume (dscf)
- 453.6 – gram per pound
- 1e6 – gram per ug

Equation 14

$$Train_{Loading\ Added} = ((SER_{Background} + SER_{Contamination})\ x\ V_{Sample}\ x\ 453.6\ x\ 1e6)/(Q\ x\ 60)$$

Where:

- Train Loading Added - Added Sample Train Loading from PICs/Background (ug)
- SER $_{Background}$ – Stack Emission Rate Equivalent from Background (lb/hr)
- SER $_{Contamination}$ – Stack Emission Rate Equivalent from Sample Train Contamination (ug/sample)
- V $_{Sample}$ – Sample Volume (dscf)
- 453.6 – gram per pound
- 1e6 – gram per ug
- Q – Dry Stack Gas Flow Rate (dscfm)
- 60 – minutes per hour