May 9, 2025

Texas Commission on Environmental Quality
Attention: Waste Permits Division, MC 126
P.O. Box 13087
Austin, Texas 78711-3087

RE: RCRA PERMIT APPLICATION – ENVIROSAFE DEMIL, LLC IN HOOKS, TEXAS
INDUSTRIAL SOLID WASTE REGISTRATION NUMBER: 98470
PROPOSED HAZARDOUS WASTE PERMIT NUMBER: 50424
TRACKING NO. 30585390; RN111572442/CN606060028
RESPONSE: APPLICATION DEFICIENCIES – TECHNICAL NOD #1

Texas Commission on Environmental Quality, Waste Permits Division:

EnviroSafe Demil, LLC (ESD) is including a response to the Texas Commission on Environmental Quality (TCEQ) for the Technical Notification of Deficiencies (NOD) issued on April 10, 2025 for its Industrial and Hazardous Waste Permit Application for the facility in Hooks, Texas.

The NODs addressed in this submittal are the NODs transmitted via Mr. Vahab Haghighatian on April 10, 2025. ESD understands that the deficiencies included in the attached table relate to Part B application Section III and a part of Sections V and VIII and that other sections/parts of the application are still under review.

As discussed during the April 24, 2025 conference call between ESD and TCEQ, a written response to the NODs will be provided indicating what changes will be made to address the NOD. Revised re-paginated pages (including a redline/strikeout version of all the changes) are not required to be submitted until after all of the other sections of the application have been reviewed and all NODs have been addressed in written response format.

This submittal includes the table provided by TCEQ on April 10, 2025 titled *Application Deficiencies – Technical NOD #1*. ESD has provided responses to each NOD in red text. Please review the responses and inform ESD if the responses are adequate to meet the requirements. Note that the responses to #T18 and #T19 will take more time to develop and are not yet complete. Following the table, additional information that will be included in the final application is included if changes could not be adequately documented by a written response only (i.e. if a map, etc. was needed to address the NOD).

Facility Updates Since Application Was Submitted
At the time the application was initially submitted, ESD had not yet completed closing on the purchase of the main portion of the facility from the TexAmericas Center. ESD has now closed on the main portion of

the facility and is now both the owner and operator of the main facility. With the purchase of this property, the information in Attachment A of the Part A Application will be revised to indicate ownership of both the north portion of the F-line (45 acres) and the south portion of the F-line (130 acres). The current lease information in Attachment A.1 and A.2 of the Part A Application will be removed and the nomenclature for these two attachments will be merged into one attachment named Attachment A.1/A.2. Attachment A.1/A.2 will include the signed Deed of Trust for the property (both F-line (45 acres) and F-line (130 acres)). The Deed of Trust is attached to this submittal for TCEQ's review.

As stated in the permit application, ESD is leasing the two storage areas from the TexAmericas Center – these storage areas are not available for purchase and can only be leased from TexAmericas Center. No changes will be made to Attachment A.3 or Attachment A.4.

Additionally, with the purchase of the main portion of the facility, ESD now owns Montague Street and will be renaming Montague Street to Demil Way. Therefore the address of the facility will be changing from 401 N Montague Street, Hooks, Texas 75561 to 401 Demil Way, Hooks, Texas 75561. The street name change has not officially been made as of the date of submittal of this letter, but is planned to officially change during the review period of the RCRA permit application. When the change is official, ESD will submit a letter notifying TCEQ of the new address.

Please contact me at 360-480-9320 or [redacted] with any questions or comments.

Sincerely,

Michael Wentz
President, EnviroSafe Demil, LLC.
401 N Montague Street
Hooks, Texas 75561-0019

ATTACHMENT

APPLICATION DEFICIENCIES – TECHNICAL NOD #1

RESPONSES

Application Deficiencies – Technical NOD #1

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T1	B	III. Facility Management instructions	Section III – Pages 1-3	Application Instructions	Typo	References to included information Appendix III.A, B, C, D, and E are incorrectly stated as Appendix II.A, B, C, D, and E. The references will be updated to the correct references.
T2	B	III	Section III Page 18	Application Instructions	Omitted	Table 2, Safety and Emergency Equipment Inspection Frequencies does not have an entry for "Security Devices" which is included in Table II.D. Inspection Schedule Page 20. Table 2, Safety and Emergency Equipment Inspection Frequencies will be updated to include the following information for each column: Device Type: "Security Devices" Frequency: "Weekly" Inspections, Tests, & Calibrations: "Visually inspect fences, gates, locks, and key card entry equipment for compromise; ensure gates and key card entry equipment are functioning properly."
T3	B	III	Section III Page 21	Application Instructions	Typo	The heading cites 40 CFR Part 64 Subpart D (264.50-56) which should read 40 CFR Part 264 Subpart D (264.50-56). For clarity please add text to the title to read: "40 CFR Part 264 Subpart C – Preparedness and Prevention (264/30- 264.37) and 40 CFR Part 264 Subpart D – Contingency Plan and Emergency Procedures (264.50-56)." The suggested text will be added to the title.

[1] Deficiency ID – Key: A#=Administrative deficiency (ex. A12); NT#=Non-Technical deficiency relating to more administrative in nature such as typo, format, etc. (ex. NT7); T#=Technical deficiency relating to Sections I-X and Sections XII-XIII of the Part B application (ex. T10); C#=Comment only (ex. C1); CP#=Technical deficiency relating to Section XI-Compliance Plan of the Part B application (ex. CP14); **Number in parenthesis (*n*) = *n*th instance of same deficiency** (ex. T1(2) is the second instance of deficiency T1 originally identified in previous NOD).

[2] Location of deficiency in submittal/application. Items in square brackets [ ] refer to applicant's supplemental information submitted as attachments to the application form.

[3] Possible Error Types: Ambiguous, Incomplete, Inconsistent, Incorrect, Omitted, Typo, or Format.

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T4	B	III	Section III 2.6.2 Evacuation Routes (III Page 26) and associated Figure 2-1 Evacuation Map (Section III Page 34)	40 CFR 264.52(f)	Format	The text refers to the Evacuation Map which is difficult to use to identify primary and secondary evacuation routes. If a larger map with those routes more clearly seen is used for training and use in the case of an emergency please note; if not please provide a more easy to use map, or separate maps for each of the three facility sites. This following statement will be added after the first sentence in Section 2.6.2. "A larger map where the routes are more clearly seen is used for training and in the case of emergencies."
T5	B	III	Table 1.1-1	40 CFR 264.31-264.56	Format	This table includes cross-references from the CFR regulations to locations where addressed in the application for both 40 CFR 264 Subpart C – Preparedness and Prevention and 40 CFR 264 Subpart D Contingency Plan and Emergency Procedures. For clarity we recommend changing the title to "Preparedness and Prevention and Contingency Plan Regulatory Checklist" and providing subheadings within the table for the block of 40 CFR 264.32-37 as "Subpart C-Preparedness and Prevention, and for the block of 40 CFR 264.52(c), 264.51, and 264.52(a) – 264.56 as "Contingency Plan and Emergency Procedures." The title will be updated as suggested in the comment above and the two suggested sub headers will be added to the table.
T6	B	III	Section III p. 45	Application Instructions	Ambiguous	The acronyms HBC and NEW are used in this section without defining them. HBC and NEW will be defined as follows: Hybrid Burn Chamber (HBC) Net Explosive Weight (NEW)
T7	B	V	Section V p. 10	Application Instructions	Ambiguous	To match the Part B Section V instructions please change the heading of "1.0 Introduction" to "1.0 General Information." The heading will be updated as suggested.

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T8	B	V	Section V p. 10	40 CFR 270.14(b)(19)	Incorrect	40 CFR 270.14(b)(19) requires that a topographic map surrounding the facility 1000 feet at a scale of 1 inch to not more than 200 feet be provided. The topographic map referred to by this section identified as Attachment C of the Part A application is a USGS topographic map with a scale of 1:24000 which is an equivalent scale of 1 inch to 2000 feet. Referrals to information, drawings, maps, etc. within other sections of the Part B are allowable, but referrals to the Part A are not, since that application submittal is separate and apart from the Part B. There are 12 items required on this map (40 CFR 270.14(b)(19)(i-xii), some of which, but not all, are included on this map referred to, such as (ii) the 100-year floodplain, etc. Three separate maps, one for each separate properties constituting the entire facility might be considered due to the overall coverage of this facility. Contours of sufficient spacing must be indicated to allow determination of stormwater flow at the surface. Topographic maps at the scale of 1 inch to not more than 200 feet are included as an attachment to this submittal as well as maps at other scales in order to display the facility in its entirety. A wind rose is provided on a separate page so that the map can be more clearly seen and not have wind rose information blocking pertinent map data. These maps and wind rose will be included as "Attachment V.A – Maps for General Engineering Reports – General Information" after the last section (Section 4.0) in Section V – Engineering Reports, Appendix V.A – General Engineering Reports. Table 1-2 (Section V – Page 12) will be revised to replace the Part A references with the following: "Attachment V.A – Maps for General Engineering Reports – General Information."

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T9	B	V	Section V p. 15	30 TAC 335.204(a)(5)	Incomplete	Table 2-1 lists in the 4th row, referencing the TAC citation that "The facility may not be located in: areas where soil unit(s) within five feet of the containment structure have a Unified Soil Classification of GW, BP, GM, GC, SW, SP, or SM…"referring to Attachment II.5 – Soil Unit Information." (pages II-52-53) where it appears that soil unit SM is identified in Area 4 where the Above Ground Magazine Unit No. 300 is located. The text in Section II – Facility Siting Criteria, Section 3.2 (Section II – Page 7) will be replaced with the following text: "Attachment II.5 includes maps that show the United States Department of Agriculture, Natural Resources Conservation Service soil designations within the ESD facility boundaries. The soil underneath where the HBC and Rocket Motor Ops Building will be located is classified as CL, ML, and CH. The soil underneath where the ECMs are located is also classified as CL, ML, and CH. The soil underneath where the AGM is located is classified as CL, ML, SC, SM, and CH. 30 TAC §335.204(a)(5) states that a storage or processing facility may not be located in areas where soil units within 5 feet of the containment structure have a Unified Soil Classification of GW, GP, GM, GC, SW, SP, or SM unless one of the following is true: • secondary containment is provided to preclude migration to groundwater or surface water from spills, leaks or discharges; or • the soil unit is not sufficiently thick and laterally continuous to provide a significant pathway for waste migration. The soil where the AGM located has the Unified Soil Classification code of SM, but secondary containment is provided to preclude migration of spills, leaks, or discharges to groundwater if they were to occur. The AGM is fully enclosed and has raised edges at the entrance locations such that no material would be able to reach the soil outside in the event of a spill (if one were to occur). It should be noted that the energetic materials stored will have no free liquids present. Therefore, there is no potential for liquid spills or leaks." Additionally, the 5th question regarding Unified Soil Classifications in Table

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
						II (Section II – Page 9) will be updated from "No" to "Yes (AGM area only). See Section II – Facility Siting Criteria, Section 3.2."
T10	B	V	Section V p. 15	30 TAC 335.204(a)(8)	Typo	This response to "the critical habitat of an endangered species of plant or animal" refers to Section 2.9 of Appendix II – Facility Siting Criteria which does not exist; apparently should refer to Section 3.3 of Appendix II -Facility Siting Criteria, 3.3 Critical Habitat of an Endangered Species of Plant or Animal. This section refers to Attachment II.5 – Critical Habitat of an Endangered Species of Plant or Animal which is actually Attachment II.6. Table 2-1 on page Section V – Page 15 will be updated to change the reference of Section 2.9 to Section 3.3 and change the reference of Attachment II.5 to Attachment II.6. "Endangered Species of Plan or Animal" will be updated to "Endangered Species of Plant or Animal." Additionally, Section II – Page 58 will be updated to change the reference of Section 2.9 to Section 3.3 and change the reference of Attachment II.5 to Attachment II.6.
T11	B	V	Section V page 18	Application Instructions	Typo	The first sentence locates the storage magazines as being: "…storage magazines that are adjacent to the main facility….". The word "adjacent" should be changed to "proximate" as the three properties of this facility are not adjacent to each other. In addition, all portions of the facility included in the permit application for waste management must be contiguous; i.e., may not be connected by public roadways or if connected by private roadways that the applicant does not own or control a right-of-way must be obtained and clearly included on the legal description of the facility in Part A of the permit application as a contagious facility. The first sentence in Section V – Page 18 will be updated to replace the word "adjacent" with the word "proximate." Additionally, the word "adjacent" on the following pages will also be changed to "proximate." • Part A Application – Page 9 • Part A Application – Attachment B, first page • Part A Application – Attachment E, first page • Section II – Page 5 • Section VII – Page 4 The roadways between the main facility and the storage areas are owned by TexAmericas. These roadways are private roads designated for TexAmericas tenants and their related business activities – these

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
						are not public roadways. ESD pays its share of the "TexAmericas Center-East common area charges" which allows ESD the use of roadways and other common areas. More information on the common area charges can be found in the Part A Application - Attachment A.3 in Section 15.17 of the Industrial Lease document. Specifics on roadway access are included in the Part A Application - Attachment A in Section 15.18 of the Industrial Lease document. The streets that will be used to move material between the storage magazines and the main facility will be Beech Street, Cherry Street, Cypress Street and Montague Street (soon to be renamed "Demil Way"). The following sentence will be added to the first page of the Part A Application – Attachment B: "ESD will transport material between the storage magazines and the main facility using Beech Street, Cherry Street, Cypress Street and Montague Street (soon to be renamed "Demil Way"). ESD's Industrial Lease provides a right-of-way for ESD to access these roads (see Sections 15.17 and 15.18 of the Industrial Lease document in the Part A Application – Attachment A.3)." A third map will be included in the Part A Application – Attachment B. This map is attached to this response. The attached map shows the roadways where ESD has a right-of-way and will plan to move the materials between the storage magazines and the main facility.
T12	B	V	Section V page 19	40 CFR 270.15(e)	Incomplete	The response to the requirement to demonstrate compliance of "N/A" does not detail why the container storage areas are not subject to this cited regulation. If ultimately the regulations depend upon a demonstration of the wastes containing less than 500 ppm VO (40 CFR 264.1082(c)(1) then provide a justification of that exemption. The entries for §264.175(a) and §264.175(b) will be modified to have the following entry "N/A, see §264.175(c) and Section 4.0." Additionally, the entries for §264.175(a), §264.175(b), §264.175(c), and §270.15(a) will have a footnote added that states "The storage magazines will not store containers with free liquids. Per 40 CFR §264.175(c), storage areas that store containers holding only wastes that do not contain free liquids need not have a containment system described by 40 CFR §264.175(b) as long as certain requirements are met. See Section 4.0 for more information.

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T13	B	V	Section V page 21	Application Instructions	Ambiguous	The description of the existing earth covered magazines in the second sentence of Section 3.1 is unclear, only identifying one part of the structure, the headwall as being made of concrete and the earth covering to be at least two feet deep suggesting it is below grade. Identifying the structure as "…consisting of reinforced concrete headwall, endwall, at grade floor, and arched roof all sealed watertight to each other as one unit, the roof also covered with a minimum two foot thick soil covering…", should more clearly describe the structure and assist in evaluating the structure with respect to other general requirements such as stormwater runon and runoff. The following sentence will be added to the end of the second paragraph in Section 3.1 on page Section V – Page 21: "Each earth covered magazine consists of a reinforced concrete headwall and endwall, an at grade floor, and an arched roof all sealed watertight to each other as one unit. The roof is also covered with a minimum of two feet thick soil covering." To aide TCEQ in visualizing the existing earth covered magazines, photographs of the earth covered magazines were included in the Part A Application – Attachment D.
T14	B	V	Section V page 57	Application Instructions	Incomplete	Section 2.2.1 Operation states "No unprocessed energetic material be left in the Rocket Motor Ops Building when the HBC is not in operation." Where will this unprocessed material be managed in the interim period? The following sentence will be included in Section 2.2.1 at the end of the first paragraph: "Any unprocessed energetic material will be transferred to the storage magazines until the HBC returns to operation."
T15	B	V	Section V page 58	Application Instructions	Ambiguous	Section 3.0 Pathways to Exposure states "Due to the nature of the wastes…" is vague, which should explain that the "nature of the wastes as solids containing no free liquids nor significant concentration of volatile organic compounds…" The third sentence in Section 3.0 will be modified to state: "Due to the nature of the wastes (solids containing no free liquids or volatile organic compounds), the manner in which hazardous wastes are stored and handled, the equipment used, the building designs, and the operational practices of the facility, the likelihood of a release of hazardous wastes or hazardous waste constituents is remote."

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T16	B	V	Section V page 62	Application Instructions	Typo	Last sentence of first paragraph refers to "Appendix II – Facility Sitting Criteria". "Facility Sitting Criteria" will be updated to "Facility Siting Criteria" on the following pages: • Section V – Page 54 • Section V – Page 62
T17	B	V	Section V page 62	Application Instructions	Omitted	The second paragraph of this part relies upon referrals to information presented within the Part A application. The information required by the Part B application is a stand alone requirement separate and apart from the Part A application. Cross referrals within the Part B are acceptable but not referrals to the Part A. The second paragraph of Section 1.0 will be revised to remove the references to the Part A Application Form. The location of the facility is described elsewhere in the Part B application and detailed location information does not necessarily need to be referenced from this particular section for compliance with the requirements of 40 CFR §264.600-§264.602, and §270.23. The second paragraph will be reworded as follows: "The HBC and the associated air pollution control system will be located towards the southern portion of the main facility property, near the intersections of N Montague Street (soon to be renamed "Demil Way") and Cypress Street in Hooks, Texas (Bowie County). The exact location is described in Section II of the Part B Application – *Facility Siting Criteria*."
T18	B	V	Section V pages 68-69	40 CFR Part 264 Subpart X	Incorrect	The statement is made on these pages that regulations explicitly not contained within Subpart O do not apply to Subpart O. Subpart O (40 CFR 264.601) states that "Permit terms and provisions must 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." Revise the statement accordingly. The paragraph in Section 2.7 under the subheading "Monitoring" will be revised to read as follows: "Continuous process monitoring, including monitoring of the operating parameter limits (OPLs) discussed in Section 3.0, is conducted through the Human Machine Interface (HMI) located in the Range Control room. A series of computers and monitors displays information on the

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
						temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. By procedure, HBC process cycles are not allowed to commence if all safe conditions are not met or remedied." The first paragraph of Section 3.0 will be revised to read as follows: "The HBC is not an incinerator and there is no controlled flame combustion. The HBC operation most closely resembles open burning/open detonation, but is more environmentally responsible. As opposed to open burning/open detonation, the HBC has the advantage of containing and cleaning the exhaust gases. The HBC is non-incineration, and ESD is applying for a RCRA 40 CFR Part 264 Subpart X permit. After discussions with TCEQ, TCEQ recommends that the emission limits and relevant operating parameter limits (OPLs) of 40 CFR Part 63 Subpart EEE (HWC MACT) would be most appropriate for the HBC and its APCS." The remainder of *Section V – Engineering Reports, Appendix V.K - Miscellaneous Units (Hybrid Burn Chamber)* will be reviewed and changes will be made as necessary to reflect the Trial Burn Plan and its associated requirements. A redline/strikeout revision of this section will be provided to TCEQ along with the Trial Burn Plan requested in NOD #T19.

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T19	B	V	Section V page 70	Application Instructions 40 CFR Part 264 Subpart X	Incomplete	Section 4.1 indicates that this facility intends to operate in compliance with a TCEQ issued permit-by-rule (PBR). Please remove the reference to the PBR, instead include a Trial Burn Plan, as follows: 1. Propose a trial burn plan to test the unit and associated air pollution system which will ensure compliance with the emission standards for new hazardous waste incinerators in 40 CFR Section 63.1219 (b) and the monitoring requirements in 40 CFR Section 63.1209. 2. Complete the following tables except replace "incinerator" with "the name of the unit being permitted", and replace "H" with "K" in the designation for the tables: a. Table V.H.3 – Maximum Allowable Constituents Feed Rates based on the design and performance of the unit. b. Table V.H.4. Maximum Allowable emission Rates, based on 40 CFR Section 63.1219 for new hazardous waste incinerators and the performance of the unit. c. Table V.H.5 – Incinerator Permit Conditions, Monitoring and Automatic Waste Feed Cutoff Systems based on the design and performance of the unit – Short Term Operation. Note: Upon issuance of the permit, the permittee will be required to test the unit using the trial burn plan incorporated into the permit and submit the results to the TCEQ for evaluation along with a permit modification per 30 TAC 305.69 to set long term limits in the Tables V.H.2 and V.H.3. ESD is in the process of developing a Trial Burn Plan that is appropriate for the Hybrid Burn Chamber and will send the plan to TCEQ when it is complete. As noted in NOD #T18, additional changes will be made to *Section V – Engineering Reports, Appendix V.K - Miscellaneous Units (Hybrid Burn Chamber)* as necessary to reflect the Trial Burn Plan and its associated requirements. A redline/strikeout revision of this section will be provided to TCEQ along with the Trial Burn Plan.

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T20	B	V	Section V page 71	Application Instructions	Ambiguous	The first and third paragraphs of this page describes the HBC as being set into a "large concrete foundation that completely contains the chamber." A foundation would provide support, and enclosure would completely contain the chamber; please clarify this description of the relationship of how the HBC is placed on the concrete foundation and within the enclosure. The text in Section 4.2 under the heading "Precipitation Run-on and Runoff" will be replaced with the following text: "The feed system for the HBC is enclosed within the Rocket Motor Ops Building, preventing precipitation from entering the feed system. The HBC unit is an enclosed vessel (the exterior of the vessel is exposed to the elements) that is set into a large concrete foundation that provides support and completely contains the footprint of the HBC. The HBC APCS has a concrete pad with an apron to capture rainwater runoff through a filter. These measures guard against the release of hazardous waste to the surface water, groundwater, or soil." The text in the second paragraph of Section 5.0 will be replaced with the following text: "As mentioned in Section 4.2, the HBC vessel is set into a large concrete foundation that completely contains the footprint of the HBC. The HBC APCS has a concrete pad with an apron to capture rainwater runoff through a filter."

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T21	B	VIII	Section VIII	30 TAC 305.50(a)(4)(B)	Incomplete	The applicant must demonstrate the capability to provide sufficient financial resources to construct, safely operate, properly close, and provide adequate closure and liability coverage for the facility. a. The Letter of Opinion from Financial Expert Mike Levine is not signed. Please arrange to have this letter signed and included with the permit application. b. provide updated loan commitment documentation. For additional information, please contact Mr. Mark Stoebner of the TCEQ Financial Assurance Unit at 512-239-6150 or [redacted] The Letter of Opinion signed by Mike Levine will be included in the final revised application and is also included as an attachment to this submittal. Updated loan commitment documentation will be included in the final revised application and is also included as an attachment to this submittal..

ATTACHMENT

ADDITIONAL INFORMATION FOR

NOD #T8

EnviroSafe Demil Facility Hooks, Texas
May 2025
Padlocked Gate (Not Used)
Controlled Access Gate
Fenceline
Waste Management Unit
Area Boundary
Roadways with Rights of Way
Surface Waters
Marsh, Swamp, Bog, Prairie
Stream, River
Flood Hazard
100-Year Floodplain Area
Hooks
E Ave A
Elm Cir
Oak St
Ishova Tech
Leary
O'Leary St
Walnut
Cedar
Oak St
Lamar Rd
Harrison Ave
Freedom Way
N Montague
N Orange
Denton St
Cypress
Bowie Pkwy
Taylor Ave
Huckleberry
DZ PVT 3
Alder Cir
402 ft
Anderson
Brazos
Delta
Ellis
Fannin
Gregg
Kaufman
Limestone
Montague
Nacogdoches
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Smith
Trinity
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Hopkins Rd
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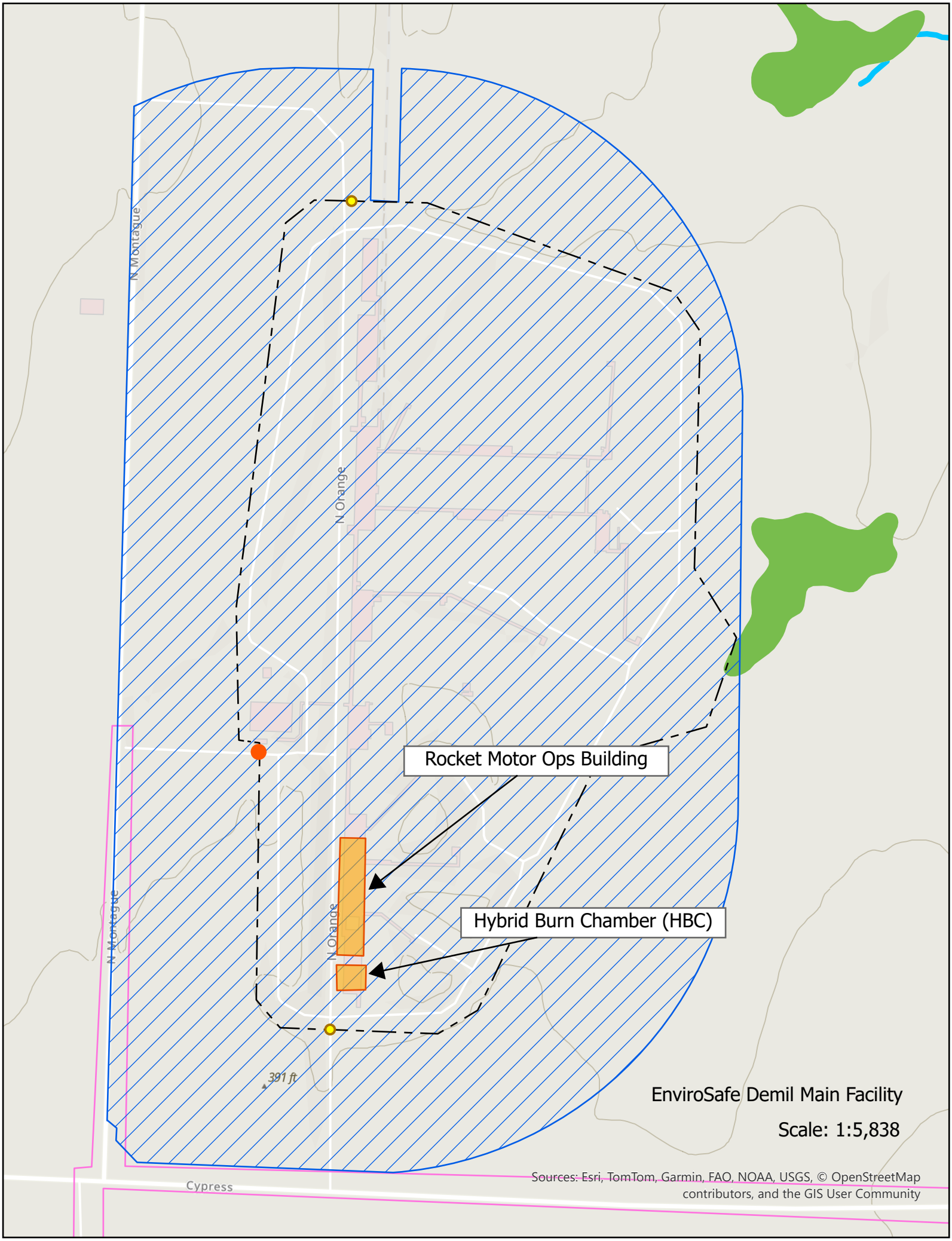
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


N Montague
N Orange
Rocket Motor Ops Building
Hybrid Burn Chamber (HBC)
N Montague
N Orange
391 ft
Cypress
EnviroSafe Demil Main Facility
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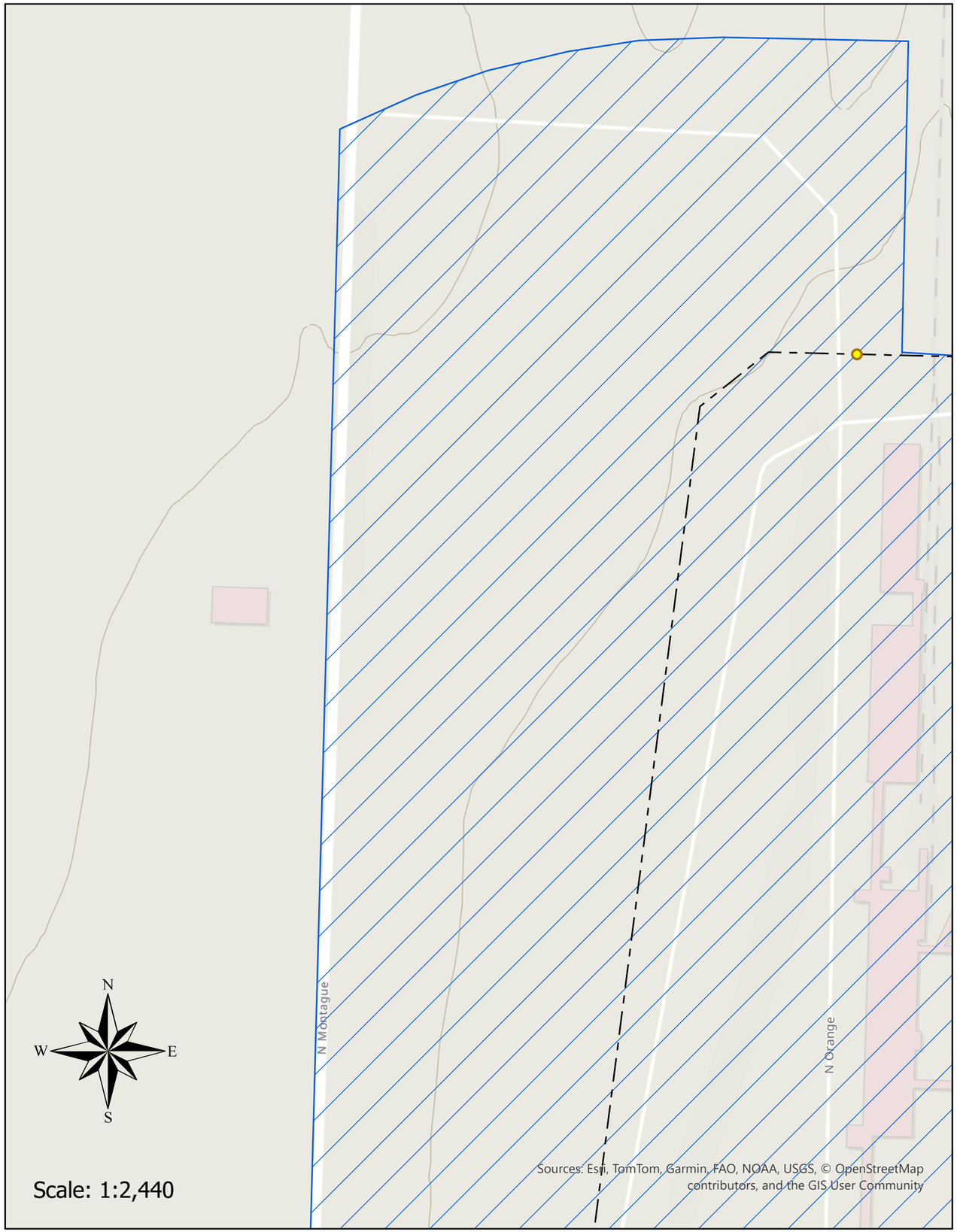
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community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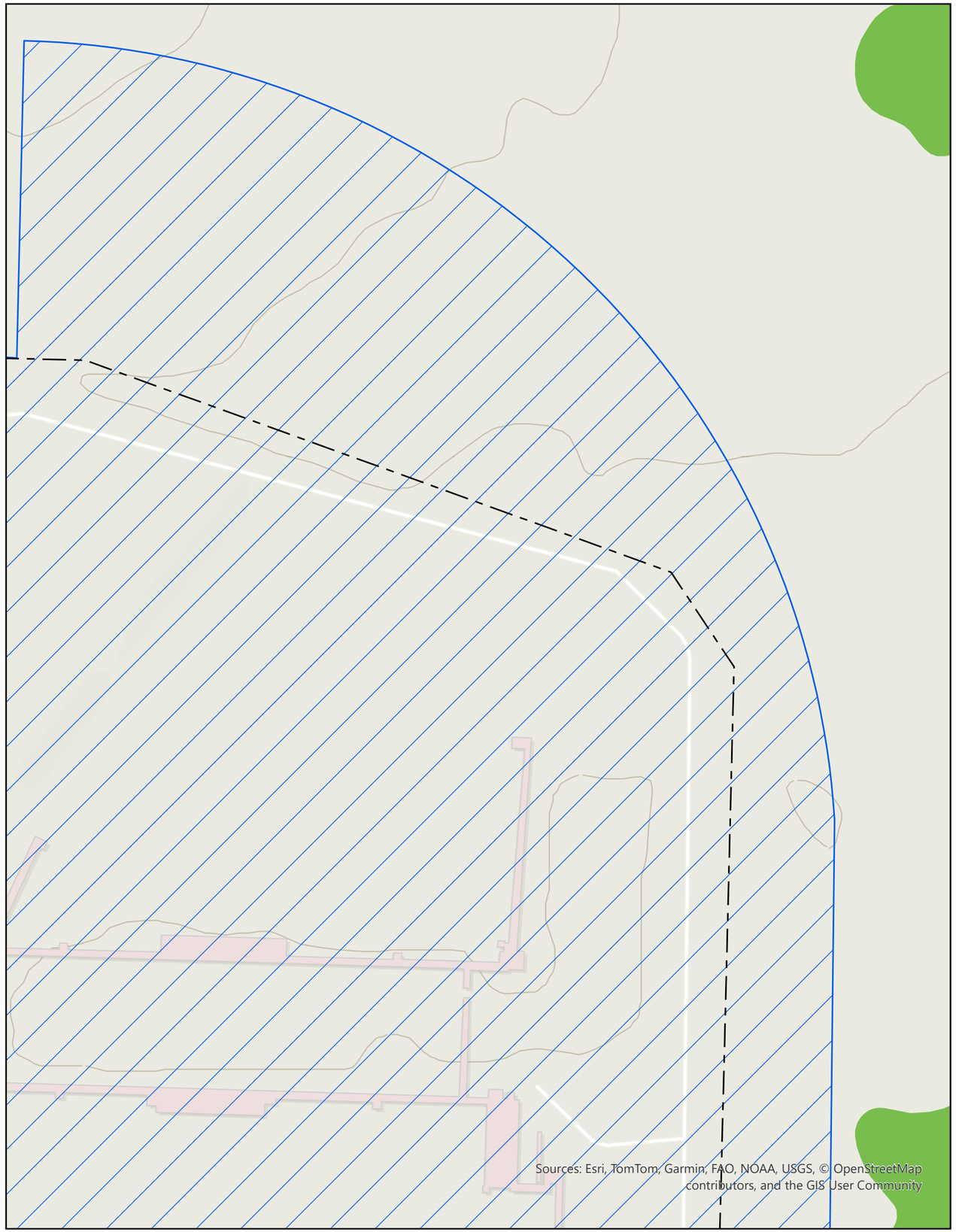
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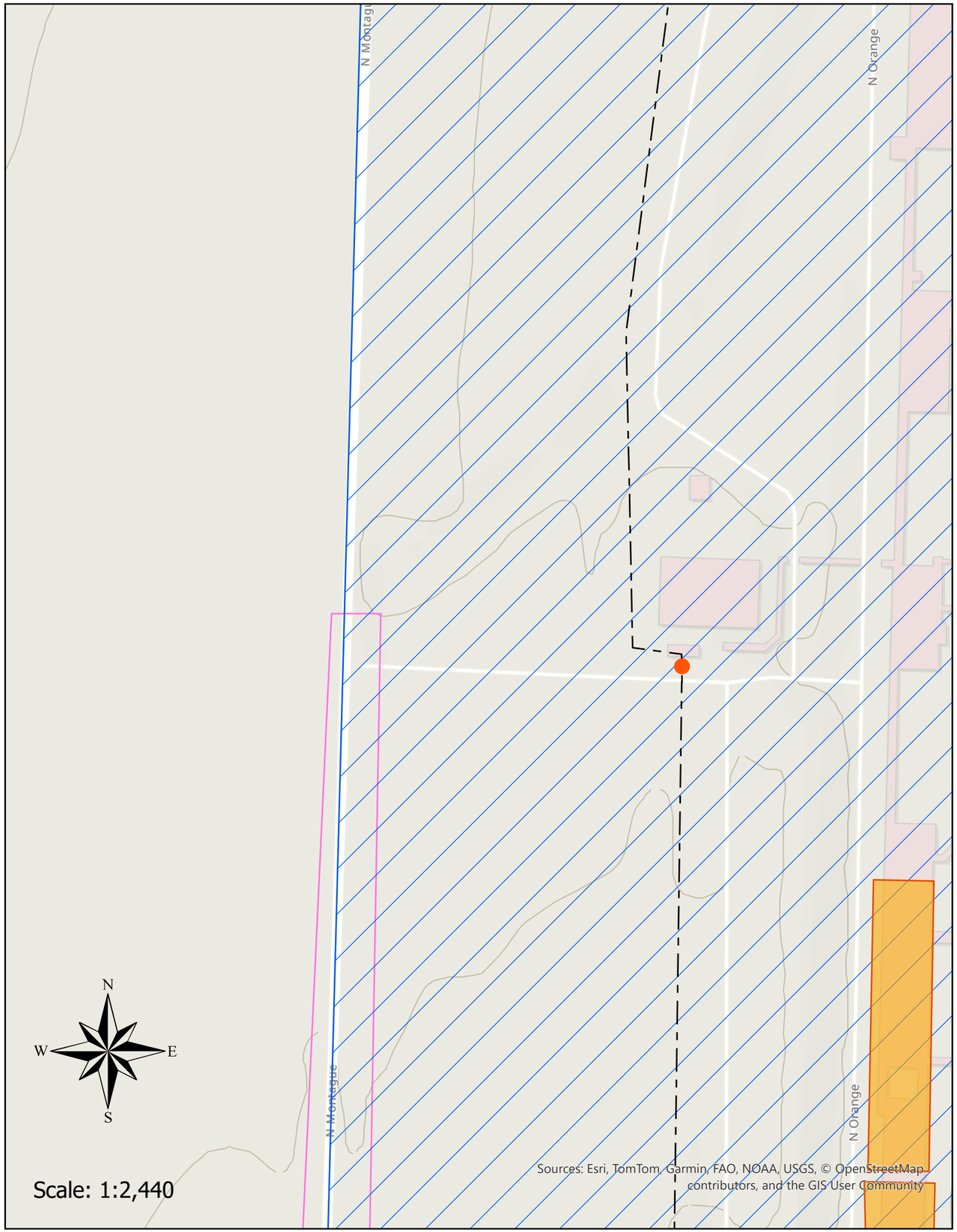
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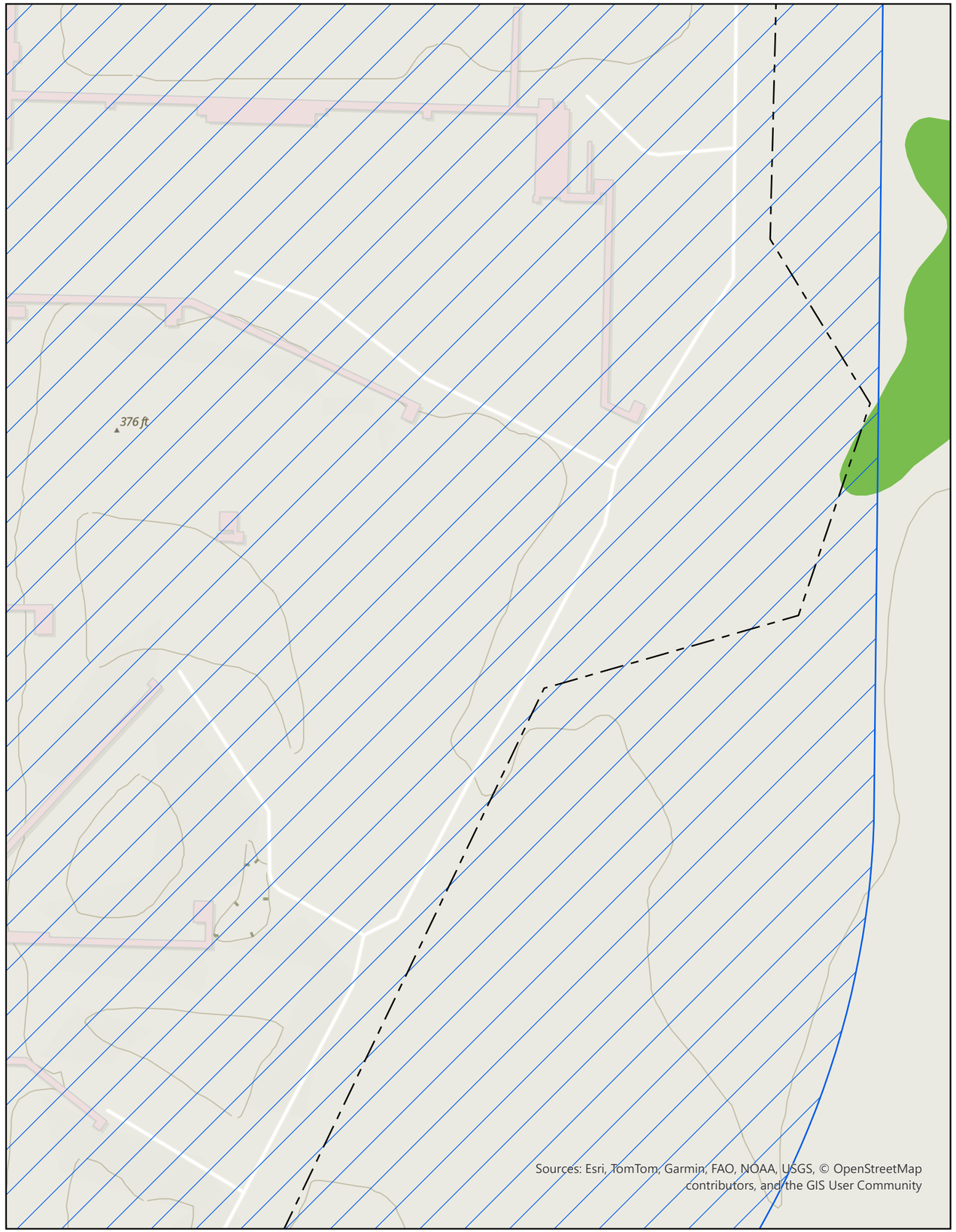
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


376 ft
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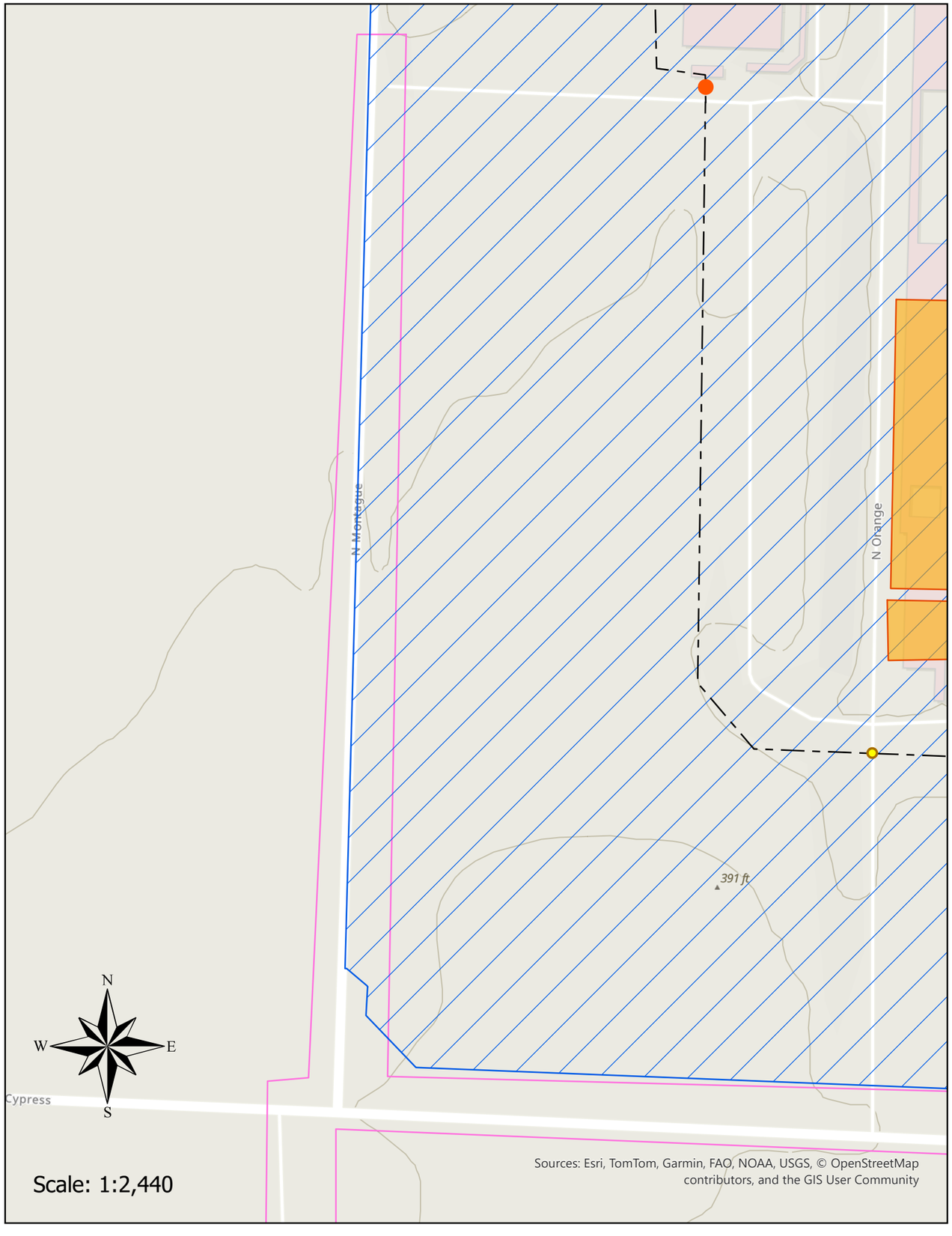
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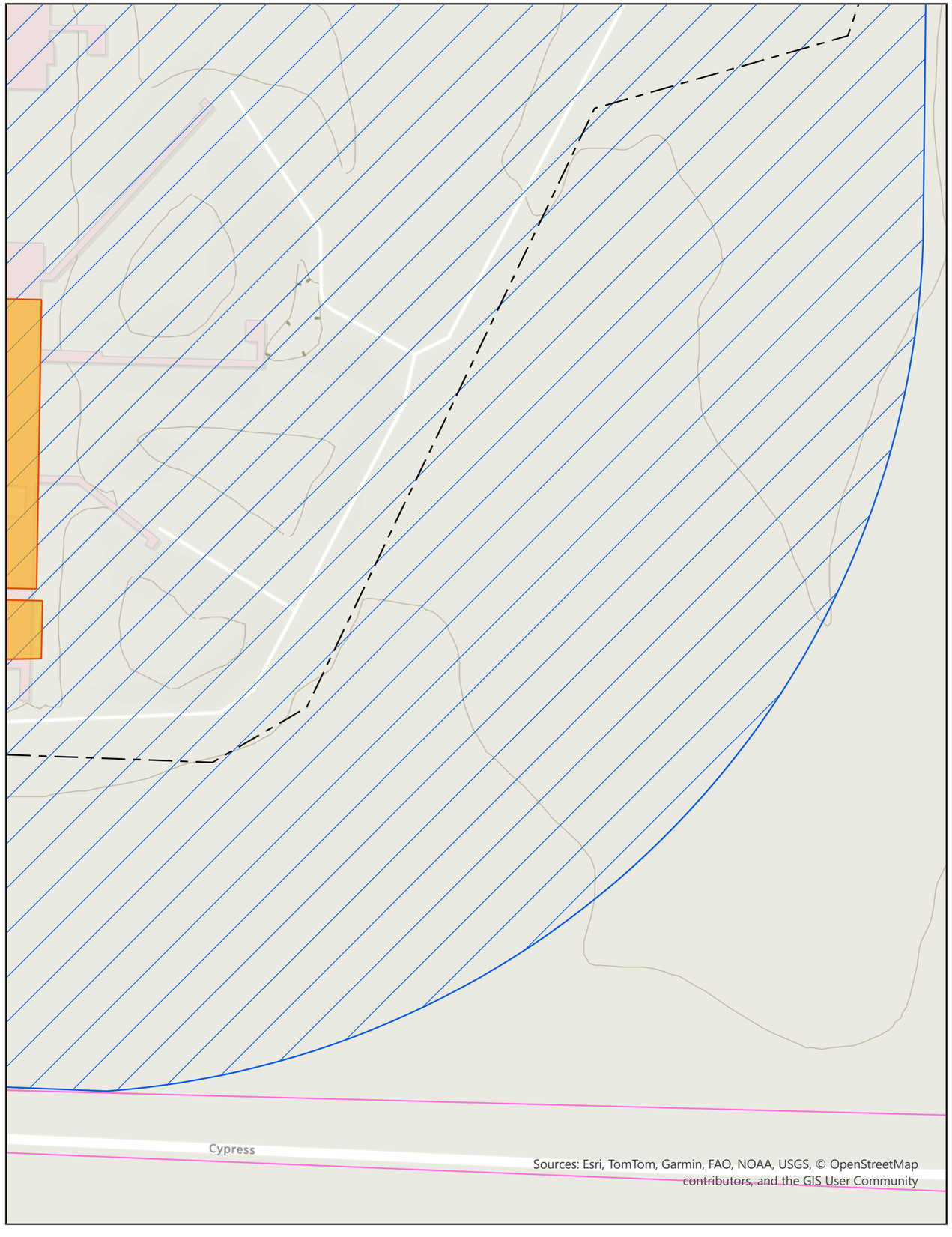
Cypress
Scale: 1:2,440
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community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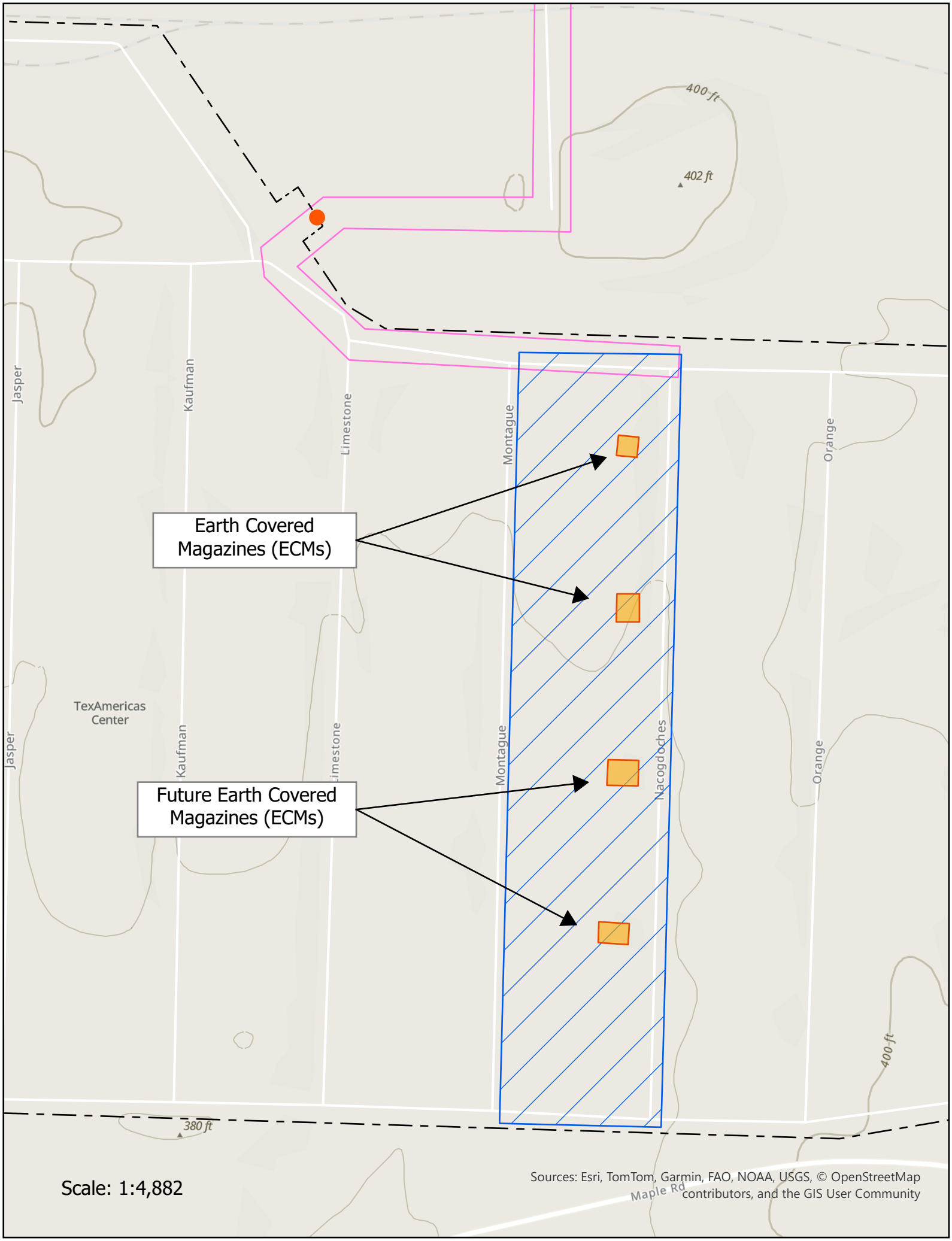
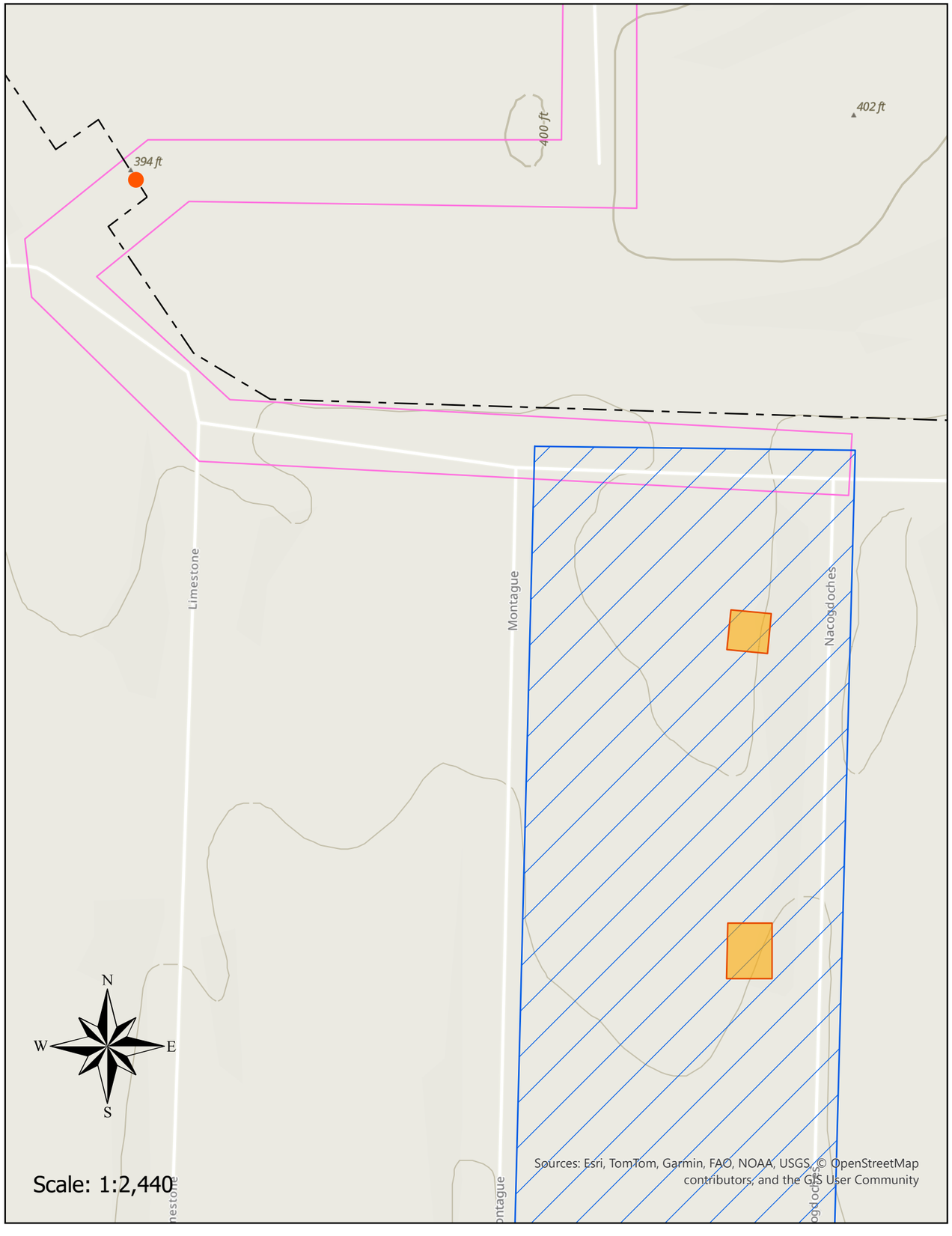
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


Earth Covered Magazines (ECMs)
Future Earth Covered Magazines (ECMs)
Jasper
Kaufman
Limestone
Montague
Nacogdoches
Orange
TexAmericas Center
400 ft
402 ft
380 ft
Maple Rd
Scale: 1:4,882
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community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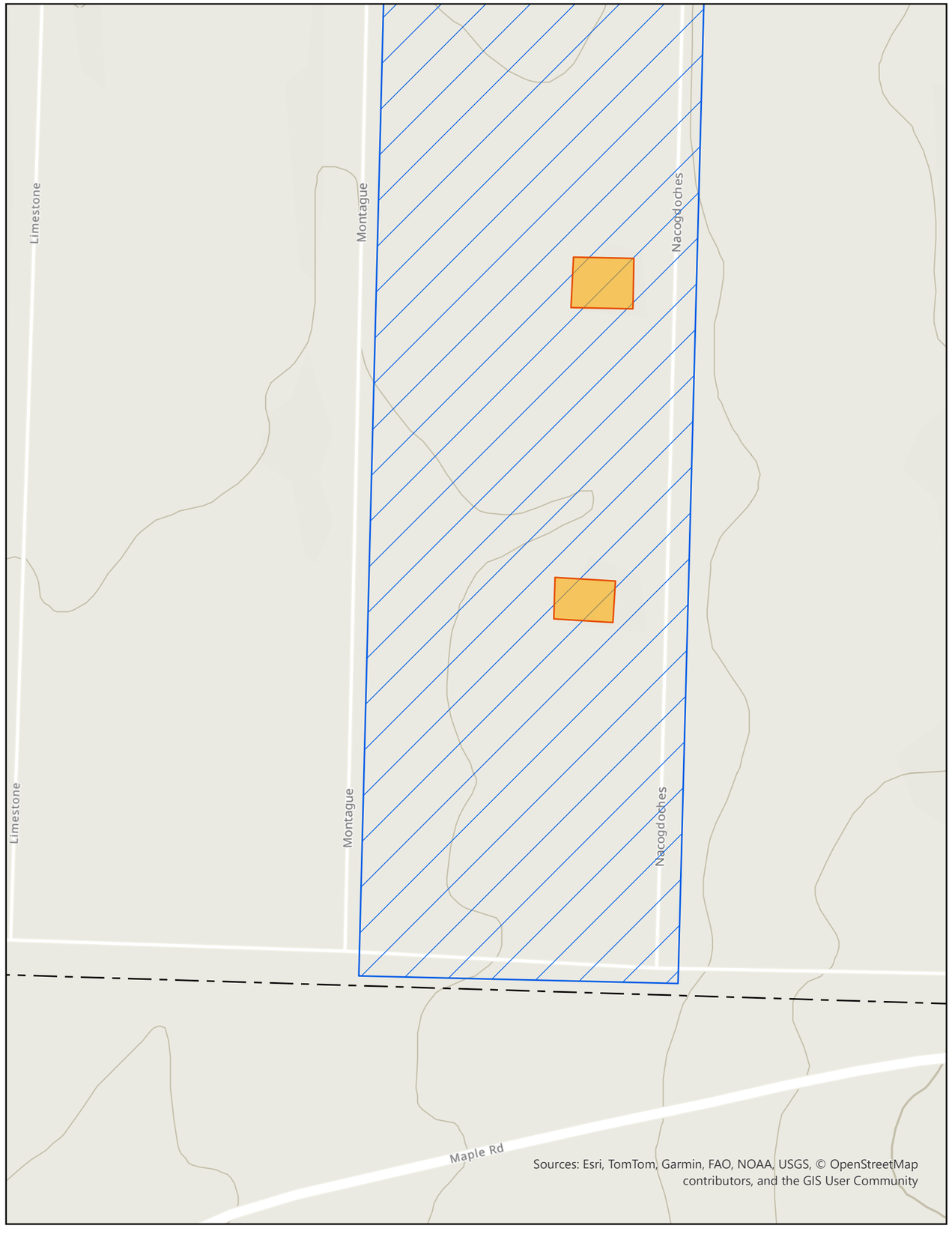
Limestone
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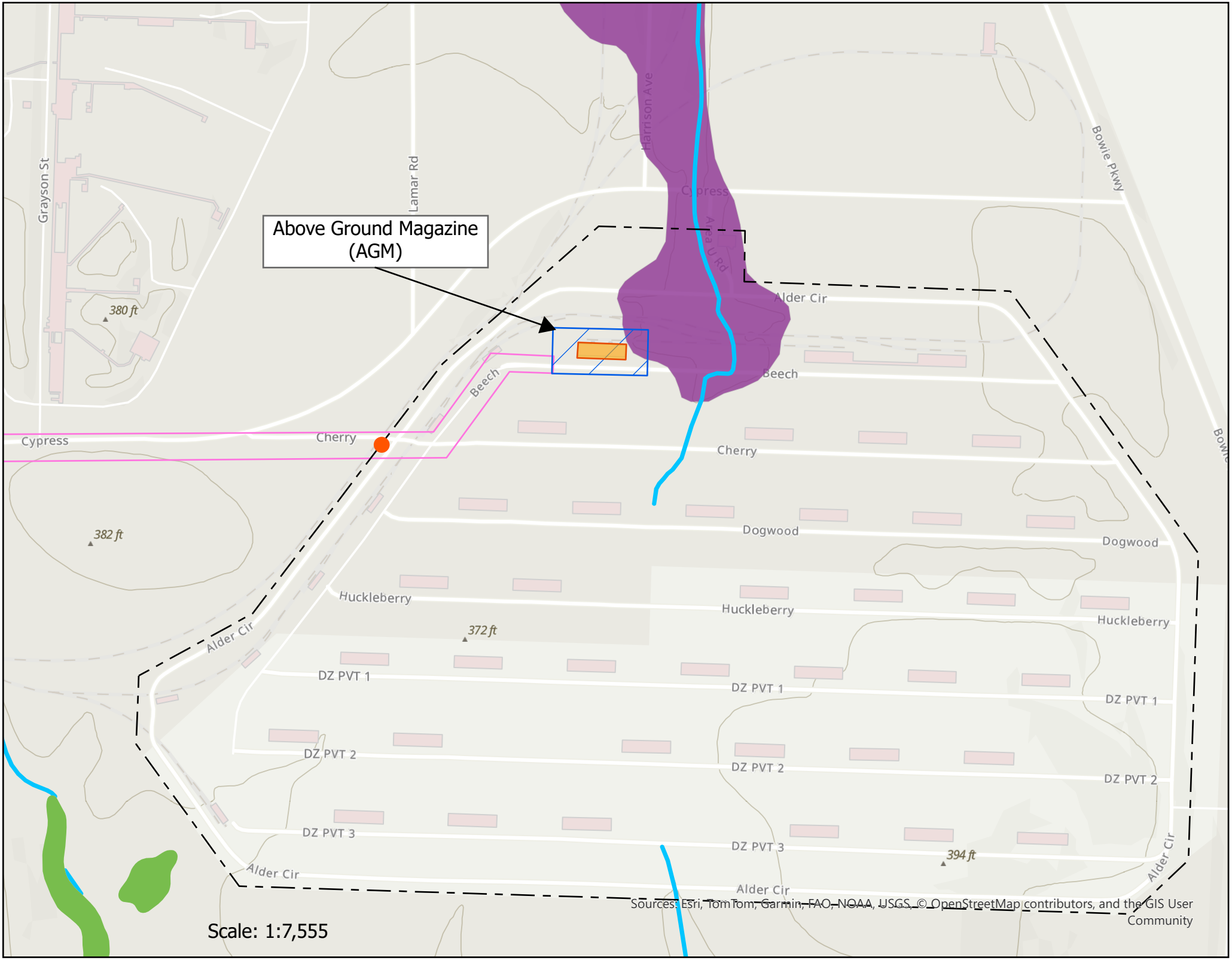
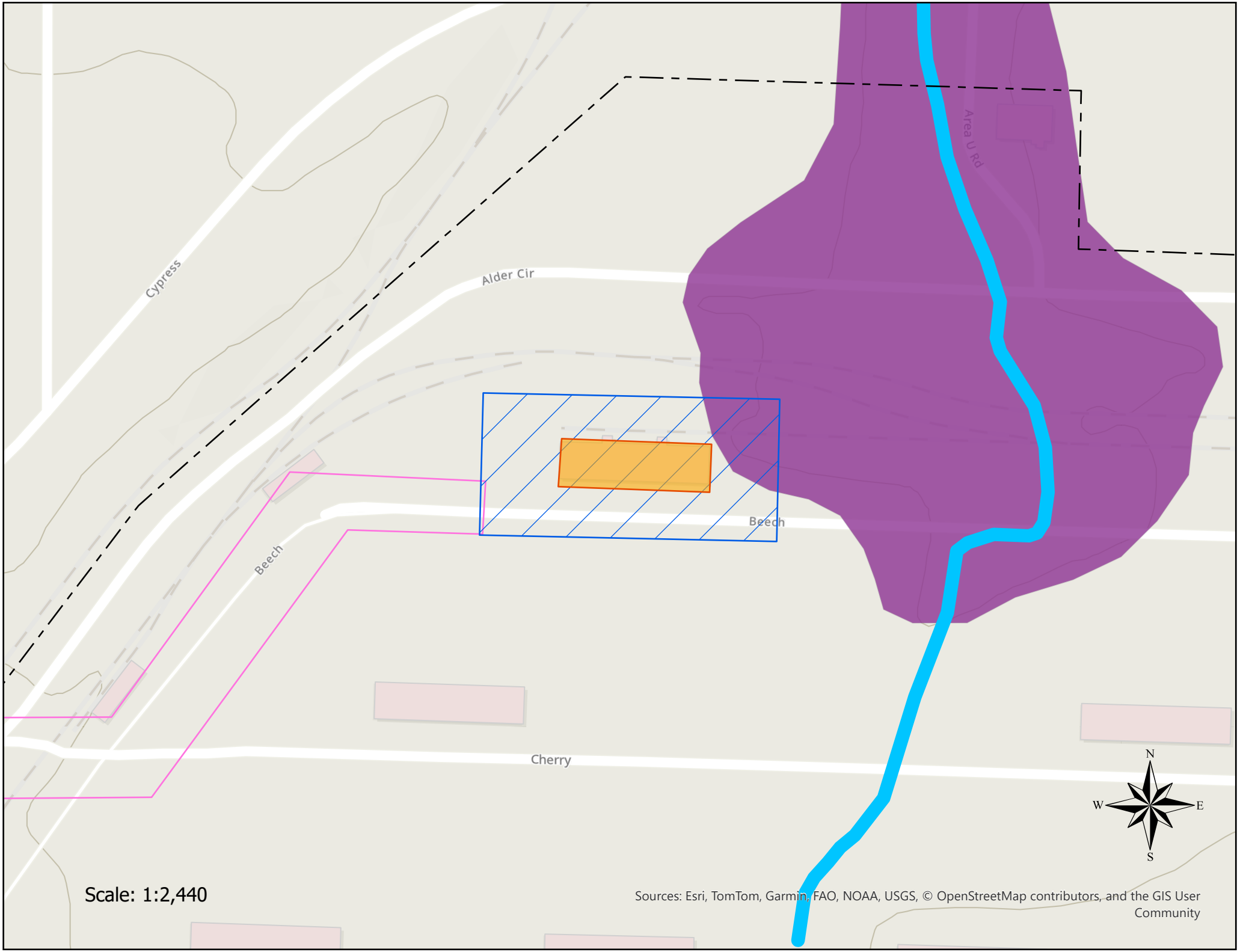
Maple Rd
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


Above Ground Magazine (AGM)
Grayson St
Lamar Rd
Harrison Ave
Bowie Pkwy
Cypress
Alder Cir
Beech
Cherry
Dogwood
Huckleberry
DZ PVT 1
DZ PVT 2
DZ PVT 3
380 ft
382 ft
372 ft
394 ft
Scale: 1:7,555
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


Cypress
Alder Cir
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Beech
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Scale: 1:2,440
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

https://www.mrlc.gov/viewer/

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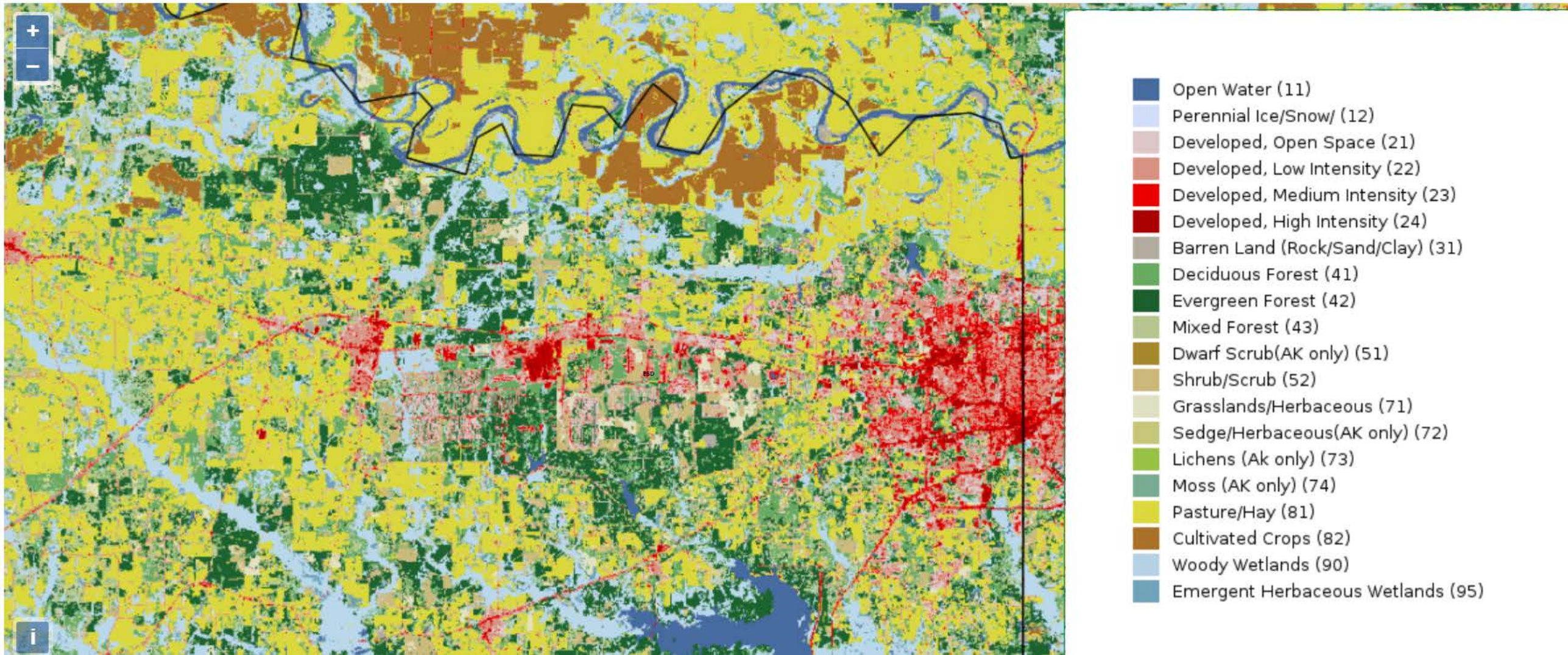
All NLCD Land Cover 2019 CONUS Land Cover

Land Use



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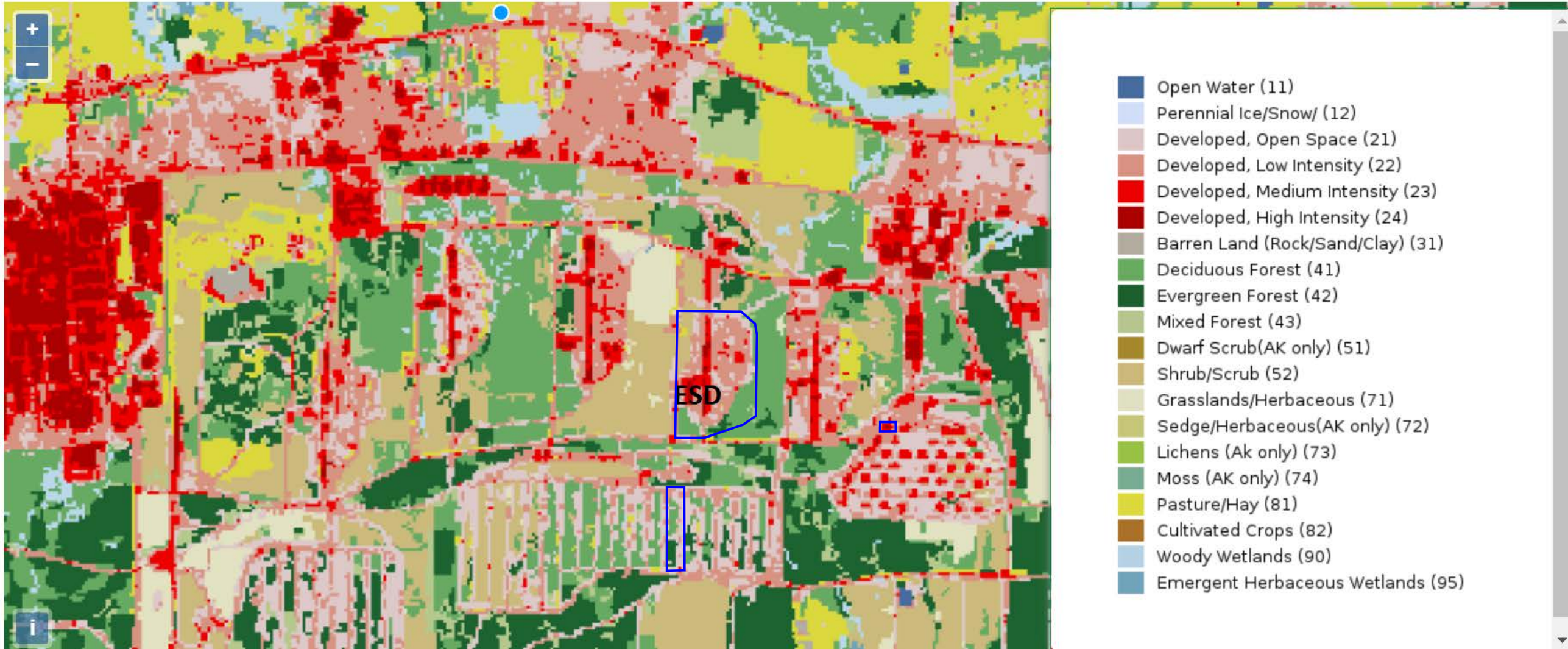
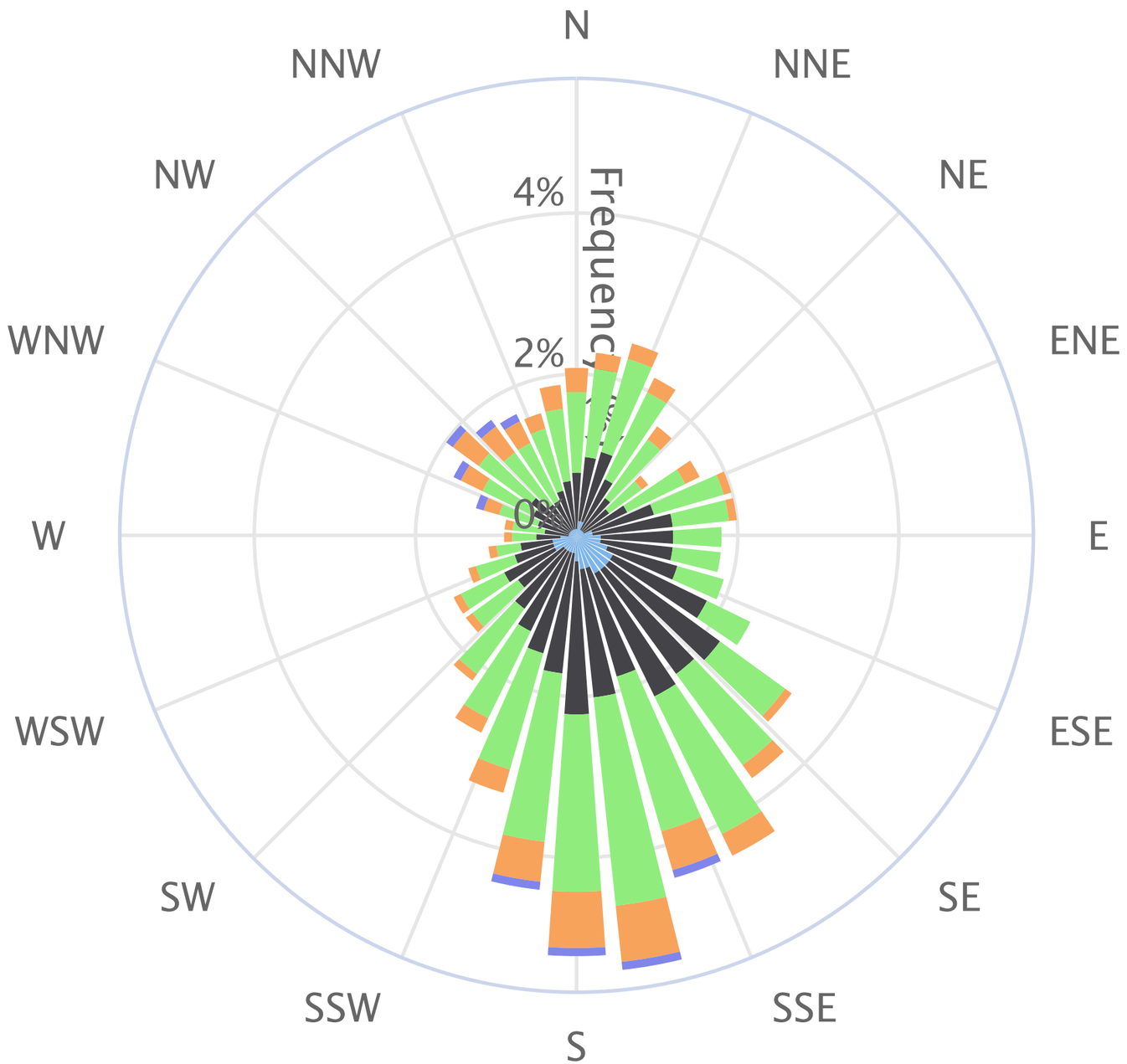
All NLCD Land Cover 2019 CONUS Land Cover

Land Use



SHREVEPORT RGNL AP (LA) Wind Rose

Feb. 1, 2018 – Feb. 1, 2023
Sub-Interval: Jan. 1 – Dec. 31, 0 – 23



Wind Speed (m/s)

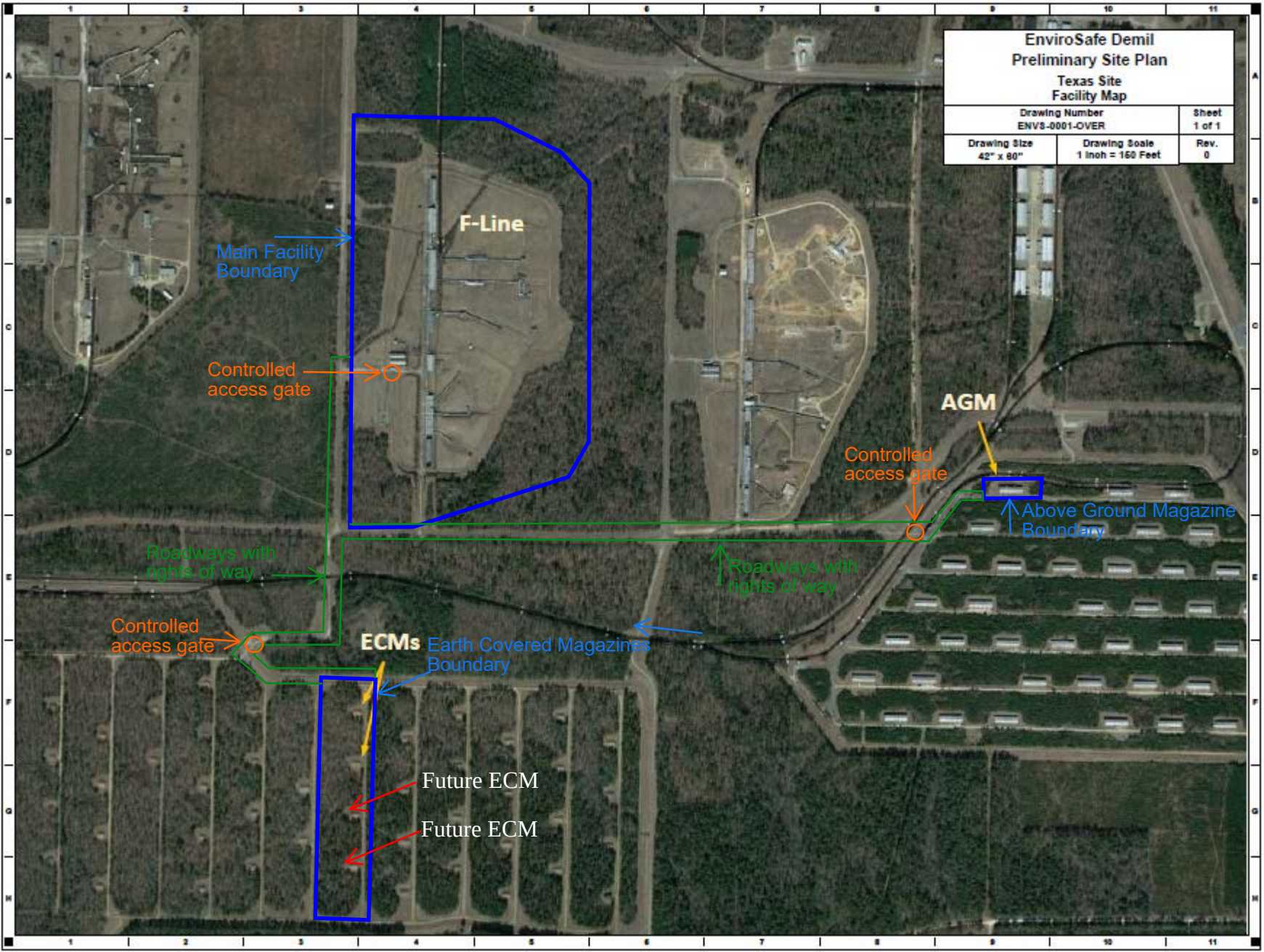
- 1.3 – 1.8
- 1.8 – 3.6
- 3.6 – 5.85
- 5.85 – 8.55
- 8.55 – 11.25
- 11.25 – 14.4
- 14.4 – 17.55
- 17.55 – 21.15
- 21.15 –

Click and drag to zoom

ATTACHMENT

ADDITIONAL INFORMATION FOR

NOD #T11


EnviroSafe Demil
Preliminary Site Plan
Texas Site
Facility Map
Drawing Number
ENVS-0001-OVER
Sheet
1 of 1
Drawing Size
42" x 60"
Drawing Scale
1 inch = 160 Feet
Rev.
0
F-Line
Main Facility Boundary
Controlled access gate
AGM
Controlled access gate
Above Ground Magazine Boundary
Roadways with rights of way
Roadways with rights of way
Controlled access gate
ECMs
Earth Covered Magazines Boundary
Future ECM
Future ECM

ATTACHMENT

ADDITIONAL INFORMATION FOR

NOD # T21

October 23, 2023

Mr. Isaac Vela
Manager, Industrial and Hazardous Waste Permits Section
Texas Commission on Environmental Quality
Building F, MC 130
12100 Park 35 Circle
Austin, Texas 78753

Re: Letter of Opinion From Financial Expert for EnviroSafe Demil LLC
RCRA Permit Application
Hazardous Waste EPA ID No. #**TXR000086289**
Industrial Solid Waste Registration (SWR) No. #**98470**

Dear Mr. Vela:

This letter is furnished to you in response to financial disclosure requirements as applicable under Texas Health and Safety Code Section 361.085 and Title 30, Texas Administrative Code (30 TAC), Section 305.50 to provide assurance that EnviroSafe Demil LLC has sufficient financial resources.

The Texas Commission on Environmental Quality (TCEQ) is relying upon my opinion expressed regarding EnviroSafe Demil LLC (ESD) financial plan which includes balance sheets and forward looking proforma financial statements.

In keeping with the above law and rule requirements please allow this letter to serve as my acknowledgment that I have recently reviewed the following documents:

- EnviroSafe Demil LLC current financial statement dated September 2023;
- EnviroSafe Demil LLC proforma business plan;
- The most recent copy of EnviroSafe Demil LLC's two-year projected balance sheet, cash flow as well as income/expense statements September 2023 that was submitted to the TCEQ.

AdvantEdge Resources
2950 North Loop West, Suite 500,
Houston, TX 77092

866-200-6627
www.advantedgeresources.com

Brief Analysis of ESD's Financial Strength: ESD is a fast-growing company with an order book of over $350 million in government contracts from the US and Canada. To complete its expansion and fulfill its large and growing order book, the company is in the process of raising ~$20 million in debt and equity for the completion of its flagship Hybrid Burn Chamber (HBC) system and minor facility improvement for its Hooks, TX property. The company is in the final phases of a USDA Business and Industry (B&I) Guaranteed Loan Program and has secured the Letter of Commitment from West Town Bank.

Brief Explanation of How ESD has Sufficient Financial Resources to Operate Through Closure/Post-Closure Facility Care: As part of the USDA Loan Program, ESD underwent a rigorous financial and business review called a "Feasibility Study". As part of this process, we (AdvantEdge Resources, via West Town Bank) assessed and analyzed ESD financial statements in addition to the following: (1) Project underwriting; (2) Management's assumptions; (3) Funds; (4) Accounting policies and cost accounting system; (5) Dependency on other entities; 6) Market demand and forecast; (7) Peer industry comparison; (8) Availability of short-term credit; (9) Adequacy of raw materials and supplies; (10) Projected financial statements; (11) Sensitivity analysis; (12) Key financial ratios; and (13) Other secured funding. In addition, we analyzed economic impacts, assessed the market, evaluated the technology, and reviewed company management. Based on the resulting findings, ESD met the requirements for financial feasibility.

I conducted a thorough feasibility study at the request of West Town Bank as part of EnviroSafe Demil LLC's USDA guaranteed loan application and have concluded that the projections seem ***reasonable and attainable if the RCRA Permit is granted***.

Sincerely,

Mike Levine
Principal Consultant
Mike Levine
Office: 866-200-6627
Mobile: 980-777-9787
[redacted]

Enclosures: **Feasibility Study Abstract**

AdvantEdge Resources
2950 North Loop West, Suite 500,
Houston, TX 77092

866-200-6627
www.advantedgeresources.com

USDA

United States Department of Agriculture

Rural Development

Texas State Office

101 South Main Street
Suite 102
Temple, Texas
76501

Voice 254.742.9780
Fax 844.767.7086

April 16, 2025

Mr. Michael Kirby, SVP/Director of Government Lending
Capital Bank, N.A., Formally Known As (FKA) West Town Bank And Trust
2275 Research Boulevard, Suite 600
Rockville, MD 20850

RE: F Line Holdings LLC and Envirosafe Demil LLC
Business & Industry (B&I) OneRD Guaranteed Loan $19,400,000
1st Amendment to Form RD 5001-3, "Conditional Commitment"

Dear Mr. Kirby,

Thank you for your continued interest in the B&I Guaranteed Loan, administered by USDA Rural Development.

USDA Rural Development, Business & Cooperative Programs has considered your lending institution's March 20, 2025, electronic mail PDF request for an extension of Form RD 5001-3, "Conditional Commitment" dated April 26, 2024.

In accordance with 7 CFR 5001, §5001.451(e), USDA Rural Development, Business & Cooperative Programs, modifies the expiration date on Form RD 5001-3, "Conditional Commitment" dated April 26, 2024, for F Line Holdings LLC and Envirosafe Demil LLC, from April 26, 2025, to April 26, 2026.

All other conditions set forth in the April 26, 2024, Form RD 5001-3, "Conditional Commitment;" for the $19,400,000, B&I Guaranteed Loan, remain unchanged and valid.

If the terms of the 1st Amendment to Form RD 5001-3, "Conditional Commitment" are acceptable to Capital Bank, N.A and F Line Holdings LLC and Envirosafe Demil LLC, please return, the enclosed "Acceptance of 1st Amendment."

Should you have any questions, please contact Business & Cooperative Programs, at (254) 742-9780.

Sincerely,

MICHAEL SELF

Digitally signed by MICHAEL SELF
Date: 2025.04.16 16:58:42 -05'00'

MICHAEL SELF
Business & Cooperative Programs Director

Enclosure

USDA is an equal opportunity provider, employer, and lender.

Acceptance of 1st Amendment to April 26, 2024, Form RD 5001-3, "Conditional Commitment" for F Line Holdings LLC and Envirosafe Demil LLC.

Capital Bank, N.A., FKA West Town Bank And Trust

(Name of Lender)

A. Riddick Skinner

(Name of Lender Representative)

By: _____

(Signature of Lender Representative)

Date: 5/8/25

F Line Holdings LLC

(Name of Borrower)

TJ Ogden

(Name of Borrower's Representative)

By: _____

(Signature of Borrower's Representative)

Date: 4-30-2025

Envirosafe Demil LLC

(Name of Borrower)

TJ Ogden

(Name of Borrower's Representative)

By: _____

(Signature of Borrower's Representative)

Date: 4-30-2025

Form RD 5001- 3
(2-2021)

UNITED STATES DEPARTMENT OF AGRICULTURE

RURAL DEVELOPMENT

FORM APPROVED
OMB NO. 0572-0155

CONDITIONAL COMMITMENT

Lender Name: WEST TOWN BANK AND TRUST	USDA's Borrower Unique Entity Identifier: 49-019-702609127
Lender's Address: 8450 FALLS OF NEUSE RD, SUITE 202 RALEIGH, NC 27615	Borrower: F LINE HOLDINGS LLC AND ENVIROSAFE DEMIL LLC
Borrower's Tax ID: 931576197 AND 352618751	Principal Amount of Loan: $19,400,000.00

Type of Loan:
☐ Community Facilities (7 CFR 5001.1(a)(1))
☐ Water and Waste Disposal (7 CFR 5001.1(a)(2))
☒ Business and Industry (7 CFR 5001.1(a)(3))
☐ Rural Energy for America Program (7 CFR 5001.1(a)(4))

Interest Rate Information Fixed: 9.7000% Variable: _____ Both: _____
If both, projected effective rate: _____
At close, rate will be based on 10-year United States Treasury plus 5.00%, fixed for the entire term of loan.

FIXED: Guaranteed Rate: 9.7000%
Unguaranteed Rate: 9.7000%

Variable: Source of Base Rate Publication : _____

Guaranteed Rate: _____	Current Base Rate: _____	+Incremental Difference: _____
Rate Change Period: _____	Rate Cap: _____	Rate Floor: _____
Unguaranteed Rate: _____	Current Base Rate: _____	+Incremental Difference: _____
Rate Change Period: _____	Rate Cap: _____	Rate Floor: _____

The United States of America acting through the United States Department of Agriculture (USDA) hereby agrees that, in accordance with applicable provisions of 7 CFR 5001, it will execute Form RD 5001-4, "Loan Note Guarantee," subject to the conditions and requirements specified in the regulations and herein. The Lender shall not represent this Conditional Commitment as a **guarantee.**

The Guarantee fees payable by the Lender to USDA will be the amount as specified in 7 CFR 5001 and the applicable Federal Register register notice as determined by the date of this Conditional Commitment.

If the loan note guarantee is issued prior to completion of the project's construction an additional guarantee fee will be added.

A Loan Note Guarantee will not be issued until the Lender certifies that there has been no material adverse change in the Borrower's financial condition, nor any other material adverse change in the Borrower's condition, for any reason, during the period of time from USDA's issuance of this Conditional Commitment for Guarantee to issuance of the Loan Note Guarantee regardless of the cause or causes of the change and whether the cause or causes of the change were within the Lender's or Borrower's control.

This Conditional Commitment becomes null and void unless the conditions are accepted by the Lender and Borrower within 60 days from the date of issuance by USDA, at which time the USDA reserves the right to discontinue further processing of the application and terminate its commitment. If USDA decides to terminate this commitment, USDA will provide the lender a written notice of at least 14 days prior to the termination.

This Conditional Commitment is effective until 04-26-2025. All conditions for the issuance of a Loan Note Guarantee must be met during this period. The Lender must submit a written request to extend the Conditional Commitment thirty (30) days prior to its expiration and obtain Agency written approval in accordance with 7 CFR 5001.451(e).

Except as set out below, the purposes for which the loan funds will be used and the amounts to be used for such purposes are set out in the Application for Loan Guarantee. Once this instrument is executed and returned to USDA, no change of conditions or approved loan purpose will be considered, unless requested in writing by the Lender and approved, in writing, by the Agency.

Additional Conditions and Requirements are in Attachment A of this form.

UNITED STATES OF AMERICA

Date: 04-26-2024

By: MICHAEL SELF Digitally signed by MICHAEL SELF Date: 2024.04.26 15:44:37 -05'00'

Title: BUSINESS & COOPERATIVE PROGRAMS DIRECTOR

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a currently valid OMB Control Number. The OMB Control Number for this information collection is 0572-0155 Public reporting for this collection of information is estimated to be approximately 3.42 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, completing and reviewing the collection of information.
All responses to this collection of information are voluntary, however in order to obtain or retain a benefit the information in this form is required (citing authority). Rural Development has no plans to publish information collected under the provisions of this program. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, Rural Development Innovation Center, Regulations Management Division

ACCEPTANCE OF CONDITIONS

To: USDA

Address: RURAL DEVELOPMENT
101 SOUTH MAIN STREET
SUITE 102
TEMPLE, TEXAS 76501

The conditions of this Conditional Commitment for Guarantee including attachments are acceptable and the undersigned intends to proceed with the loan transaction.

WEST TOWN BANK AND TRUST

(Name of Lender)

Date: _____

By: _____

(Signature for Lender)

Date: 09-30-2024

_____

(Signature for Borrower)

Attachment A to Conditional Commitment - Loan Conditions

Date: April 26, 2024
Lender: West Town Bank & Trust
Borrower: F Line Holdings, LLC and EnviroSafe Demil, LLC
Loan Amount: $19,400,000
USDA, Rural Development Guarantee: 80%

No provision stated herein shall be changed without the prior written consent of the lender and USDA Rural Development, which is referred to throughout this document as "the Agency." Language contained in 7 CFR 5001 and Form RD 5001-2, "Lender's Agreement," or Form RD 5001-2a, "Lender's Agreement," will apply as appropriate.

1. PURPOSE

The purpose of the loan is to provide long-term financing to design, construct and install a turnkey-rocket motor burn chamber and related equipment totaling $23,270,000. The project is located at 401 Montague Road, Hooks, Bowie County, TX 75567. Guaranteed loan funds will be used for machinery & equipment (approximately $19,400,000). Funds may also be used to payoff interim financing provided for this purpose. These funds are to be matched by contributions from the borrower of approximately $5,191,000. Upon final disbursement of loan funds, a copy of the lender's detailed loan settlement must be provided to the Agency as evidence that all funds were disbursed in amounts and for purposes outlined above. No activity that is in violation of Federal law shall be permitted on the borrower's premises nor shall any equipment or other assets funded by the USDA guaranteed loan be used for activities that are in violation of Federal law.

Any change in the loan amount or source and use of funds between the date of this Conditional Commitment and the issuance of the Loan Note Guarantee must be approved by the Agency and be documented as an amendment to this Conditional Commitment.

2. PERCENTAGE OF GUARANTEE

An 80% guarantee will be issued after the terms of this Conditional Commitment have been met.

3. INTEREST RATE AND TERM

The term of the loan is to be 10 years. The interest rate is to be fixed and established with interest rate formula 10-year United States Treasury plus 5.00% per annum. The loan is to be fully amortized with monthly payments over the life of the loan with no balloon payments. Reasonable and customary prepayment penalties, provisions for default or penalty interest, or late payment fees will not be prohibited. However, any penalties, fees or default interest will not be covered by the guarantee.

4. SECURITY AND LIEN POSITION

The lender is responsible for obtaining and maintaining proper and adequate collateral to protect the interests of the lender, the Agency, and any holder. The entire loan will be secured by the same collateral with equal lien priority for the guaranteed and non-guaranteed portions of the loan. The lender will not take separate security to secure only the unguaranteed portion of the loan nor will the lender require compensating balances as a means of eliminating the lender's exposure on the unguaranteed portion of the loan. The non-guaranteed portion of the loan will not be paid first nor given any preference or priority over the guaranteed portion of the loan.

Collateral value must provide at least a **1 to 1** value after discounting.

This loan is to be secured by**:**

a. A first mortgage or deed of trust (including assignment of rents) on the borrower's real estate located on a 175-acre commercial property at 401 Montague Road in Hooks, Texas 75567. All taxes and assessments are to be current at loan closing. The lender must certify that the borrower has obtained a title opinion by its attorney showing ownership of real estate and any mortgages, restrictions, lien defects or encumbrances.
b. A first lien on all business assets, including machinery and equipment, inventory, and accounts receivable of F Line Holdings, LLC.
c. A second lien on all business assets, including machinery and equipment, inventory, and accounts receivable of Envirosafe Demil, LLC.
d. A first lien on all furnishings, fixtures, and equipment associated with the facility, including the items listed in the appraisal by COLLIERS INTERNATIONAL VALUATION & ADVISORY SERVICES dated July 6, 2023. A final list of all equipment financed with this loan, with a matching cost breakdown, will be provided with the loan settlement statement.
e. Pledge of all revenues of the Borrowers.
f. Pledge of US Army contract for rocket motor demilitarization, as allowable by law.
g. Assignment of contracts (as allowable)
h. Assignment of Lease, Rents, and Profits.

Prior to the issuance of the Loan Note Guarantee, the lender must certify that the collateral interest described above has been obtained and is perfected. This will be accomplished with the certification found in Attachment B to the Conditional Commitment.

5. APPRAISALS

A current (less than 12 months old) appraisal acceptable to the Agency and completed in accordance with USPAP and FIRREA indicating that the fair market value of the real estate security is not less than $3,576,461, excluding any value attributed to business valuation, and the fair market value of the furniture, fixtures, and equipment is not less than $29,913,539 excluding any value attributed to business valuation. Lenders will be responsible for ensuring that appraisal values adequately reflect the actual value of the collateral based on an arm's length transaction. Collateral must have documented value sufficient to protect the interest of the lender and the Agency. The discounted collateral value must be at least equal to the loan amount.

A qualified appraiser must determine the appraised market value in accordance with 7 CFR §5001.203 prior to issuance of the Loan Note Guarantee.

The lender must obtain the "As Is" market value and the "As-Completed" market value as of the date of construction completion to determine the value of the real estate property or obtain an income-based appraisal as of the date of completion to determine the value of revenues that will be generated by the collateral.

6. SYSTEM FOR AWARD MANAGEMENT

The lender will be required to maintain a Unique Entity ID (UEI) and maintain an active registration in the System for Award Management (SAM) database. Renewal can be completed online at: http://sam.gov. This registration must be renewed and revalidated every 12 months for as long as there is an active loan, grant, or guaranteed loan with the Agency.

To ensure the information is current, accurate and complete, and to prevent the SAM account expiration, the review and updates must be performed within 365 days of the activation date, commonly referred to as the expiration date. The registration process may take up to 10 business days. (See 2 CFR Part 25 and the "Help" section at http://sam.gov).

7. OTHER FEDERAL, STATE, AND LOCAL REQUIREMENTS

Beginning on the date of issuance of the Loan Note Guarantee, for proposals where facilities are financed in whole or in part with a loan guarantee by the Agency, borrowers and lenders will be required to comply with any Federal, State, or local laws or regulatory commission rules that are in existence and that affect the project including, but not limited to:

(a) Organization and authority to design, construct, develop, operate, and maintain the proposed facilities;
(b) Borrowing money, giving security, and raising revenues for the repayment;
(c) Land use zoning;
(d) Health, safety, and sanitation standards; and
(e) Protection of the environment and consumer affairs.

8. ESTABLISHMENT OF LINC ACCOUNT

Lender will become an approved participant in the Agency's Lender Interactive Network Connection (LINC). The LINC system allows the lender to conduct official business transactions such as submitting borrower account status reports and the payment of all fees, including the guarantee fee at closing and the retention fees. In order to participate in the LINC, the lender must have Level 2 eAuthentication credentials. The USDA eAuthentication is the system used by USDA agencies to enable customers to obtain accounts that will allow them to access USDA Web applications and services via the Internet. Please access and follow the instructions to obtain a Level 2 eAuthentication account and obtain access to LINC: https://www.rd.usda.gov/sites/default/files/OneRD_eAuth_LINC_Instructions.pdf

9. GUARANTEE FEE

The lender will be charged a one-time, nonrefundable guarantee fee of **3**%, payable to USDA Rural Development, in the amount of **$465,600.** The fee is calculated by taking the amount of the loan multiplied by the guarantee fee (**3**%) then multiplied by the percentage of guarantee. This fee is due and payable upon loan closing and prior to Agency issuance of the Loan Note Guarantee. The fee will be submitted via the Pre-Authorized Debit account set up within the LINC system, prior to closing, for faster processing of the Loan Note Guarantee.

10. RETENTION FEE

This loan guarantee is subject to a periodic retention fee of .55% of the guaranteed portion of the outstanding principal as of December 31 of each year. It is calculated by multiplying the outstanding principal balance of the loan by the percentage of guarantee and then multiply that result by .55%. Payments are due to the Agency by January 31 of each year. For loans where the Loan Note Guarantee is issued between October 1 and December 31, the first retention fee will be due January 31 of the second year following the date the Loan Note Guarantee is issued. Payments not received by April 1 are considered delinquent and may result in cancellation of the guarantee to the lender. Holder's rights will continue in effect as specified in the Loan Note Guarantee and Assignment Guarantee Agreement. Until the Loan Note Guarantee is terminated by the Agency, any delinquent periodic guarantee retention fees will bear interest at the note rate and are due upon notice by the Agency. Should the lender fail to pay any delinquent periodic guarantee retention fees, including any interest due thereon, the amount will be deducted from any loss payment due the lender.

11. ASSIGNMENT OF GUARANTEED LOAN

Any assignment by the lender of the guaranteed portion of the loan must be accomplished in accordance with the conditions in the Lender's Agreement and Agency program regulations and must be documented on Form RD 5001-6, "Assignment Guarantee Agreement." Subsequent assignments require notice to the lender and the Agency using any format, including that used by the Securities Industry and Financial Markets Association, together with the transfer of the original Assignment Guarantee Agreement.

The lender is required to hold in its own portfolio, or retain, a minimum of 7.5 percent of the total loan amount. This amount must be of the non-guaranteed portion of the loan and cannot be participated to another. The lender may sell the remaining amount of the non-guaranteed portion of the loan only through participation. The lender will be responsible for servicing the entire loan for the term of the loan in accordance with the Lender's Agreement, Loan Note Guarantee, and Agency Program regulations.

12. FINANCIAL REPORTING

For all borrowers with a guaranteed loan balance in excess of $600,000, the lender is responsible for obtaining annual financial statements. The borrower must submit financial statements to the lender within 90 days of the business' fiscal yearend. The lender will submit the borrower's annual financial statements to the Agency within 120 days of the end of the borrower's fiscal year. The lender will analyze the financial statements and provide the Agency with a written summary of the lender's analysis and conclusions, including trends, strengths, weaknesses, extraordinary transactions, and other indications of the financial condition of the borrower.

All personal and corporate guarantors of this loan must provide annual financial statements to the lender within 90 days of guarantor's fiscal or calendar yearend.

The loan agreement must require the borrower to submit borrower to submit financial statements to the lender. The borrower must obtain audited, financial statements annually, prepared and submitted in accordance with accounting practices acceptable to the Agency. Such practices include, but are not limited to, Generally Accepted Accounting Principles (GAAP) and the industry's standard accounting practice. Financial statements will contain, at a minimum, a balance sheet and a profit and loss statement reflecting the financial condition of the borrower as of its yearend.

13. STATUS REPORTING

For the life of each guaranteed loan, the lender must submit to the Agency, through the LINC system, semi-annual reports on the outstanding principal and interest balance of the loan(s) as of June 30 and December 31.

For each guaranteed loan that is in monetary default, the lender is required to report monthly to the Agency regarding the status of each loan, including any curative actions under consideration or undertaken to resolve the monetary default. Reports are due on the 15th working day of each month.

14. GUARANTOR(S)

In addition to the full liability of F Line Holdings, LLC and EnviroSafe Demil, LLC, a full personal guarantee for the loan is to be pledged by Michael Wentz and Thomas J. Ogden. MHW Ventures, LLC and TKO Unlimited, LLC is to pledge a full corporate guarantee for the loan.

Each guarantor must execute Form RD 5001-5, "Unconditional Guarantee." Personal and/or corporate guarantees are unsecured unless secured with specific collateral detailed in Item Number 7 of the Unconditional Guarantee form.

15. INSURANCE

The lender must ensure the borrower obtains and maintains borrower and project insurance in substance, amount, and duration similar to that ordinarily required by lenders in the industry.

Hazard insurance naming the lender as mortgagee or loss payee, as applicable, will be maintained in an amount at least equal to the outstanding loan balance or the replacement value (whichever is greater) of the collateral. Hazard insurance includes fire, windstorm, lightning, hail, explosion, riot, civil commotion, aircraft, vehicle, marine, smoke, builder's risk during construction, and property damage. Worker's Compensation must be carried in accordance with State law.

Key person life insurance is not required.

16. CAPITAL EQUITY REQUIREMENTS

A minimum of 20 percent balance sheet equity will be required at loan closing. Balance sheet equity must be met in the form of either cash or earning assets contributed to the business and reflected on the business' balance sheet. Balance sheet equity will be determined using a balance sheet prepared in accordance with Generally Accepted Accounting Principles and will not include appraisal surplus or bargain purchase gains. Subordinated debt may be included when the subordinated debt is in exchange for cash injected into the business and is subject to a standstill agreement for the life of the loan. The note or other form of evidence must be submitted to the Agency in order for subordinated debt to count towards meeting the balance sheet equity requirement.

Prior to issuance of the Loan Note Guarantee, the lender must provide the Agency with a balance sheet as of loan closing that reflects the business' post-closing status and demonstrates the required balance sheet equity, borrower investment of equity or other funds, or owner contributed capital as a part of the lender certification. This balance sheet must take into account any new assets, the guaranteed loan amount, and any non-guaranteed debt as liabilities of the borrower, regardless of whether the loan(s) has/have been fully disbursed or remain(s) to be disbursed.

17. LOAN AGREEMENT

Appropriate conditions or covenants of this Conditional Commitment and any other conditions that the lender has determined are warranted to protect the interests of the lender and the Agency must be incorporated in the lender's loan agreement with the borrower. To expedite issuance of an Agency guarantee, a copy of the final proposed loan agreement should be provided for the Agency's review and concurrence prior to loan closing.

The lender is responsible for loan servicing and for notifying the Agency of any violations of the lender's loan agreement. The lender will arrange with the borrower and the Agency for field visits. The lender will be responsible for obtaining all required financial statements from the borrower, analyzing them and submitting the financial statements with the analysis to the Agency.

At a minimum, the loan agreement must contain the following requirements:

a. Repayment and amortization provisions of the loan;
b. Description of real property collateral, list of other collateral and identification of the lender's lien priority in the collateral;
c. A list of persons and entities guaranteeing payment of the guaranteed loan and the percentage of guarantee;
d. Type and frequency of borrower and guarantor financial statements to be required for the duration of the guaranteed loan. Guarantor statements must be updated at least annually;
e. Prohibition against borrower assuming liabilities or obligations of others. Outside investment and loans/advances to stockholders, owners, officers, or affiliates require the prior written consent of the lender. Loans from stockholders, owners, officers or affiliates must be subordinated to the guaranteed loan or converted to stock. No payments are to be made on these debts unless the loan is current and in good standing;
f. Limitations on borrower dividend payments and compensation of officers, owners and members of borrower. Dividend payments and compensation of officers, owners, and members will be limited to an amount that, when taken, will not adversely affect the repayment ability of the borrower. This amount may not be increased year-to-year unless (1) an after-tax profit was made in the preceding fiscal year, (2) the borrower is and will remain in compliance with covenants of the Loan Agreement and Conditional Commitment, and (3) all borrower debts are paid to a current status. This is not intended to apply to dividend payments to cover personal tax liability resulting from profitability of the business;
g. Limitations on the purchase and sale of equipment and other fixed assets. The borrower must not acquire additional fixed assets (including assignments, transfers and leases) that would result in borrower not being in compliance with required ratios without the lender's written consent. Borrower will not lease, sell, transfer, or otherwise encumber fixed assets without the concurrence of the lender. Disposition of fixed assets serving as collateral for this loan must also have the concurrence of the Agency;
h. Restrictions concerning mergers, consolidations, or other circumstances, including significant management changes, and a limitation on selling the business or project without the concurrence of the lender;
i. Maximum debt-to-net worth ratio of 9 to 1, required by the lender;
j. Minimum debt service coverage ratio of 1.25 to 1, required by the lender;
k. A reserved section for any requirements, including environmental requirements, imposed by the Agency in its Conditional Commitment; and
l. A provision for the lender and the Agency to have reasonable access to the project and its performance information during the term of the guaranteed loan, including the periodic inspection of the project by a representative of the lender or the Agency.

If necessary, the borrower is to take all necessary actions to remain in good standing with all licensing and/or regulatory authorities to maintain operations. The borrower is to notify the lender of any adverse findings made by licensing authorities if these cannot be corrected within 30 days. The lender must notify the Agency of this notification of adverse findings within 15 days.

18. ENVIRONMENTAL

The lender will take action to ensure that the continuing operations of the business and all construction associated with this credit facility are completed in accordance with applicable Federal, State, and local laws, regulations, and ordinances, with any adverse impact the project/operations may potentially have on the environment being identified and mitigated.

If the Phase I Environmental Site Assessment (ESA) that was completed in accordance with ASTM E1527-13 and included as part of the Agency's environmental review becomes more than 180 days old prior to loan closing, an updated Phase I ESA is required.

19. LENDER'S CERTIFICATION

Prior to issuance of the Loan Note Guarantee, the lender will certify that all requirements of the Conditional Commitment have been met and will certify to each condition as stated in Section 5001.452(b)(8)(iii). These certifications are furnished on Attachment B to the Conditional Commitment.

20. LOAN CLOSING DOCUMENTATION

Coincident with, or immediately after, loan closing and prior to issuance of the guarantee, the lender will provide the Agency with the following in the request for issuance of the guarantee:

a. The lender will prepare and deliver Form RD 5001-9, "Guaranteed Loan Closing Report," for each loan to be guaranteed.
b. The lender will pay the guarantee fee of **$465,600** (= **$19,400,000** x 80% x 3%). The Agency encourages lenders to pay the guarantee fee electronically. If lender has not already established an account with the Agency, please furnish the routing and account number as soon as possible to ensure timely payment of the guarantee fee. The fee will be withdrawn from the account prior to issuance of the Loan Note Guarantee. If electronic payment is not successful, checks made payable to the U.S. Treasury should be submitted.
c. An executed Form RD 5001-2, "Lender's Agreement," or RD 5001-2a, "Lender's Agreement," if one has not previously been executed.
d. A copy of the executed Loan Agreement that contains any continuing loan conditions as set forth by the Agency in this Conditional Commitment.
e. A copy of the executed Promissory Note(s).
f. A copy of the executed Settlement Statement, which shows the specific use and disbursement of all loan funds for the project.
g. Original, executed Forms RD 5001-5, "Unconditional Guarantee," as required;
h. A copy of the borrower's balance sheet as of the date the loan was closed.
i. Written lender certification in accordance with 7 CFR 5001.452(b)(8).

A Loan Note Guarantee may only be issued upon receipt of the Loan Closing Documentation items and the Agency's satisfactory review for compliance with the Conditional Commitment and program requirements.

21. ACCESS TO PROJECT AND LENDERS RECORDS

Agency personnel and any person(s) accompanying Agency personnel shall be authorized to enter upon the premises and into any building thereon, whether permanent or temporary, jointly or separately, with personnel of the lender to carry out the functions involving its interests. Scheduled inspections may be conducted by these personnel to determine the effectiveness of the loan program.

Upon request by the Agency, the lender will permit representatives of the Agency to inspect and make copies of any of the records of the lender pertaining to the guaranteed loans. Such inspection and copying may be made during regular office hours of the lender or at any other time agree upon by the lender and the Agency.

The lender will always retain responsibility for servicing the entire loan and for notifying the Agency of any violations of the terms of the Loan Agreement or Conditional Commitment.

22. LENDER AND BORROWER CERTIFICATION

West Town Bank & Trust (lender) certifies by accepting this Conditional Commitment for a guarantee of its $19,400,000 loan to the borrower that the lender understands that no adverse change may occur during the period of time from Agency issuance of the Conditional Commitment to issuance of the Loan Note Guarantee relating to **F Line Holdings, LLC and EnviroSafe Demil, LLC** (borrower(s)) regardless of the cause or causes of the change and whether the change or cause(s) of the change were within the lender's or borrower's control. Prior to each disbursement, lender shall be in receipt of satisfactory evidence that there has been no unremedied adverse change in the financial or any other condition of the borrower since the date of the application or since any preceding disbursements that would warrant withholding or not making further disbursements. The lender will immediately notify the Agency of any material adverse change in the project or the borrower's financial condition.

By accepting Form RD 5001-3, "Conditional Commitment," and this attachment, **F Line Holdings, LLC and EnviroSafe Demil, LLC** certifies that each is not delinquent on any Federal debt, including tax debt.

By signing this Conditional Commitment, the lender and borrower certify that they understand and accept the conditions outlined herein. No provision stated herein shall be amended or waived without the prior written consent of the lender and the Agency. Any loans or advances made to the borrower by the lender after issuance of the Loan Note Guarantee will not be covered by the guarantee, except authorized protective advances. Regulations contained in 7 CFR 5001 and Form RD 5001-2, "Lender's Agreement," or RD 5001-2a, "Lender's Agreement," will apply.

Any request for an extension of the expiration date of this Conditional Commitment must be made in writing and received by the Agency prior to the expiration date. This request must be accompanied by a full explanation as to why the extension is needed.

Attachment B to Form RD 5001-3, "Conditional Commitment"
Loan Note Guarantee Certifications

Prior to issuance of the Loan Note Guarantee, the lender will certify to the following conditions as outlined in 7 CFR 5001.452(b)(8)(iii). This certification, **on lender letterhead**, is intended to meet the requirements of 7 CFR 5001.452(b)(8)(iii) as it relates to a loan between the lender and borrower listed below.

REQUEST FOR LOAN NOTE GUARANTEE AND LENDER CERTIFICATION

USDA RURAL DEVELOPMENT		**DATE OF PROMISSORY NOTE:**
Type of Loan: **REAP ☐ B&I ☒ CF ☐ WWD ☐**	**Amount of Loan:** $19,400,000	**State:** Texas
Name and Address of Borrower: F Line Holdings, LLC EnviroSafe Demil, LLC 401 Montague Road Hooks, Texas 75567	**Name of Lender:** West Town Bank & Trust	

LENDER CERTIFICATIONS

The undersigned lender hereby requests issuance of a Loan Note Guarantee in the subject case.

West Town Bank & Trust hereby certifies:

A. All requirements of the Conditional Commitment have been met.

B. The financial criteria specified in §5001.303(b)(4) of the OneRD Guaranteed Loans regulation and any financial criteria contained in the Conditional Commitment were:

(1) Determined in accordance with any applicable requirements in § 5001.9, and

(2) Have been maintained through the issuance of the Loan Note Guarantee. Failure to maintain or attain the minimum financial criteria will result in the Agency not issuing a Loan Note Guarantee.

C. No major changes have been made in the applicant, project or lender's loan conditions and requirements since the issuance of the Conditional Commitment, unless such changes have been approved by the Agency.

D. There has been neither any material adverse change in the borrower's financial condition nor any other material adverse change in the borrower during the period of time from the Agency's issuance of the Conditional Commitment to issuance of the Loan Note Guarantee regardless of the cause or causes of the change and whether or not the change or causes of the change were within the lender's or borrower's control.

(1) The borrower is a legal entity in good standing with its regulator (as applicable) and is operating in accordance with the laws of the State(s) or Tribe where the borrower was organized or has a place of business.

(2) The borrower meets the eligibility requirements as outlined in § 5001.126(a) through (e), as applicable.

E. There is a reasonable prospect that the guaranteed loan and other project debt will be repaid on time and in full (including interest) from project cash flow according to the terms proposed in the application.

F. The guaranteed loan has been properly closed, the required security instruments have been properly executed, and all security interests obtained by the lender have been or will be properly perfected in accordance with applicable law.

G. All planned property acquisition has been or will be completed; all development has been or will be substantially completed in accordance with plans and specifications and conforms to applicable Federal, State, and local codes; all equipment required for the project is available, can be procured and delivered within the project development schedule and will be installed in conformance with manufacturer's specifications and design requirements; and costs have not exceeded the amount approved by the lender and the Agency.

H. The proposed project complies with all current Federal, State, and local laws and regulatory rules that affect the project, the borrower, and the lender activities, including, but not limited to, equal opportunity and Fair Housing Act requirements and design and construction requirements.

I. Lender-required insurances are in effect.

J. All truth-in-lending and equal credit opportunity requirements have been met.

K. The borrower has marketable title to the collateral then owned by the borrower, subject to the rights of the guaranteed loan and to any other exceptions approved in writing by the Agency.

L. Where required, necessary or prudent, the borrower has obtained:

(1) A legal opinion relative to the title and accessibility to any rights-of-way and easements; and

(2) A title opinion or title insurance showing the borrower has good and marketable title to the real property and other collateral and fully addressing all existing mortgages or other lien defects, restrictions or encumbrances. In those cases where there is adequate gap coverage, a title commitment may be acceptable.

M. All project funds have been or will be disbursed for purposes and in amounts consistent with the Conditional Commitment (or Agency-approved amendment thereof) and the application submitted to the Agency. Appropriate lender controls were used to ensure that all funds were properly disbursed, including funds for working capital. A copy of the settlement statement by the lender detailing the use of loan and matching/equity funds is attached to support this certification.

N. When applicable, the entire amount of the loan for working capital or initial operating expenses have been disbursed to the borrower, except in cases where the Agency has approved disbursement over an extended period of time and funds are escrowed so that the settlement statement reflects the full amount to be disbursed.

O. When required, personal and/or corporate guarantees have been obtained in accordance with § 5001.204 of the OneRD Guaranteed Loans regulation.

P. Lien priorities are consistent with the requirements of the Conditional Commitment. No claims or liens of laborers, subcontractors, suppliers of machinery and equipment, materialmen, or other parties have been filed against the collateral, and no suits are pending or threatened that would adversely affect the collateral.

Q. Neither the lender nor any of the lender's officers has an ownership interest in the borrower or is an officer or director of the borrower, and neither the borrower nor its officers, directors, stockholders, or other owners have more than a 5 percent ownership interest in the lender.

R. The loan agreement includes all borrower compliance measures identified in the Agency's environmental review for avoiding or reducing adverse environmental impacts of the project's construction or operation.

S. The lender will comply with the requirements of the Debt Collection Improvement Act.

T. The lender has executed and delivered the Lender's Agreement, completed registration in the Agency's electronic reporting system, and electronically submitted the guaranteed closing report for the guaranteed loan along with the appropriate guarantee fee.

_____
Lender Representative

_____
Title

_____
Date

ATTACHMENT

REPLACEMENT INFORMATION FOR

PART A APPLICATION – ATTACHMENT A.1 /A.2

DEED OF TRUST

F-LINE (45 ACRES)

F-LINE (130 ACRES)

PREPARED IN THE OFFICE OF:
JORDAN LAW FIRM, L.L.P.
#4 Woodmont Crossing
Texarkana, Texas 75503

NOTICE OF CONFIDENTIALITY RIGHTS:
IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OF THE FOLLOWING INFORMATION FROM THIS INSTRUMENT BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS:
YOUR SOCIAL SECURITY NUMBER OR
YOUR DRIVER'S LICENSE NUMBER.

DEED OF TRUST
(TEXAS)

2435062

THE STATE OF TEXAS

KNOW ALL MEN BY THESE PRESENTS:

COUNTY OF BOWIE

That F LINE HOLDINGS, LLC, hereinafter called Grantors, for the purpose of securing the indebtedness hereinafter described, and in consideration of the sum of TEN DOLLARS ($10.00) to us in hand paid by the Trustee hereinafter named, the receipt of which is hereby acknowledged, and for the further consideration of the uses, purposes and trusts hereinafter set forth, has granted, sold and conveyed, and by these presents does grant, sell and convey unto Raymond W. Jordan, Trustee, of Bowie County, Texas, and his substitutes or successors, all of the following described property situated in Bowie County, Texas, to-wit:

All that certain lot, tract or parcel of land lying and situated in the William H. Fore Headright Survey, Abstract 214, Bowie County, Texas, being a part of that certain tract of land described as 318.555 acres in the deed from TexAmericas Center to TAC East Holding Company No. 1, dated April 25, 2017, recorded in Document No. 2017-4829 of the Real Property Records of Bowie County, Texas, and being more particularly described by metes and bounds as follows:

BEGINNING at a 1/2 inch steel rod found for a corner, capped MTG 101011-00, the Southwest corner of the said 318.555 acre tract, the Southeast corner of Montague Street, an ingress and egress easement recorded in the said Document No. 2017-4829, lying in the North line of that certain tract of land described as Tract 10 – Proposed 5th

Street Parcel w/ 81.718 acres in the deed from United States of America to Red River Redevelopment Authority, now known as TexAmericas Center, dated September 1, 2010, recorded in Volume 5898, Page 1 of the Real property Records in Bowie County, Texas;

THENCE North 45 degrees 10 minutes 16 seconds West a distance of 71.19 feet along the West line of the said 318.555 acre tract and the East line of the said Montague Street to a 1/2 inch steel rod found for a corner, capped MTG 101011-00 (control monument), at an angle point;

THENCE North 00 degrees 33 minutes 19 seconds West a distance of 3814.64 feet along the West line of the said 318.555 acre tract and the East line of the said Montague Street to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, said corner bears North 00 degrees 33 minutes 19 seconds West a distance of 1185.33 feet to 1/2 inch steel rod found for a corner, capped MTG 101011-00 (control monument), at an angle point;

THENCE North 89 degrees 38 minutes 24 seconds East a distance of 148.98 feet across the said 318.555 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, the Northwest corner of that certain tract of land described as 45.000 acres in the deed from TAC East Holdings Company No. 1 to F Line Holdings, LLC, dated September 14, 2023, recorded in Document No. 2023-00008948 of the Real Property Records of Bowie County, Texas;

THENCE South 00 degrees 55 minutes 04 seconds East a distance of 1650.37 feet along the West line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, the Southwest corner of the said 45.000 acre tract;

THENCE North 89 degrees 19 minutes 34 seconds East a distance of 1209.94 feet along the South line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, the Southeast corner of the said 45.000 acre tract;

THENCE North 00 degrees 23 minutes 40 seconds West a distance of 1643.72 feet along the East line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, the Northeast corner of the said 45.000 acre tract;

THENCE North 89 degrees 38 minutes 14 seconds East a distance of 345.66 feet across the said 318.555 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00;

THENCE South 00 degrees 21 minutes 51 seconds East a distance of 366.14 feet across the said 318.555 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00;

THENCE North 89 degrees 38 minutes 32 seconds East a distance of 380.02 feet across the said 318.555 acre tract to a 1/2 inch steel rod set for a corner, capped MTG ENG;

THENCE South 00 degrees 50 minutes 08 seconds East a distance of 2134.21 feet across the said 318.555 acre tract to a 1/2 inch steel rod set for a corner, capped MTG ENG;

THENCE South 89 degrees 23 minutes 15 seconds West a distance of 244.93 feet across the said 318.555 acre tract to a 1/2 inch steel rod set for a corner, capped MTG ENG;

THENCE South 00 degrees 03 minutes 41 seconds West a distance of 1381.52 feet across and through the said 318.555 acre tract to a 1/2 inch steel rod set for a corner, capped MTG ENG, lying in the South line of the said 318.555 acre tract, the North line of the said 81.718 acre tract, and a circular curve to the right;

THENCE in a Northwesterly direction along the arc of the said circular curve a distance of 101.83 feet, with a delta angle of 00 degrees 23 minutes 27 seconds, a radius of 14925.00 feet, a chord bearing of North 89 degrees 58 minutes 55 seconds West, and a chord distance of 101.83 feet to a 1/2 inch steel rod set for a corner, capped MTG ENG, at the end of the said circular curve;

THENCE North 89 degrees 47 minutes 11 seconds West, tangent to the said circular curve, a distance of 1697.38 feet along the South line of the said 318.555 acre tract and the North line of the said 81.718 acre tract to the point of beginning and containing 130.000 acres of land, at the time of this survey.

Permitted encumbrances:

All exceptions, covenants, conditions, easements, restrictions and reservations other than liens, affecting the property, and currently recorded in the Real Property Records of Bowie County, Texas.

HAVE AND TO HOLD the above described property, together with the rights, privileges and appurtenances thereto belonging unto the said Trustee, and to his substitutes or successors forever. And Grantors do hereby bind themselves, their heirs, executors, administrators and assigns to warrant and forever defend the said premises unto the said Trustee, his substitutes or successors and assigns forever, against the claim, or claims, of all persons claiming or to claim the same or any part thereof.

This conveyance, however, is made in TRUST to secure payment of one promissory note of even date herewith in the principal sum of EIGHT HUNDRED SIX THOUSAND AND NO/100

DOLLARS ($806,000.00) executed by Grantors, payable to the order of TAC EAST HOLDINGS COMPANY NO. 1 at 107 Chapel Lane, New Boston, Bowie County, Texas 75570, as therein stipulated, bearing interest as therein set forth and providing for acceleration of maturity and for attorney's fees, with a maturity date of the 1st day of November, 2025.

This Deed of Trust shall secure, in addition to the Note, all funds advanced by Beneficiary to or for the benefit of Grantors, as contemplated by any covenant or provision herein contained or for any other purpose, and all other indebtedness, of whatever kind or character, owing or which may hereafter become owing by Grantors (or by any of them) to Beneficiary, whether such indebtedness is evidenced by note, open account, overdraft, endorsement, surety agreement, guaranty or otherwise, it being contemplated that Grantors may hereafter become indebted to Beneficiary in further sum or sums. All indebtedness secured hereby shall be payable at 107 Chapel Lane, New Boston, Bowie County, Texas; and, unless otherwise provided in the instrument evidencing such indebtedness, shall bear interest at the same rate per annum as the Note bears, from the date of accrual of such indebtedness until paid. If the Note or any other indebtedness secured hereby shall be collected by legal proceedings, whether through a probate or bankruptcy court or otherwise, or shall be placed in the hands of an attorney for collection after maturity, whether matured by the expiration of time or by any option given to the Beneficiary to mature same, Grantors agree to pay Beneficiary's attorney's and collection fees in the amount as set forth in the Note, and such fees shall be a part of the indebtedness secured hereby. This Deed of Trust shall also secure all renewals, extensions and modifications of any of the indebtedness secured hereby, which said indebtedness or Deed of Trust securing same shall be renewed, extended or modified without notice to any prior grantor, which such renewal, extension or modification shall not relieve any prior grantor of any personal liability under said indebtedness or Deed of Trust securing same. Finally, this Deed of Trust shall secure, in addition to such indebtedness, the performance of all obligations of Grantors, their heirs, successors, assigns or assumptors (or any of them), to Beneficiary relating in any manner to such indebtedness or any part thereof.

Should Grantors do and perform all of the covenants and agreements herein contained, and make prompt payment of all indebtedness as the same shall become due and payable, then this conveyance shall become null and void and of no further force and effect, and shall be released at the expense of Grantors, by the holder thereof, hereinafter called Beneficiary (whether one or more).

Grantors covenant and agree as follows:

That they are lawfully seized of said property, and have the right to convey the same; that said property is free from all liens and encumbrances except as herein provided.

No hazardous or toxic substance, the manufacture, use, storage or disposition of which is subject to any Federal, State or local law or regulations will be manufactured, used or stored, or disposed of, on or about the real property herein described except in accordance with all laws and that Grantors, their heirs and assigns, will indemnify and hold the holder of the Note secured by this Deed of Trust harmless from all liability and legal fees, , and all other expenses resulting from any

violation of this covenant, but excluding any special, punitive, exemplary and consequential damates other than to the extent such special, punitive, exemplary or consequential damages are asserted against the holder of the Note by a third party.

To protect the title and possession of said property and to pay when due all taxes and assessments now existing or hereafter levied or assessed upon said property, or the interest therein created by this Deed of Trust, and to preserve and maintain the lien hereby created as a first and prior lien on said property including any improvements hereafter made a part of the realty.

Notwithstanding the foregoing and anything else herein to the contrary, upon Grantor obtaining financing from Capital Bank, N.A., or another lender, to facilitate the acquisition and instillation of the rocket motor project ("RMP Financing"), the this lien hereby created shall automatically be subordinate to such RMP Financing and become a second lien on the property, without the requirement of any additional action or recording of any other document,

To provide Beneficiary written proof of payment when due of all insurance premiums and tax statements due and owing on the property herein described.

To keep the improvements on said property in good repair and condition and not to permit or commit any waste thereof; to keep said buildings occupied so as not to impair the insurance carried thereon.

To insure and keep insured all improvements now or hereafter created upon said property against loss or damage by fire and windstorm, and any other hazard or hazards as may be reasonably required from time to time by Beneficiary during the term of the indebtedness hereby secured, to the extent of the original amount of the indebtedness hereby secured, or to the extent of the full insurable value of said improvements, whichever is lesser, in such form and with such Insurance Company or Companies as may be approved by Beneficiary, and to deliver to Beneficiary the policies of such insurance having attached to said policies such mortgage indemnity clause as Beneficiary shall direct; to deliver renewals of such policies to Beneficiary at least ten (10) days before any such insurance policies shall expire; any proceeds which Beneficiary may receive under any such policy, or policies, may be applied by Beneficiary, at its option, to reduce the indebtedness hereby secured, whether then matured or to mature in the future, and in such manner as Beneficiary may elect, or Beneficiary may permit Grantors to use said proceeds to repair or replace all improvements damaged or destroyed and covered by said policy.

That in the event Grantors shall fail to keep the improvements on the property hereby conveyed in good repair and condition after thirty (30) days' written notice from Beneficiary, or to pay promptly when due all taxes and assessments, as aforesaid, or to preserve the prior lien of this Deed of Trust on said property (excluding the automatic subordination in connection with the RMP Financing as set forth above), or to keep the buildings and improvements insured, as aforesaid, or to deliver the policy, or policies, of insurance or the renewal thereof to Beneficiary, as aforesaid, then Beneficiary may, at its option, but without being required to do so, make such repairs, pay such

taxes and assessments, purchase any tax title thereon, remove any prior liens, and prosecute or defend any suits in relation to the preservation of the prior lien of this Deed of Trust on said property, or insure and keep insured the improvements thereon in an amount not to exceed that above stipulated; that any sums which may be so paid out by Beneficiary and all sums paid for insurance premiums, as aforesaid, including the costs, expenses and Attorney's fees paid in any suit affecting said property when necessary to protect the lien hereof shall bear interest from the dates of such payments at the rate stated in said note and shall be paid by Grantors to Beneficiary upon demand, at the same place at which said note is payable, or, at Beneficiary's option, same shall be deemed a part of the debt hereby secured and recoverable as such in all respects.

That in the event Beneficiary, in its sole discretion determines that an appraisal, supplemental appraisal or re-appraisal of the real property described herein and the improvements located thereon is necessary, required by regulatory authorities, or desirable during the term of the note described herein, or during any extended or renewal term, Beneficiary may acquire such appraisal, supplemental appraisal or re-appraisal from such entities as Beneficiary desires and Grantors shall pay for the expense of the same within ten (10) days of receipt of notice from Beneficiary of the cost. If Grantors fail to pay said expense within the ten days, said expense shall be deemed to be a part of the debt hereby secured, bear interest from the date paid at the rate stated in the note and shall be recoverable as such in all respects.

Grantors further covenant and agree with Beneficiary that Beneficiary at its option may declare the entire unmatured portion of all indebtedness secured hereby (whether such indebtedness then be evidenced by the original note or notes evidencing the same or by any instrument(s) given in renewal or extension thereof), together with all interest accrued on all such indebtedness, to be immediately due and payable (which acceleration of maturity may be accomplished without notice to any one), and thereupon the same shall forthwith become immediately due and payable in any one of the following events:

A. If any voluntary or involuntary petition be filed to subject Grantors or either of them (or any party obligated as maker, endorser, surety, or guarantor for the payment of the Primary Indebtedness) to any bankruptcy, debt-adjustment, receivership or other insolvency proceedings;

B. If default be made in the performance by Grantors or either of them of any term, provision, covenant, or agreement herein contained to be kept and performed by Grantors and such default is not cured within thirty (30) days of written notice from Beneficiary;

C. If default be made in the payment of any part of the principal or interest of any indebtedness secured hereby within five (5) days of written notice of such failure of payment from Beneficiary according to the terms of the original instrument evidencing such indebtedness or of any instrument at any time hereafter evidencing such indebtedness;

D. If Grantors or either of them, being a partnership or a corporation, shall be dissolved or reorganized in any manner;

E. Intentionally omitted;

F. If at any time it shall appear that any financial statement or any other representation made to obtain the loan designated above as Primary Indebtedness is materially incorrect; or

G. If at any time it shall appear that Grantors' title to the hereinabove described property or any portion thereof is subject to any prior lien, title or interest not mentioned in this Deed of Trust as a prior encumbrance except for the RMP Financing and except for any lien caused by or through Beneficiary;

H. If at any time Grantors shall sell or convey, contract to sell or convey the above described real property without the express written consent of Beneficiary, such action by Grantors shall be deemed a Default under the terms of this Deed of Trust and all sums then remaining due, owing and unpaid hereunder shall be accelerated and matured and subject to foreclosure as provided for herein.

It is particularly understood that the foregoing acceleration provisions shall be applicable not only to the maturities recited in the original note(s) evidencing the indebtedness hereby secured but also to any substituted maturities created by extension, modification or renewal; and that Beneficiary's failure to declare an acceleration of maturities when a ground therefor exists, even though such forbearance may be repeated from time to time, shall not constitute a waiver of Beneficiary's right to accelerate maturities upon a recurrence of the same ground therefor; and that the act of Grantors in remedying any condition resulting from Grantors' default shall not bar Beneficiary from declaring an acceleration of maturities by reason of such default.

In the event of such default it shall thereupon, or at any time thereafter, be the duty of the Trustee, or his successor or substitute as hereinafter provided, at the request of Beneficiary (which request is hereby conclusively presumed), to enforce this trust; and after advertising the time, place and terms of the sale of the above described and conveyed property, then subject to the lien hereof, for at least twenty-one (21) days preceding the date of sale by posting written or printed notice thereof at the Courthouse door of the County where said real property is situated, which notice may be posted by the Trustee acting, or by any person acting for him, and the Beneficiary (the holder of the indebtedness secured hereby) has, at least twenty-one (21) days preceding the date of sale, served written or printed notice of the proposed sale by certified mail on each debtor obligated to pay the indebtedness secured by this Deed of Trust according to the records of Beneficiary, by the deposit of such notice, enclosed in a postpaid wrapper, properly addressed to such debtor at debtor's most recent address as shown by the records of Beneficiary, in a post office or official depository

under the care and custody of the United States Postal Service, the Trustee shall sell the above described property, then subject to the lien hereof, at public auction in accordance with such notice at the Courthouse door of said county where such real property is situated (provided where said real property is situated in more than one county, the notice to be posted as herein provided shall be posted at the Courthouse door of each of such counties where said real property is situated, and said above described and conveyed property may be sold at the Courthouse door of any one of such counties, and the notices so posted shall designate the county where the property will be sold), on the first Tuesday in any month between the hours of ten o'clock a.m. and four o'clock p.m. to the highest bidder for cash, selling all of the property as an entirety or in such parcels as the Trustee acting may elect, and make due conveyance to the Purchaser or Purchasers, with general warranty binding Grantors, their heirs and assigns; and out of the money arising from such sale, the Trustee acting shall pay first, all the expenses of advertising the sale and making the conveyance, including a reasonable commission to himself, which commission shall be due and owing in addition to the Attorney's fees provided for in said note, and then to Beneficiary the full amount of principal, interest, Attorney's fees and other charges due and unpaid on said note and all other indebtedness secured hereby, rendering the balance of the sales price, if any, to Grantors, their heirs or assigns, and the recitals in the conveyance to the Purchaser or Purchasers shall be full and conclusive evidence of the truth of the matters therein stated, and all prerequisites to said sale shall be presumed to have been performed, and such sale and conveyance shall be conclusive against Grantors, their heirs and assigns.

It is agreed that in the event a foreclosure hereunder should be commenced by the Trustee, or his substitute or successor, Beneficiary may at any time before the sale of said property direct the said Trustee to abandon the sale, and may then institute suit for the collection of said note, and for the foreclosure of this Deed of Trust lien; it is further agreed that if Beneficiary should institute a suit for the collection thereof, and for a foreclosure of this Deed of Trust lien, that he may at any time before the entry of a final judgment in said suit dismiss the same, and require the Trustee, his substitute or successor to sell the property in accordance with the provisions of this Deed of Trust.

Beneficiary shall have the right to purchase at any sale of the property, being the highest bidder and to have the amount for which such property is sold credited on the debt then owing.

Beneficiary in any event is hereby authorized to appoint a substitute trustee, or a successor trustee, to act instead of the Trustee named herein without other formality than the designation in writing of a substitute or successor trustee; and the authority hereby conferred shall extend to the appointment of other successor and substitute trustees successively until the indebtedness hereby secured has been paid in full, or until said property is sold hereunder, and each substitute and successor trustee shall succeed to all of the rights and powers of the original Trustee named herein.

In the event any sale is made of the above described property, or any portion thereof, under the terms of this Deed of Trust, Grantors, their heirs and assigns, shall forthwith upon the making of such sale surrender and deliver possession of the property so sold to the Purchaser at such sale, and in the event of their failure to do so they shall thereupon from and after the making of such sale be

and continue as tenants at will of such Purchaser, and in the event of their failure to surrender possession of said property upon demand, the Purchaser, his heirs or assigns, shall be entitled to institute and maintain an action for forcible detainer of said property in the Justice of the Peace Court in the Justice Precinct in which such property, or any part thereof, is situated.

It is agreed that, except for a lien created in connection with the RMP Financing, the lien hereby created shall take precedence over and be a prior lien to any other lien of any character whether vendor's, materialmen's or mechanic's lien hereafter created on the above described property, and in the event the proceeds of the indebtedness secured hereby as set forth herein are used to pay off and satisfy any liens heretofore existing on said property, then Beneficiary is, and shall be, subrogated to all of the rights, liens and remedies of the holders of the indebtedness to so paid.

It is further agreed that if Grantors, their heirs or assigns, while the owner of the hereinabove described property, should commit an act of bankruptcy, or authorize the filing of a voluntary petition in bankruptcy, or should an act of bankruptcy be committed and involuntary proceedings instituted or threatened, or should the property hereinabove described be taken over by a Receiver for Grantors, their heirs or assigns, the note hereinabove described shall, at the option of Beneficiary, immediately become due and payable, and the acting Trustee may then proceed to sell the same under the provisions of this Deed of Trust.

As further security for the payment of the hereinabove described indebtedness, Grantors hereafter transfer, assign and convey unto Beneficiary all rents issuing or to hereafter issue from said real property, together with all revenues, profits, royalties, bonuses, delay rentals or other income derived from any oil, gas and/or mineral lease or any other lease executed by Grantors, and in the event of any default in the payment of said note hereunder, after applicable notice and grace periods, Beneficiary, its agent or representative, is hereby authorized, at its option, to collect rent, revenues, profits, royalties, bonuses, delay rentals or other income derived from any oil, gas and/or mineral lease or any other lease executed by Grantors, to be applied, less the reasonable costs and expenses of collection thereof, to the payment of said indebtedness, whether then matured or to mature in the future, and in such manner as Beneficiary may elect. Upon the cure of any default, Beneficiary shall not longer be entitled to collect such rent, revenues, profits, royalties, bonuses, delay rentals or other income derived from any oil, gas and/or mineral lease or any other lease executed by Grantors, and such right shall revert to Grantors. The collection of said rents, revenues, profits, royalties, bonuses, delay rentals or other income derived from any oil, gas and/or mineral lease or any other lease executed by Grantors, by Beneficiary shall not constitute a waiver of its right to accelerate the maturity of said indebtedness nor of its right to proceed with the enforcement of this Deed of Trust.

It is agreed that an extension, or modification, may be made of the time of payment of all, or any part, of the indebtedness secured hereby, and that any part of the above described real property may be released from this lien without altering or affecting the priority of the lien created by this Deed of Trust in favor of any junior encumbrancer, mortgagee or purchaser, or any person acquiring

an interest in the property hereby conveyed, or any part thereof; it being the intention of the parties hereto to preserve this lien on the property herein described and all improvements thereon, and that may be hereafter constructed thereon, first and superior to any liens that may be placed thereon, or that may be fixed, given or imposed by law thereon after the execution of this instrument notwithstanding any such extension or modification of the time of payment, or the release of any portion of said property from this lien.

In the event any portion of the indebtedness hereinabove described cannot be lawfully secured by this Deed of Trust lien on said real property, it is agreed that the first payments made on said indebtedness shall be applied to the discharge of that portion of said indebtedness.

Beneficiary shall be entitled to receive any and all sums which may become payable to Grantors for the condemnation of the hereinabove described real property, or any part thereof, for public or quasi-public use, or by virtue of private sale in lieu thereof, and any sums which may be awarded or become payable to Grantors for damages caused by public works or construction on or near the said property. All such sums are hereby assigned to Beneficiary, who may, after deducting therefrom all expenses actually incurred, including attorney's fees, release same to Grantors or apply the same to the reduction of the indebtedness hereby secured, whether then matured or to mature in the future, or on any money obligation hereunder, as and in such manner as Beneficiary may elect. Beneficiary shall not be, in any event or circumstances, liable or responsible for failure to collect, or exercise diligence in the collection of, any such sums.

Nothing herein or in said note contained shall ever entitle beneficiary, upon the arising of any contingency whatsoever, to receive or collect interest in excess of the highest rate allowed by the applicable laws on the principal indebtedness hereby secured or on any money obligation hereunder and in no event shall Grantors be obligated to pay interest thereon in excess of such rate.

If this Deed of Trust is executed by only one person or by a corporation the plural reference to Grantors shall be held to include the singular and all of the covenants and agreements herein undertaken to be performed by and the rights conferred upon the respective Grantors named herein, shall be binding upon and inure to the benefit of not only said parties respectively but also their respective heirs, executors, administrators, grantees, successors and assigns.

The debt evidenced by the note is in part payment of the purchase price of the property; the debt is secured by this deed of trust and by a vendor's lien on the property, which is expressly retained in a deed of even date given by TAC EAST HOLDINGS COMPANY NO. 1 to F LINE HOLDINGS, LLC. This deed of trust does not waive the vendor's lien, and the two liens and rights created by this instrument shall be cumulative. Beneficiary may elect to foreclose under either of the liens without waiving the other or may foreclose under both. The deed is incorporated into this deed of trust.

THIS WRITTEN LOAN AGREEMENT REPRESENTS THE FINAL AGREEMENT BETWEEN THE PARTIES AND MAY NOT BE CONTRADICTED BY EVIDENCE OF PRIOR, CONTEMPORANEOUS, OR SUBSEQUENT ORAL AGREEMENTS OF THE PARTIES.

THERE ARE NO UNWRITTEN ORAL AGREEMENTS BETWEEN THE PARTIES.

EXECUTED this 26th day of February, 2025.

F LINE HOLDINGS, LLC

By: _____
Thomas J. Ogden
Manager

Trustees Address:	Beneficiary's Address:	Grantor's Address
Raymond W. Jordan	TAC EAST HOLDINGS COMPANY NO. 1	F LINE HOLDINGS, LLC
Jordan Law Firm, L.L.P.	107 Chapel Lane	401 N Montague Street
4 Woodmont Crossing	New Boston, Texas 75570	Hooks, TX 75561
Texarkana, Texas 75503		

ACKNOWLEDGMENT

STATE OF Texas §
§
COUNTY OF Bowie §

This instrument was acknowledged before me on the 26 day of February 2025, by Thomas J. Ogden, Manager of F Line Holdings LLC, a Texas Limited Liability Company, on behalf of said limited liability company.

MELODY L JOHNSON NOTARY PUBLIC STATE OF TEXAS ID# 11409859-5 EXP. 11-06-2026

_____
Notary Public, State of _____

September 3, 2025

Texas Commission on Environmental Quality
Attention: Waste Permits Division, MC 126
P.O. Box 13087
Austin, Texas 78711-3087

RE: RCRA PERMIT APPLICATION – ENVIROSAFE DEMIL, LLC IN HOOKS, TEXAS
INDUSTRIAL SOLID WASTE REGISTRATION NUMBER: 98470
PROPOSED HAZARDOUS WASTE PERMIT NUMBER: 50424
TRACKING NO. 30585390; RN111572442/CN606060028
RESPONSE: APPLICATION DEFICIENCIES – TECHNICAL NOD #1
UPDATED RESPONSE

Texas Commission on Environmental Quality, Waste Permits Division:

EnviroSafe Demil, LLC (ESD) is including an updated response to the Texas Commission on Environmental Quality (TCEQ) for the Technical Notification of Deficiencies (NOD) issued on April 10, 2025 for its Industrial and Hazardous Waste Permit Application for the facility in Hooks, Texas. The initial response was submitted on May 9, 2025.

The NODs addressed in the initial response and in this updated response are the NODs transmitted via Mr. Vahab Haghighatian on April 10, 2025. ESD understands that the deficiencies included in the attached table relate to Part B application Section III and a part of Sections V and VIII and that other sections/parts of the application are still under review.

This submittal includes the table provided by TCEQ on April 10, 2025 titled *Application Deficiencies – Technical NOD #1*. ESD has included the initial responses to each NOD in red text. Updated responses to #T18 and #T19 are included in this submittal as green text. Please review the responses and inform ESD if the responses are adequate to meet the requirements.

As noted in the May 9, 2025 initial response, ESD has purchased the main portion of the facility. ESD has renamed Montague Street to Demil Way. Therefore the address of the facility is now 401 Demil Way, Hooks, Texas 75561.

Please contact me at 360-480-9320 [redacted] with any questions or comments.

Sincerely,

Michael Wentz
President, EnviroSafe Demil, LLC.
401 Demil Way
Hooks, Texas 75561-0019

ATTACHMENT

APPLICATION DEFICIENCIES – TECHNICAL NOD #1

UPDATED RESPONSES

Initial responses are shown in red text
Updated responses are shown in green text

Application Deficiencies – Technical NOD #1

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T1	B	III. Facility Management instructions	Section III – Pages 1-3	Application Instructions	Typo	References to included information Appendix III.A, B, C, D, and E are incorrectly stated as Appendix II.A, B, C, D, and E. The references will be updated to the correct references.
T2	B	III	Section III Page 18	Application Instructions	Omitted	Table 2, Safety and Emergency Equipment Inspection Frequencies does not have an entry for "Security Devices" which is included in Table II.D. Inspection Schedule Page 20. Table 2, Safety and Emergency Equipment Inspection Frequencies will be updated to include the following information for each column: Device Type: "Security Devices" Frequency: "Weekly" Inspections, Tests, & Calibrations: "Visually inspect fences, gates, locks, and key card entry equipment for compromise; ensure gates and key card entry equipment are functioning properly."
T3	B	III	Section III Page 21	Application Instructions	Typo	The heading cites 40 CFR Part 64 Subpart D (264.50-56) which should read 40 CFR Part 264 Subpart D (264.50-56). For clarity please add text to the title to read: "40 CFR Part 264 Subpart C – Preparedness and Prevention (264/30- 264.37) and 40 CFR Part 264 Subpart D – Contingency Plan and Emergency Procedures (264.50-56)." The suggested text will be added to the title.

[1] Deficiency ID – Key: A#=Administrative deficiency (ex. A12); NT#=Non-Technical deficiency relating to more administrative in nature such as typo, format, etc. (ex. NT7); T#=Technical deficiency relating to Sections I-X and Sections XII-XIII of the Part B application (ex. T10); C#=Comment only (ex. C1); CP#=Technical deficiency relating to Section XI-Compliance Plan of the Part B application (ex. CP14); **Number in parenthesis (*n*) = *n*th instance of same deficiency** (ex. T1(2) is the second instance of deficiency T1 originally identified in previous NOD).

[2] Location of deficiency in submittal/application. Items in square brackets [ ] refer to applicant's supplemental information submitted as attachments to the application form.

[3] Possible Error Types: Ambiguous, Incomplete, Inconsistent, Incorrect, Omitted, Typo, or Format.

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T4	B	III	Section III 2.6.2 Evacuation Routes (III Page 26) and associated Figure 2-1 Evacuation Map (Section III Page 34)	40 CFR 264.52(f)	Format	The text refers to the Evacuation Map which is difficult to use to identify primary and secondary evacuation routes. If a larger map with those routes more clearly seen is used for training and use in the case of an emergency please note; if not please provide a more easy to use map, or separate maps for each of the three facility sites. This following statement will be added after the first sentence in Section 2.6.2. "A larger map where the routes are more clearly seen is used for training and in the case of emergencies."
T5	B	III	Table 1.1-1	40 CFR 264.31-264.56	Format	This table includes cross-references from the CFR regulations to locations where addressed in the application for both 40 CFR 264 Subpart C – Preparedness and Prevention and 40 CFR 264 Subpart D Contingency Plan and Emergency Procedures. For clarity we recommend changing the title to "Preparedness and Prevention and Contingency Plan Regulatory Checklist" and providing subheadings within the table for the block of 40 CFR 264.32-37 as "Subpart C-Preparedness and Prevention, and for the block of 40 CFR 264.52(c), 264.51, and 264.52(a) – 264.56 as "Contingency Plan and Emergency Procedures." The title will be updated as suggested in the comment above and the two suggested sub headers will be added to the table.
T6	B	III	Section III p. 45	Application Instructions	Ambiguous	The acronyms HBC and NEW are used in this section without defining them. HBC and NEW will be defined as follows: Hybrid Burn Chamber (HBC) Net Explosive Weight (NEW)
T7	B	V	Section V p. 10	Application Instructions	Ambiguous	To match the Part B Section V instructions please change the heading of "1.0 Introduction" to "1.0 General Information." The heading will be updated as suggested.

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T8	B	V	Section V p. 10	40 CFR 270.14(b)(19)	Incorrect	40 CFR 270.14(b)(19) requires that a topographic map surrounding the facility 1000 feet at a scale of 1 inch to not more than 200 feet be provided. The topographic map referred to by this section identified as Attachment C of the Part A application is a USGS topographic map with a scale of 1:24000 which is an equivalent scale of 1 inch to 2000 feet. Referrals to information, drawings, maps, etc. within other sections of the Part B are allowable, but referrals to the Part A are not, since that application submittal is separate and apart from the Part B. There are 12 items required on this map (40 CFR 270.14(b)(19)(i-xii), some of which, but not all, are included on this map referred to, such as (ii) the 100-year floodplain, etc. Three separate maps, one for each separate properties constituting the entire facility might be considered due to the overall coverage of this facility. Contours of sufficient spacing must be indicated to allow determination of stormwater flow at the surface. Topographic maps at the scale of 1 inch to not more than 200 feet are included as an attachment to this submittal as well as maps at other scales in order to display the facility in its entirety. A wind rose is provided on a separate page so that the map can be more clearly seen and not have wind rose information blocking pertinent map data. These maps and wind rose will be included as "Attachment V.A – Maps for General Engineering Reports – General Information" after the last section (Section 4.0) in Section V – Engineering Reports, Appendix V.A – General Engineering Reports. Table 1-2 (Section V – Page 12) will be revised to replace the Part A references with the following: "Attachment V.A – Maps for General Engineering Reports – General Information."

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T9	B	V	Section V p. 15	30 TAC 335.204(a)(5)	Incomplete	Table 2-1 lists in the 4th row, referencing the TAC citation that "The facility may not be located in: areas where soil unit(s) within five feet of the containment structure have a Unified Soil Classification of GW, BP, GM, GC, SW, SP, or SM…"referring to Attachment II.5 – Soil Unit Information." (pages II-52-53) where it appears that soil unit SM is identified in Area 4 where the Above Ground Magazine Unit No. 300 is located. The text in Section II – Facility Siting Criteria, Section 3.2 (Section II – Page 7) will be replaced with the following text: "Attachment II.5 includes maps that show the United States Department of Agriculture, Natural Resources Conservation Service soil designations within the ESD facility boundaries. The soil underneath where the HBC and Rocket Motor Ops Building will be located is classified as CL, ML, and CH. The soil underneath where the ECMs are located is also classified as CL, ML, and CH. The soil underneath where the AGM is located is classified as CL, ML, SC, SM, and CH. 30 TAC §335.204(a)(5) states that a storage or processing facility may not be located in areas where soil units within 5 feet of the containment structure have a Unified Soil Classification of GW, GP, GM, GC, SW, SP, or SM unless one of the following is true: • secondary containment is provided to preclude migration to groundwater or surface water from spills, leaks or discharges; or • the soil unit is not sufficiently thick and laterally continuous to provide a significant pathway for waste migration. The soil where the AGM located has the Unified Soil Classification code of SM, but secondary containment is provided to preclude migration of spills, leaks, or discharges to groundwater if they were to occur. The AGM is fully enclosed and has raised edges at the entrance locations such that no material would be able to reach the soil outside in the event of a spill (if one were to occur). It should be noted that the energetic materials stored will have no free liquids present. Therefore, there is no potential for liquid spills or leaks." Additionally, the 5th question regarding Unified Soil Classifications in Table

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
						II (Section II – Page 9) will be updated from "No" to "Yes (AGM area only). See Section II – Facility Siting Criteria, Section 3.2."
T10	B	V	Section V p. 15	30 TAC 335.204(a)(8)	Typo	This response to "the critical habitat of an endangered species of plant or animal" refers to Section 2.9 of Appendix II – Facility Siting Criteria which does not exist; apparently should refer to Section 3.3 of Appendix II -Facility Siting Criteria, 3.3 Critical Habitat of an Endangered Species of Plant or Animal. This section refers to Attachment II.5 – Critical Habitat of an Endangered Species of Plant or Animal which is actually Attachment II.6. Table 2-1 on page Section V – Page 15 will be updated to change the reference of Section 2.9 to Section 3.3 and change the reference of Attachment II.5 to Attachment II.6. "Endangered Species of Plan or Animal" will be updated to "Endangered Species of Plant or Animal." Additionally, Section II – Page 58 will be updated to change the reference of Section 2.9 to Section 3.3 and change the reference of Attachment II.5 to Attachment II.6.
T11	B	V	Section V page 18	Application Instructions	Typo	The first sentence locates the storage magazines as being: "…storage magazines that are adjacent to the main facility….". The word "adjacent" should be changed to "proximate" as the three properties of this facility are not adjacent to each other. In addition, all portions of the facility included in the permit application for waste management must be contiguous; i.e., may not be connected by public roadways or if connected by private roadways that the applicant does not own or control a right-of-way must be obtained and clearly included on the legal description of the facility in Part A of the permit application as a contagious facility. The first sentence in Section V – Page 18 will be updated to replace the word "adjacent" with the word "proximate." Additionally, the word "adjacent" on the following pages will also be changed to "proximate." • Part A Application – Page 9 • Part A Application – Attachment B, first page • Part A Application – Attachment E, first page • Section II – Page 5 • Section VII – Page 4 The roadways between the main facility and the storage areas are owned by TexAmericas. These roadways are private roads designated for TexAmericas tenants and their related business activities – these

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
						are not public roadways. ESD pays its share of the "TexAmericas Center-East common area charges" which allows ESD the use of roadways and other common areas. More information on the common area charges can be found in the Part A Application - Attachment A.3 in Section 15.17 of the Industrial Lease document. Specifics on roadway access are included in the Part A Application - Attachment A in Section 15.18 of the Industrial Lease document. The streets that will be used to move material between the storage magazines and the main facility will be Beech Street, Cherry Street, Cypress Street and Montague Street (soon to be renamed "Demil Way"). The following sentence will be added to the first page of the Part A Application – Attachment B: "ESD will transport material between the storage magazines and the main facility using Beech Street, Cherry Street, Cypress Street and Montague Street (soon to be renamed "Demil Way"). ESD's Industrial Lease provides a right-of-way for ESD to access these roads (see Sections 15.17 and 15.18 of the Industrial Lease document in the Part A Application – Attachment A.3)." A third map will be included in the Part A Application – Attachment B. This map is attached to this response. The attached map shows the roadways where ESD has a right-of-way and will plan to move the materials between the storage magazines and the main facility.
T12	B	V	Section V page 19	40 CFR 270.15(e)	Incomplete	The response to the requirement to demonstrate compliance of "N/A" does not detail why the container storage areas are not subject to this cited regulation. If ultimately the regulations depend upon a demonstration of the wastes containing less than 500 ppm VO (40 CFR 264.1082(c)(1) then provide a justification of that exemption. The entries for §264.175(a) and §264.175(b) will be modified to have the following entry "N/A, see §264.175(c) and Section 4.0." Additionally, the entries for §264.175(a), §264.175(b), §264.175(c), and §270.15(a) will have a footnote added that states "The storage magazines will not store containers with free liquids. Per 40 CFR §264.175(c), storage areas that store containers holding only wastes that do not contain free liquids need not have a containment system described by 40 CFR §264.175(b) as long as certain requirements are met. See Section 4.0 for more information.

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T13	B	V	Section V page 21	Application Instructions	Ambiguous	The description of the existing earth covered magazines in the second sentence of Section 3.1 is unclear, only identifying one part of the structure, the headwall as being made of concrete and the earth covering to be at least two feet deep suggesting it is below grade. Identifying the structure as "…consisting of reinforced concrete headwall, endwall, at grade floor, and arched roof all sealed watertight to each other as one unit, the roof also covered with a minimum two foot thick soil covering…", should more clearly describe the structure and assist in evaluating the structure with respect to other general requirements such as stormwater runon and runoff. The following sentence will be added to the end of the second paragraph in Section 3.1 on page Section V – Page 21: "Each earth covered magazine consists of a reinforced concrete headwall and endwall, an at grade floor, and an arched roof all sealed watertight to each other as one unit. The roof is also covered with a minimum of two feet thick soil covering." To aide TCEQ in visualizing the existing earth covered magazines, photographs of the earth covered magazines were included in the Part A Application – Attachment D.
T14	B	V	Section V page 57	Application Instructions	Incomplete	Section 2.2.1 Operation states "No unprocessed energetic material be left in the Rocket Motor Ops Building when the HBC is not in operation." Where will this unprocessed material be managed in the interim period? The following sentence will be included in Section 2.2.1 at the end of the first paragraph: "Any unprocessed energetic material will be transferred to the storage magazines until the HBC returns to operation."
T15	B	V	Section V page 58	Application Instructions	Ambiguous	Section 3.0 Pathways to Exposure states "Due to the nature of the wastes…" is vague, which should explain that the "nature of the wastes as solids containing no free liquids nor significant concentration of volatile organic compounds…" The third sentence in Section 3.0 will be modified to state: "Due to the nature of the wastes (solids containing no free liquids or volatile organic compounds), the manner in which hazardous wastes are stored and handled, the equipment used, the building designs, and the operational practices of the facility, the likelihood of a release of hazardous wastes or hazardous waste constituents is remote."

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T16	B	V	Section V page 62	Application Instructions	Typo	Last sentence of first paragraph refers to "Appendix II – Facility Sitting Criteria". "Facility Sitting Criteria" will be updated to "Facility Siting Criteria" on the following pages: • Section V – Page 54 • Section V – Page 62
T17	B	V	Section V page 62	Application Instructions	Omitted	The second paragraph of this part relies upon referrals to information presented within the Part A application. The information required by the Part B application is a stand alone requirement separate and apart from the Part A application. Cross referrals within the Part B are acceptable but not referrals to the Part A. The second paragraph of Section 1.0 will be revised to remove the references to the Part A Application Form. The location of the facility is described elsewhere in the Part B application and detailed location information does not necessarily need to be referenced from this particular section for compliance with the requirements of 40 CFR §264.600-§264.602, and §270.23. The second paragraph will be reworded as follows: "The HBC and the associated air pollution control system will be located towards the southern portion of the main facility property, near the intersections of N Montague Street (soon to be renamed "Demil Way") and Cypress Street in Hooks, Texas (Bowie County). The exact location is described in Section II of the Part B Application – *Facility Siting Criteria*."
T18	B	V	Section V pages 68-69	40 CFR Part 264 Subpart X	Incorrect	The statement is made on these pages that regulations explicitly not contained within Subpart O do not apply to Subpart O. Subpart O (40 CFR 264.601) states that "Permit terms and provisions must 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." Revise the statement accordingly. The paragraph in Section 2.7 under the subheading "Monitoring" will be revised to read as follows: "Continuous process monitoring, including monitoring of the operating parameter limits (OPLs) discussed in Section 3.0, is conducted through the Human Machine Interface (HMI) located in the Range Control room. A series of computers and monitors displays information on the

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
						temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. By procedure, HBC process cycles are not allowed to commence if all safe conditions are not met or remedied." The first paragraph of Section 3.0 will be revised to read as follows: "The HBC is not an incinerator and there is no controlled flame combustion. The HBC operation most closely resembles open burning/open detonation, but is more environmentally responsible. As opposed to open burning/open detonation, the HBC has the advantage of containing and cleaning the exhaust gases. The HBC is non-incineration, and ESD is applying for a RCRA 40 CFR Part 264 Subpart X permit. After discussions with TCEQ, TCEQ recommends that the emission limits and relevant operating parameter limits (OPLs) of 40 CFR Part 63 Subpart EEE (HWC MACT) would be most appropriate for the HBC and its APCS." The remainder of *Section V – Engineering Reports, Appendix V.K - Miscellaneous Units (Hybrid Burn Chamber)* will be reviewed and changes will be made as necessary to reflect the Trial Burn Plan and its associated requirements. A redline/strikeout revision of this section will be provided to TCEQ along with the Trial Burn Plan requested in NOD #T19. Updated Response (September 2025): *Section V – Engineering Reports, Appendix V.K - Miscellaneous Units (Hybrid Burn Chamber)* has been updated to reflect the Trial Burn Plan and its associated requirements. A redline/strikeout revision of this section is included with this submittal.

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T19	B	V	Section V page 70	Application Instructions 40 CFR Part 264 Subpart X	Incomplete	Section 4.1 indicates that this facility intends to operate in compliance with a TCEQ issued permit-by-rule (PBR). Please remove the reference to the PBR, instead include a Trial Burn Plan, as follows: 1. Propose a trial burn plan to test the unit and associated air pollution system which will ensure compliance with the emission standards for new hazardous waste incinerators in 40 CFR Section 63.1219 (b) and the monitoring requirements in 40 CFR Section 63.1209. 2. Complete the following tables except replace "incinerator" with "the name of the unit being permitted", and replace "H" with "K" in the designation for the tables: a. Table V.H.3 – Maximum Allowable Constituents Feed Rates based on the design and performance of the unit. b. Table V.H.4. Maximum Allowable emission Rates, based on 40 CFR Section 63.1219 for new hazardous waste incinerators and the performance of the unit. c. Table V.H.5 – Incinerator Permit Conditions, Monitoring and Automatic Waste Feed Cutoff Systems based on the design and performance of the unit – Short Term Operation. Note: Upon issuance of the permit, the permittee will be required to test the unit using the trial burn plan incorporated into the permit and submit the results to the TCEQ for evaluation along with a permit modification per 30 TAC 305.69 to set long term limits in the Tables V.H.2 and V.H.3. ESD is in the process of developing a Trial Burn Plan that is appropriate for the Hybrid Burn Chamber and will send the plan to TCEQ when it is complete. As noted in NOD #T18, additional changes will be made to *Section V – Engineering Reports, Appendix V.K - Miscellaneous Units (Hybrid Burn Chamber)* as necessary to reflect the Trial Burn Plan and its associated requirements. A redline/strikeout revision of this section will be provided to TCEQ along with the Trial Burn Plan.

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
						Updated Response (September 2025): ESD submitted the Trial Burn Plan to TCEQ on August 25, 2025. The Trial Burn Plan is also attached to this submittal. As noted in NOD #T18, additional changes were made to *Section V – Engineering Reports, Appendix V.K - Miscellaneous Units (Hybrid Burn Chamber)* to reflect the Trial Burn Plan and its associated requirements. A redline/strikeout revision of this section is included with this submittal.
T20	B	V	Section V page 71	Application Instructions	Ambiguous	The first and third paragraphs of this page describes the HBC as being set into a "large concrete foundation that completely contains the chamber." A foundation would provide support, and enclosure would completely contain the chamber; please clarify this description of the relationship of how the HBC is placed on the concrete foundation and within the enclosure. The text in Section 4.2 under the heading "Precipitation Run-on and Runoff" will be replaced with the following text: "The feed system for the HBC is enclosed within the Rocket Motor Ops Building, preventing precipitation from entering the feed system. The HBC unit is an enclosed vessel (the exterior of the vessel is exposed to the elements) that is set into a large concrete foundation that provides support and completely contains the footprint of the HBC. The HBC APCS has a concrete pad with an apron to capture rainwater runoff through a filter. These measures guard against the release of hazardous waste to the surface water, groundwater, or soil." The text in the second paragraph of Section 5.0 will be replaced with the following text: "As mentioned in Section 4.2, the HBC vessel is set into a large concrete foundation that completely contains the footprint of the HBC. The HBC APCS has a concrete pad with an apron to capture rainwater runoff through a filter."

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution
T21	B	VIII	Section VIII	30 TAC 305.50(a)(4)(B)	Incomplete	The applicant must demonstrate the capability to provide sufficient financial resources to construct, safely operate, properly close, and provide adequate closure and liability coverage for the facility. a. The Letter of Opinion from Financial Expert Mike Levine is not signed. Please arrange to have this letter signed and included with the permit application. b. provide updated loan commitment documentation. For additional information, please contact Mr. Mark Stoebner of the TCEQ Financial Assurance Unit at 512-239-6150 or [redacted] The Letter of Opinion signed by Mike Levine will be included in the final revised application and is also included as an attachment to this submittal. Updated loan commitment documentation will be included in the final revised application and is also included as an attachment to this submittal..

ATTACHMENT

ADDITIONAL INFORMATION FOR

NOD #T18 and #T19

Section V – Engineering Reports

Appendix V.K – Miscellaneous Units (Hybrid Burn Chamber)

40 CFR §264.600-§264.602, and §270.23

1.0 INTRODUCTION

The Hybrid Burn Chamber (HBC) is subject to 40 CFR Part 264 Subpart X (40 CFR §264.600-§264.603) – Miscellaneous Units. *Table V.K – Miscellaneous Units* lists information for the HBC. The HBC is located, designed, constructed, operated, maintained, and will be closed in a manner that will ensure protection of human health and the environment. Site-specific information pertaining to the hydrologic and geologic characteristics, groundwater flows, patterns of land use, precipitation patterns, etc. are required by 40 CFR §264.601 in order to ensure that the site is suitable to ensure protection of human health and the environment. Detailed site-specific information is provided in Section II of the Part B Application in *Appendix II – Facility Siting Criteria*.

The HBC and the associated air pollution control system will be located towards the southern portion of the main facility property, near the intersection of N Montague Street (soon to be renamed "Demil Way") and Cypress Street in Hooks, Texas (Bowie County). The exact location is described in Section II of the Part B Application – *Facility Siting Criteria*.

Table 1, *Table of Information Requirements for Miscellaneous Units*, presents the regulatory references for the information required to be submitted for miscellaneous units in 40 CFR §270.23 and 40 CFR §264.600-§264.602 and the section of this document that addresses the specific requirement. Most of the information for this miscellaneous unit is addressed in other portions of this permit application. For information that is addressed in another portion of this permit application, a statement indicating which section the information can be found in is provided. Any additional information that is not covered in other portions of this permit application is presented in this document.

Table 1
Table of Information Requirements for Miscellaneous Units

Regulatory Citation (40 CFR)	Description	Section Requirement is Addressed
§270.23(a)(1)	Physical characteristics, materials of construction, and dimensions of the unit	Section 2.6
§270.23(a)(2)	Description of how the unit will be located, designed, constructed, operated, maintained, monitored, inspected, and closed to comply with the requirements of §264.601 and §264.602	Section 1.0
§270.23(a)(3)	For disposal units, plans for post-closure requirements	N/A
§270.23(b)	Hydrologic, geologic, and meteorologic assessments and land-use maps for the region surrounding the site	Section 1.0
§270.23(c)	Information on potential pathways of exposure and on the potential magnitude and nature of such exposures	Section 4.0
§270.23(d)	For any treatment unit, a demonstration of the effectiveness of the treatment based on laboratory or field data	Section 2.8
§270.23(e)	Additional information determined by the Director to be necessary	N/A
§264.601(a)	Prevention of releases due to migration of waste constituents in the groundwater or subsurface environment	Section 4.2
§264.601(b)	Prevention of releases of due to migration of waste constituents in surface water, or wetlands, or on the soil surface	Section 4.2
§264.601(c)	Prevention of releases due to migration of waste constituents in the air	Section 4.1
§264.602	Monitoring, testing, analytical data, inspections, response, and reporting procedures and frequencies	Section 2.7 Section 6.0

2.0 DESCRIPTION OF THE HYBRID BURN CHAMBER SYSTEM

Energetic materials are transferred from the storage magazines to the Rocket Motor Ops Building, where they are prepared for processing in the HBC. The HBC provides demilitarization for numerous munition items such as rocket motors, flares, smoke munitions, and other munitions that are ignitable and non-mass detonating. After the materials are prepared for processing, they are transferred through the Rocket Motor Ops Building to the feed sled of the HBC. The HBC system is a contained burn system followed by air pollution control equipment. A process flow diagram is included in Figure V.K.1.

The HBC system initial concept was designed by El Dorado Engineering (EDE). EDE has designed other thermal treatment facilities which are currently in operation. Examples of these facilities include the Ammonium Perchlorate Rocket Motor Destruction (ARMD) facility at Letterkenny Army Depot in PA and the Camp Minden M6/CBI Bulk Propellant facility at Camp Minden, LA. EDE designs have proven control technologies. The ESD HBC system is a hybrid-like version of the EDE ARMD and Camp Minden designs.

Contained burn technology can be thought of as "open burning indoors." This proven technology provides a modern and environmentally responsible alternative to replace open burning. These robust systems are designed to be simple, safe, and flexible from an operations standpoint, while limiting pollution and potentially harmful emissions which are a concern from open burning operations.

Materials are prepared in batches and are ignited in a manner similar to traditional open burning operations, maintaining simplicity and flexibility. The exhaust gasses, however, are contained and cleaned prior to release to protect human health and the environment. The design of the air pollution control system (APCS) to scrub the off gases is tailored to the chemistry of the materials being processed. Precision Partners Industrial Development Group (PPIDG) is providing the APCS equipment.

The basic components of the contained burn system include the feed system, the HBC, an ignition system and an APCS. Ancillary systems include an HBC wash system and utilities. The components and systems presented in the following sections are used to achieve energetic destruction and pollution abatement.

2.1 Feed System

The feed system design is customized based on the type and quantity of material to be processed to maximize throughput, process material type flexibility, and minimize personnel handling of the

process feed material, thus minimizing risk. All feeding into the HBC is performed by operators in the control room (Range Control) which is separated from the HBC by a substantial barricade wall designed to prevent injury to operators. Safety systems throughout the HBC include a series of interlocks and alarms for abnormal conditions.

The feed system operates in a batch feed mode. Bulk materials are prepared for processing and are placed into a removable burn pan. Rocket motor components or other items that create thrust when burned are secured using a holding fixture to restrain the motor during firing. The burn pan or rocket motor is then remotely loaded into the HBC using an automated loading system. The material is ignited remotely. After thermal processing is complete, the burn pan is remotely extracted from the HBC.

2.2 Hybrid Burn Chamber (HBC)

The HBC is a steel pressure vessel specially designed and sized to contain the exhaust products generated from burning. It is designed to ensure both the safety of personnel and to protect equipment in the case of a maximum credible event. It is sized to provide proper combustion of the process materials and to withstand the process operating pressures and temperatures.

2.3 Ignition System

An electrically actuated ignition source is incorporated in the contained burn system so that materials loaded for processing can be ignited remotely by an operator. The ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is operational. Once the chamber is closed and ignition initiated, the operators have no further active control.

2.4 Air Pollution Control System (APCS)

After processing of the energetic materials within the HBC, emissions are exhausted through a series of air pollution control equipment that make up the APCS. The APCS is tailored to the exact waste profile being processed. The APCS is designed to achieve low/non-detectable emission levels.

The pressure and flow of the gas will be regulated by a multi-damper recirculation loop at the outlet of the HBC. The HBC gas will be evacuated from the top of the chamber directly into a thermal oxidizer (also known as an afterburner) for VOC destruction where the gas temperature will be increased to approximately 2,000ºF for 2 seconds of residence time to provide effective thermal oxidation of VOCs.

The hot flue gas will be quenched by water injection down to approximately 750ºF and will enter the reaction duct. In the reaction duct, dry sorbent (hydrated lime) and aqueous ammonia (19% solution) are injected into the gas stream to mix prior to distribution through the ceramic filter housings. At the ceramic filter housings, the process PM and reacted sorbent containing captured HCl and SOx are filtered out of the gas stream directly on the outer surface of the ceramic filters and discharged from the filter housing waste hopper. The catalyst in the filters will react with the NOx and ammonia resulting in NOx destruction. The clean gas exits the filter housing and flows through the high temperature induced draft fan and out the stack.

2.4.1 Thermal Oxidizer (Afterburner)

A natural gas direct-fired thermal oxidizer is provided and includes a certified combustion management system. The system increases gas temperatures to 2,000°F with approximately 2 seconds of residence time to achieve thermal oxidation. This design enhances the effectiveness of the oxidation process.

2.4.2 Ammonia Injection System

To control NOx with the catalytic ceramic filters, atomized aqueous ammonia (19% vol.) is injected directly into the flue gas inlet duct upstream from the dry sorbent injection (DSI) point. The ammonia system utilizes a metering pump with pulse dampeners and pressure transmitters to ensure proper system operation. Ammonia is atomized using compressed air at the nozzle to ensure proper mixing with NOx in the flue gas. All wetted components are chemical resistant plastic and 316 grade stainless. The pump skid is contained in an impact resistant steel structure with a spill containment and plastic spray shields.

2.4.3 Dry Sorbent Injection (DSI) System

Dry sorbent is stored in supersacks with a capacity of 1,100 lbs. Supersacks of fresh sorbent are loaded on the bag unloader system designed to inject sorbet into the flue gas duct within the operating injection range of 10-40 lbs/hr. The bag unloader system has a screw feeder to control the feedrate and a high pressure centrifugal blower to convey sorbent to the injection point. Supersack fluidizing paddles keep the fresh sorbent flowing out of the supersack. The bag unloader system uses level sensors and alarms to notify operators that a supersack change is required.

2.4.4 Ceramic Filter Housing and Elements

The prefabricated filter housings include the tube sheet, filter cleaning system, inlet/outlet duct connection flanges, housing body, hopper, insulation, and cladding. The filter housing is

welded internally to eliminate air or water leakage into the housing while under negative pressure during operation.

The CFA Cerafil catalytic ceramic filters have been proven to operate for over 10 years without replacement. Due to the mechanism of the filters, both the embedded catalyst and the mechanical integrity of the filter, do not observe meaningful performance degradation for the life of the filter. This significantly reduces the cost, downtime and risk observed when compared against traditional selective catalytic reduction (SCR) catalyst and fabric filter bags which often require replacement in <3 years.

2.4.5 Waste Collection and Handling

The spent sorbent material temperature at the discharge of the filter housing hoppers will be approximately 600ºF.

2.4.6 ID Fan

The high temperature induced draft (ID) fan features a direct drive configuration for improved performance. It includes integrated vibration and temperature sensors for enhanced monitoring. This design ensures efficient operation and reliable performance at all times during operation.

2.4.7 Stack

The exhaust system features a freestanding 50-foot carbon steel stack, complete with EPA test ports and CEMS ports.

2.4.8 Stack Gas Monitoring - CEMS

Stack gas is continuously monitored using a Fourier transform infrared spectroscopy (FTIR) based Continuous Emissions Monitoring System (CEMS). The CEMS measures the following:

- Carbon monoxide (CO)
- Oxygen (O_2)
- Ammonia slip (serves as a bag leak detection system)
- Hydrogen Chloride (HCl)

The CO and O_2 CEMS will be installed, calibrated, maintained, and continuously operated in compliance with Performance Specification 4B.

The primary functions of the CEMS are to:

- Continuously measure, display, and record the gas concentrations in the stack, and
- Activate alarms and provide input into safety interlocks.

Additionally, the CEMS performs these important functions:

- Remotely displays stack gas composition and CEMS operational status, and
- Performs calibration of monitoring systems.

More information on the CEMS is included in Attachment V.K – HBC.

2.4.9 Instrumentation and Control Cabinet

All instrumentation for process monitoring is included, such as thermocouples, flow monitors, and pressure transmitters. The control cabinet contains all control components, including a Programmable Logic Controller (PLC). These components are assembled inside a National Electrical Manufacturer Association (NEMA) 4X outdoor-rated cabinet for durability. This ensures reliable process control and monitoring in all environments.

2.5 HBC Wash System

This system provides for automated remote washing of the interior of the chamber to periodically remove ash or condensate materials from the chamber. The spray water is drained from the HBC and passes through a neutralization system to neutralize any acid present and a filter press system to remove solids. The filtered liquid stream can then be re-used for future HBC wash cycles or pumped into storage tanks where it is characterized prior to final disposal off-site.

2.6 Physical Characteristics, Materials of Construction, and Dimensions

The HBC is a steel pressure vessel specially designed and sized to contain the exhaust products generated from burning. The specific design information for the HBC is considered CONFIDENTIAL information and more details, including a process flow diagram, are contained in *Appendix XIII – Confidential Material*. Non-confidential information is shown in Attachment V.K – HBC.

2.7 Operation, Monitoring, and Maintenance

Standard operating procedures will be developed by the facility, the manufacturer for the HBC, and the manufacturers for the associated air pollution control system (APCS). As part of the design process, the manufacturer is expected to perform a design hazards analysis on the unit and the anticipated operations. This analysis will identify scenarios that could result in a safety incident. From this design hazard analysis, appropriate administrative controls, procedures, and training will be identified and used in developing the standard operating procedures.

Operation

Operation for both the HBC and the associated APCS is performed in accordance with the manufacturer recommendations. Operating instructions, start-up and shutdown procedures, preventive maintenance, servicing instructions, and troubleshooting methods are based on manufacturer recommendations, processing needs, and ensure protection of human health and the environment.

The HBC feed process is fed by batch. Items are fed to the chamber and are allowed to consume themselves (in the manner in which they were originally designed) inside of the chamber. When operating conditions are within the specified ranges, the items are then removed to be replaced by the next batch or item. If conditions are incorrect for another batch based on the chamber sensors or APCS sensors, the batch is not fed or processed until conditions are remedied.

After being processed, the output stream from the HBC consists of inert motor casings and some recyclable materials. The inert motor casings are sent to an appropriate landfill off-site and recyclable materials are sent off-site for recycling.

A general overview of normal operation is provided below:

1. Materials are prepared for processing and placed into a burn pan or holding fixture.
2. The material to be processed for a given burn cycle is remotely loaded into the HBC.
3. The ignition source is activated remotely to promote combustion of the materials.
4. The materials burn inside the HBC which contains the exhaust gases.
5. The exhaust gases are metered through the APCS via induced draft from the ID fan and the HBC vent valve which meters exhaust gas flow.
6. When HBC pressure is confirmed to be negative relative to ambient, the HBC loading door is remotely opened. Fresh air is drawn into the HBC by the ID fan.
7. The processed materials can be inspected remotely via closed circuit television (CCTV).
8. Operators are allowed to remove the burn pan or rocket motor case from the loading system and place the next load for processing.
9. The cycle is repeated.

Monitoring

Continuous process monitoring, including monitoring of the operating parameter limits (OPLs) discussed in Section 3.0, is conducted through the Human Machine Interface (HMI) located in the Range Control room. A series of computers and monitors displays information on the temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has

alarms and interlocks for normal and abnormal conditions of the equipment. By procedure, HBC process cycles are not allowed to commence if all safe conditions are not met or remedied.

Maintenance

Maintenance for both the HBC and the associated APCS is performed in accordance with the manufacturer recommendations.

2.8 Effectiveness of Treatment

Based on experience with similar techniques conducted at other facilities, there are no explosive components left after processing and the remaining material is no longer considered to carry the reactive waste code.

3.0 EMISSIONS TESTING AND COMPLIANCE STRATEGY

The HBC is not an incinerator and there is no controlled flame combustion. The HBC operation most closely resembles open burning/open detonation, but is more environmentally responsible. As opposed to open burning/open detonation, the HBC has the advantage of containing and cleaning the exhaust gases. The HBC is non-incineration, and ESD is applying for a RCRA 40 CFR Part 264 Subpart X permit. After discussions with TCEQ, TCEQ recommends that the emission limits and relevant operating parameter limits (OPLs) of 40 CFR Part 63 Subpart EEE (HWC MACT) would be most appropriate for the HBC and its APCS.

Tables V.K.3, V.K.4, and V.K.5 provide compliance information for the HBC. ESD will conduct a Trial Burn Test on the HBC and the associated APCS in order to prove compliance with the emission limitations specified in Table V.K.4. The constituent feedrate limits and select operating parameter limits (OPLs) will be established based on performance during the Trial Burn. Other OPLs will be based on manufacturer's recommendations or will be as specified in the HWC MACT rule. These limits will ensure compliance with the emission limitations.

The constituent feedrate limits specified in Table V.K.3 will be in effect during the shakedown period (no more than 720 hours of operating before the Trial Burn Test) and during the period of time after the Trial Burn Test until the permit can be modified to reflect the results of the Trial Burn Test. The constituent feedrate limits will be updated based on performance during the Trial Burn Test and the permit will be modified to include the new constituent feedrate limits.

A Trial Burn Plan outlining the purpose of the test, the operating conditions of the test, and the basis for how the constituent feedrate limits and OPLs will be established is included with this

permit application. ESD will conduct the Trial Burn Test before the HBC operates a total of 720 hours (shakedown period).

4.0 PATHWAYS OF EXPOSURE

The possibility for release exists at any facility that handles hazardous wastes. However, multiple precautions have been taken to minimize risks, exposure, and releases. Due to the nature of the wastes, the manner in which hazardous wastes are stored and handled, the equipment used, the building designs, and the operational practices of the facility, the likelihood of a release of hazardous wastes or hazardous waste constituents is remote. Training on the proper methods of packaging, storing and transporting energetic materials is provided to employees who handle energetic materials. Inspections are conducted on a regular basis to ensure that all areas where energetic materials are stored or handled are safe and that facility operating procedures are being followed.

4.1 Air Pathway of Exposure

One potential pathway of exposure to humans or environmental receptors is through the emissions of hazardous constituents from the HBC into the air. However, because the extensive APCS equipment is designed to provide minimum removal efficiencies of 99.9% for particulate matter, 99% for CO, 99.99% for VOCs, 90% for HCl, and 99.99% for metals, these potential effects are minimized to the maximum extent possible. Additionally, the facility operates under an air Permit by Rule (PBR) issued by the Texas Commission on Environmental Quality (TCEQ) Air Permits Division.

4.2 Surface Water, Groundwater, or Soil Pathways of Exposure

Another potential pathway of exposure to humans or environmental receptors is through surface water, groundwater, or soil. Surface water, groundwater, or soil could be affected if hazardous wastes were spilled or if run-off from hazardous waste areas occurred. However, the potential for exposure from spills and/or runoff is minimized due to the types of materials handled and effective management and handling procedures, as described below.

Spills

The energetic materials sent to the HBC are not in liquid form. They are solid parts or powders that are enclosed in additional packaging. The HBC concrete pad is routinely inspected to ensure that no spillage has occurred. If spillage does occur, the concrete pad prevents the material from contaminating the soil. Any spills will be cleaned up immediately.

Precipitation Run-on or Runoff

The feed system for the HBC is enclosed within the Rocket Motor Ops Building, preventing precipitation from entering the feed system. The HBC unit is an enclosed vessel (the exterior of the vessel is exposed to the elements) that is set into a large concrete foundation that provides support and completely contains the footprint of the HBC. These measures guard against the release of hazardous waste to the surface water, groundwater, or soil.

5.0 SECONDARY CONTAINMENT

As discussed in *Appendix IV.D – Waste Analysis Plan*, the information used to characterize the energetic materials demonstrates that no free liquids are present. Therefore, there is no potential for liquid spills or leaks and secondary containment is not a concern.

As mentioned in Section 4.2, the HBC vessel is set into a large concrete foundation that completely contains the footprint of the HBC. The process tanks do not contain hazardous waste or hazardous liquid; however, the ammonia feed tank which provides ammonia to the APCS, has secondary containment.

6.0 INSPECTIONS

Inspections related to the HBC and APCS are described in the Inspection Schedule in *Appendix III.D – Inspection Schedule*. The inspections cover the following components:

- Hybrid Burn Chamber
- Air Pollution Control System
- Monitoring Equipment
- Operational and Structural Equipment
- Safety and Emergency Equipment

The frequency of inspections were selected based on regulatory requirements or based on the timeframe determined to be adequate to identify problems in time to correct them before they harm human health or the environment, whichever is shorter. A checklist of inspected items will be created and inspections will be recorded and filed as described in Section 4.0 of *Appendix III.D – Inspection Schedule*.

7.0 HANDLING OF IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES

Ignitable and reactive waste are handled at this facility and are separated and protected from open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat. "No smoking" signs are conspicuously placed wherever there is a hazard from reactive

waste. In accordance with 40 CFR §264.176, the HBC is located at least 15 meters (50 feet) from the facility's property line. Figure V.A.1 in *Appendix V.A – General Engineering Reports* shows the distance from the HBC to the nearest property line.

The energetic materials are not incompatible with each other. Each type of energetic material is stored in its own sealed container and is not mixed with another type of energetic material.

8.0 CLOSURE

The HBC will be closed to comply with the requirements of 40 CFR §264.601 and §264.602 in a manner that will ensure protection of human health and the environment. The information on closure of the HBC can be found in *Appendix VII.A - Closure Plan*.

9.0 CONSTRUCTION SCHEDULE

A general construction schedule is included below.

Tasks	Days from Permit Issuance
Permit Issuance	0
HBC installation	1-365 days
APCS installation	1-365 days
Ancillary equipment installation	1-365 days
HBC construction complete	365 days

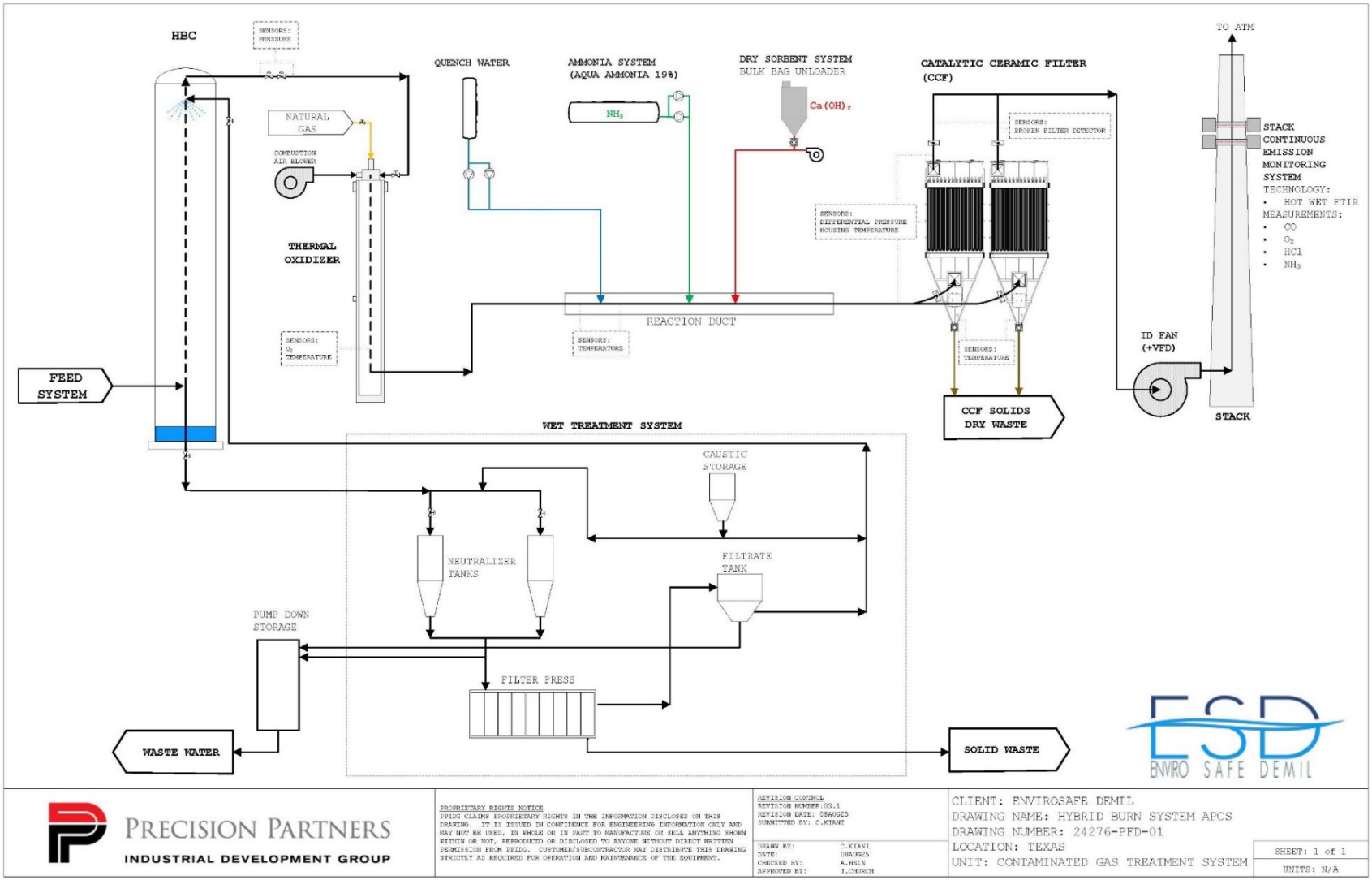


Figure V.K.1
Process Flow Diagram

Table V.K.3. – Maximum Constituent Feedrates [a]

Hybrid Burn Chamber (HBC)

The total feedrate of constituents shall not exceed the following limitations until a Trial Burn has been conducted demonstrating higher feedrates may be achieved and still meet the emission limits. Constituent concentration information (see note a) is used to ensure that the maximum allowable feedrate is not exceeded.

Constituent	Maximum Allowable Feedrate In All Feedstreams Hourly Basis (lb/hr)
Ash	90 lb/hr
Total Chlorine/Chloride	175 lb/hr
LVM (As, Be, Cr, Sb, Co, Mn, Ni)	4.26 lb/hr
SVM (Cd, Pb, Se)	5.05 lb/hr
Mercury	Not applicable [b]

Notes:

[a] Military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS). The U.S. Government provides information about the munitions to disposition. Documentation from manufacturers, suppliers, or reliable resources will be used to characterize industrial munitions.

[b] ESD will use the maximum theoretical emission concentration (MTEC) approach to document ongoing compliance with the mercury emission standard per 40 CFR §63.1207(m)(1).

Table V.K.4. – Maximum Allowable Emission Rates
Hybrid Burn Chamber (HBC)

Constituent	Maximum Allowable Emission Concentration [a]	Units
Particulate Matter (PM)	0.08	gr/dscf, corrected to 7% O_2
Dioxins/Furans (PCDD/PCDF)	0.11	ng TEQ/dscm [b], corrected to 7% O_2
Mercury	8.1	µg/dscm, corrected to 7% O_2
Semivolatile Metals (SVM includes cadmium, lead, and selenium) [c]	10	µg/dscm, corrected to 7% O_2
Low Volatile Metals (LVM includes antimony, arsenic, beryllium, chromium, cobalt, manganese, and nickel) [c]	23	µg/dscm, corrected to 7% O_2
Carbon Monoxide (CO) [d]	100	ppmv, dry, corrected to 7% O_2
Total Hydrocarbons (THC as propane) [d]	10	ppmv, dry, corrected to 7% O_2
Hydrogen Chloride/Chlorine gas (HCl/Cl_2) (expressed as a chloride (Cl^-) equivalent)	21	ppmv, dry, corrected to 7% O_2

Notes:

[a] As noted in Section 3.0, the HBC is not an incinerator. ESD is applying for a RCRA 40 CFR Part 264 Subpart X permit. After discussions with TCEQ, TCEQ recommends that the emission limits and relevant OPLs of 40 CFR Part 63 Subpart EEE (HWC MACT) would be most appropriate for the HBC and its APCS. Therefore, the emission limits shown in this table are from 40 CFR §63.1219 for new hazardous waste incinerators.

[b] TEQ is toxic equivalency to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin.

[c] In accordance with 40 CFR §63.1219(e)(3), ESD elects to comply with the alternative to the particulate matter standard by establishing SVM and LVM feedrate limits for an expanded list of metals. This is described further in Section 2.3.

[d] Per 40 CFR §63.1219(b)(5), either CO or THC can be used for compliance. ESD has chosen to continuously monitor CO. Since ESD has chosen to monitor CO, compliance with the THC emission standards must be demonstrated during the DRE of POHC test runs during the Trial Burn.

Table V.K.5. – Miscellaneous Unit Operating Parameter Limits
Hybrid Burn Chamber (HBC)

Parameter	Monitoring Basis	Monitoring Device	Device Location	Short-Term OPLs			AWFCO? [a]
				Pre Trial Burn	Trial Burn	Post Trial Burn	
Established Based on Trial Burn Test Results							
Maximum Total NEW Charge Rate	HRA	Operating logs; Constituent information [b]	HMI display	680 lb/hr	680 lb/hr	680 lb/hr	See note a
Maximum Ash Charge Rate	12-HRA	Operating logs; Constituent information [b]	HMI display	90 lb/hr	192 lb/hr	90 lb/hr	See note a
Maximum Total Chlorine/Chloride Charge Rate	12-HRA	Operating logs; Constituent information [b]	HMI display	175 lb/hr	176 lb/hr	175 lb/hr	See note a
Maximum LVM Charge Rate (As, Be, Cr, Sb, Co, Mn, Ni)	12-HRA	Operating logs; Constituent information [b]	HMI display	4.26 lb/hr	4.26 lb/hr	4.26 lb/hr	See note a
Maximum SVM Charge Rate (Cd, Pb, Se)	12-HRA	Operating logs; Constituent information [b]	HMI display	5.05 lb/hr	5.05 lb/hr	5.05 lb/hr	See note a
Maximum Stack Gas Flowrate [b]	10-minute RA [c]	Hot wire anemometer	Stack	9,300 scfm	9,300 scfm	9,300 scfm	See note a
Minimum Afterburner Temperature [b]	10-minute RA [c]	Thermocouple	Afterburner	2,000 ºF	2,000 ºF	2,000 ºF	See note a

Notes:

[a] The HBC does not utilize a traditional automatic waste feed cutoff (AWFCO) system. However, the ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is within the appropriate operating ranges. A Human Machine Interface (HMI) displays information on the temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. HBC process cycles are not allowed to commence if all safe conditions are not met or remedied.

[b] Military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS). The U.S. Government provides information about the munitions to disposition. Documentation from manufacturers, suppliers, or reliable resources will be used to characterize industrial munitions.

[c] The operating parameters associated with the APCS will only be in effect when emissions from a batch are actively being controlled.

[d] This OPL is not established during the Trial Burn.

[e] These values will be determined once the final engineering phase is completed with the CEMS provider.

[f] ESD will use the maximum theoretical emission concentration (MTEC) approach to document ongoing compliance with the mercury emission standard per 40 CFR §63.1207(m)(1).

Table V.K.5. – Miscellaneous Unit Operating Parameter Limits
Hybrid Burn Chamber (HBC) (continued)

Parameter	Monitoring Basis	Monitoring Device	Device Location	Short-Term OPLs			AWFCO? [a]
				Pre Trial Burn	Trial Burn	Post Trial Burn	
Not Established Based on Trial Burn Results							
Maximum Ceramic Filter Housing Inlet Temperature [b]	HRA [c]	Thermocouple	Inlet to Ceramic Filter Housing	750ºF	N/A [d]	750ºF	See note a
Minimum Ceramic Filter Differential Pressure [b]	HRA [c]	Differential pressure transmitter	Inlet and outlet of Ceramic Filter	1 in w.g.	N/A [d]	1 in w.g.	See note a
Maximum Ceramic Filter Differential Pressure [b]	HRA [c]	Differential pressure transmitter	Inlet and outlet of Ceramic Filter	20 in w.g.	N/A [d]	20 in w.g.	See note a
Bag Leak Detection System: [c] - FTIR CEMS (ammonia slip)	Instantaneous [c]	FTIR CEMS	Stack	TBD [e]	N/A [d]	TBD [e]	See note a
Bag Leak Detection System: [c] - Triboelectric Broken Filter Detector	Instantaneous [c]	Triboelectric	Stack	TBD [e]	N/A [d]	TBD [e]	See note a
Maximum Mercury Charge Rate [f]	N/A	Operating logs; Constituent information [b]	HMI display	N/A, MTEC [f]	N/A [d]	N/A, MTEC [f]	See note a
Maximum Stack Gas Carbon Monoxide (CO) Concentration	HRA	FTIR CEMS	Stack	100 ppmdv, corrected to 7% O_2	N/A [d]	100 ppmdv, corrected to 7% O_2	See note a

Notes:

[a] The HBC does not utilize a traditional automatic waste feed cutoff (AWFCO) system. However, the ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is within the appropriate operating ranges. A Human Machine Interface (HMI) displays information on the temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. HBC process cycles are not allowed to commence if all safe conditions are not met or remedied.

[b] Military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS). The U.S. Government provides information about the munitions to disposition. Documentation from manufacturers, suppliers, or reliable resources will be used to characterize industrial munitions.

[c] The operating parameters associated with the APCS will only be in effect when emissions from a batch are actively being controlled.

[d] This OPL is not established during the Trial Burn.

[e] These values will be determined once the final engineering phase is completed with the CEMS provider.

[f] ESD will use the maximum theoretical emission concentration (MTEC) approach to document ongoing compliance with the mercury emission standard per 40 CFR §63.1207(m)(1).

ATTACHMENT V.K - HBC

Contained Burn System
"Hybrid Burn Chamber" © (HBC)
Basic Process Description

System Overview: EnviroSafe Demil's contained burn system is known as the "Hybrid Burn Chamber"© (HBC). The HBC provides a modern and environmentally responsible alternative to open burning. These robust systems are designed to be simple, safe, and flexible from an operations standpoint, while eliminating pollution and the potentially harmful emissions of open burn operations.

Materials are prepared in batches and are remotely ignited or activated in a manner to ensure simplicity, flexibility, and safety. The exhaust gases are collected and treated by an air pollution control system (APCS). The design of the APCS to scrub the off gases is specific to the chemistry of the treated materials.

Basic Process Operations:

1. Materials are prepared for treatment and loaded into the HBC.
2. Materials are remotely ignited and destroyed inside the HBC.
3. The exhaust gas is metered from the HBC through the APCS via induced draft from the ID fan.
4. After processing is complete in the HBC and negative pressure is assured, the loading door is remotely opened and the treated materials can be inspected remotely via CCTV.
5. Operators remove the treated burn pan or case from the loading system and place the next load for treatment.
6. The cycle is repeated.

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PRECISION PARTNERS
INDUSTRIAL DEVELOPMENT GROUP

Continuous Emissions Monitoring System

Precision Partners has a partnership with CEMTEK Environmental, a technology leader in Continuous Emissions Monitoring Systems (CEMS), which after consulting, recommended and will provide a Fourier Transform Infrared Spectroscopy (FTIR) based Continuous Emissions Monitoring System. The Continuous Emissions Monitoring System was designed & engineered to meet the unique conditions encountered when monitoring emissions meeting RCRA 40 CFR Part 264 Subpart X, 40 CFR §63.1219(b)(5), and 40 CFR §63.1219(b)(5)(ii).

The CEMS FTIR technology package includes an analyzer to measure CO, & HCl, NH_3 (FTIR) and EPA compliant data acquisition software, all housed in an environmentally controlled shelter. O_2 will be measured using a zirconia oxide module in the FTIR analyzer, since O2 does not absorb light. This is a mechanical module integrated into the FTIR system. Gas is extracted into the FTIR analyzer, and after passing through it, the gas flows through the zirconia oxide module to provide a continuous O_2 reading in accordance with Performance Specification 4B. The system measures NH_3 and NH_3 slip using the FTIR analyzer, complemented by a triboelectric broken filter detector at the outlet of each filter housing. Together, these components provide dual leak detection capability.

The FTIR measurement technique incorporates several components, including a heated gas cell, electronics, a detector box, pressure measurement instrumentation, and a heated gas inlet. FTIR collects all infrared spectral data simultaneously by sending a broadband infrared light through an interferometer (modulator), which modulates all wavelengths at once. The modulated light passes through a gas cell where molecules in the sample absorb specific wavelengths. This signal is then demodulated using the Fourier Transform process, converting mirror position into a frequency response that directly correlates with the molecules present in the gas sample.

Data analysis begins with the demodulated signal, known as an interferogram, which is converted to a single-beam spectrum via the Fast Fourier Transform (FFT). To account for instrument response, a non-infrared absorbing gas is passed through the cell before sampling, and this baseline is subtracted from the sample signal. The logarithmic ratio of the sample beam to the background beam produces an absorbance spectrum over the infrared range, containing responses from all infrared-active compounds. The height of the absorbance peak is directly proportional to the compound's concentration.

The FTIR CEMS system will utilize a MKS Multigas 2030 FTIR, which is a highly sensitive instrument capable of detecting toxic gases at levels as low as 10–100 parts per billion (ppb). The system enables simultaneous analysis and display of required gases and uses permanent calibration spectrum which will be calibrated daily for O_2, and on an as required basis for CO, HCl, and NH_3. A patented, linearized detector response ensures consistent calibration across all instruments, while a heated sample line maintains temperature before gas enters the cell. Automatic temperature and pressure compensation ensures accuracy. Precision Partners and CEMTEK verify the CO and O_2 CEMS will be installed, calibrated, maintained, and continuously operated in compliance with Performance Specification 4B. The span level of the CO CEMS is 0-200 ppmv, dry basis (low-range span), 0-3,000 ppmv, dry basis (high-range span). The span level of the O2 CEMS is 0-25% oxygen.

The Multigas 2030 software offers robust quantitative analysis of all required compounds simultaneously, with automatic corrections for temperature and pressure variations. It can acquire and analyze samples in under one second, continuously acquiring spectra while computing gas concentrations. A residual spectrum feature identifies unaccounted spectral data, simplifying QA/QC verification and allowing saved spectra to be reprocessed at any time using the same or alternative calibration sets.

The system is specifically designed for process and environmental monitoring and can operate at spectral resolutions up to 0.5 cm^{-1}, even in hostile environments with vibration and temperature fluctuations. Its high-speed data processing produces low-noise infrared spectra. A single analyzer can measure all required components without requiring moisture removal prior to analysis, supporting hot/wet sampling methods. It is engineered for highly corrosive applications and excels at measuring water-soluble and reactive gases such as HCl and NH_3. Its rugged design and versatility make it well suited for the Hybrid Burn Chamber application.

Hot/Wet FTIR technology based CEMS is an ideal technology to monitor emissions and conditions of the Hybrid Burn Chamber. The Hot/Wet FTIR is not affected or corroded as all gases and components are heated above the dewpoint to maintain a safe analyzer environment. The ability of one Hot/Wet FTIR analyzer to measure multiple gases simultaneously provides a one analyzer solution, improves overall system integrity, requires less space and reductions in analyzer failures. The simple design of the system removes the requirement for chillers, filters, scrubbers, extra pumps, resulting in lower maintenance and less failure points.

TRIAL BURN PLAN
FOR THE
HYBRID BURN CHAMBER (HBC)

EnviroSafe Demil, LLC
401 Demil Way
Hooks, Texas 75561-0019

AUGUST 2025

Revision 0

TABLE OF CONTENTS

1.0 INTRODUCTION, BACKGROUND, AND REGULATORY OVERVIEW 1
2.0 TRIAL BURN OBJECTIVES 3
2.1 Test Conditions.....3
2.2 Emission Performance Objectives.....3
2.3 Alternative to the Particulate Matter Standard.....3
2.4 Waiver of Operating Parameter Limits during Pretesting 5
2.5 Waiver of Operating Parameter Limits during the Trial Burn.....5
2.6 Establishing Operating Parameter Limits 6
2.7 Site-Specific Considerations for OPLs.....6
2.7.1 Maximum Total NEW Charge Rate 11
2.7.2 Feedrates vs. Charge Rates.....11
2.7.3 Minimum Afterburner Temperature.....11
2.7.4 Maximum Stack Gas Flowrate 13
2.7.5 APCS-Related OPLs 13
2.7.6 Using CEMS for Compliance with the Dry Scrubber OPLs 13
2.8 Operation of Waste Firing System 14
2.9 Metals Feedrate Extrapolation Procedures 14
2.10 Mercury Maximum Theoretical Emission Concentration 15
2.11 Expected Levels of Regulated Constituents in Certain Feedstreams 16
3.0 DETAILED ENGINEERING DESCRIPTION 17
3.1 Feed System 17
3.2 Hybrid Burn Chamber (HBC).....19
3.3 Ignition System.....19
3.4 Air Pollution Control System (APCS).....19
3.4.1 Thermal Oxidizer (Afterburner) 20
3.4.2 Ammonia Injection System 20
3.4.3 Dry Sorbent Injection (DSI) System.....20
3.4.4 Ceramic Filter Housing and Elements 20
3.4.5 Waste Collection and Handling.....21
3.4.6 ID Fan.....21
3.4.7 Stack.....21
3.4.8 Instrumentation and Control Cabinet.....21
3.5 HBC Wash System 21
3.6 Monitoring of Process Conditions and Safety Interlocks 21
3.7 Stack Gas Monitoring – CEMS.....22
4.0 TRIAL BURN PROTOCOL.....23

TABLE OF CONTENTS (CONTINUED)

4.1 Target Operating Conditions 23
4.2 Process Feeds 26
4.2.1 Ammonium Perchlorate Motors: V878 (MK56) and MLRS 27
4.2.2 V298 Rocket Motors (not planned to be fed) 27
4.3 Spike Selection Rationale 27
4.3.1 POHC Spike 33
4.3.2 Chlorine Spike 34
4.3.3 Metal Spikes 34
4.3.4 Ash Spike 35
4.4 Characteristics, Feedrates, and Quantities of Process Feeds and Spiking Materials 35
4.5 Operating Conditions and Steady-State Operation 35
5.0 SAMPLING AND ANALYSIS 37
5.1 Stack Gas Sampling and Analytical Program 37
5.2 Feed Sampling and Analytical Program 37
5.3 Spike Sampling and Analytical Program 39
5.4 Quality Assurance / Quality Control Program 39
6.0 TRIAL BURN SCHEDULE AND TRIAL BURN REPORT 40
6.1 Trial Burn Schedule 40
6.2 Trial Burn Report 40

LIST OF TABLES

Table 2-1 Emissions Performance Requirements 4
Table 2-2 Operating Parameter Limits Specified in 40 CFR, Part 63, Subpart EEE 7
Table 2-3 Basis for Establishing Operating Parameter Limits....9
Table 4-1 Protocol for Test 24
Table 4-2 Operating Condition Targets 25
Table 4-3 V878 (MK56) Rocket Motor Composition....28
Table 4-4 V878 (MK56) Rocket Motor Chlorine Composition 29
Table 4-5 V878 (MK56) Rocket Motor Ash Composition....30
Table 4-6 V298 Rocket Motor Composition 31
Table 4-7 V298 Rocket Motor Lead Composition....32
Table 4-8 Characteristics, Feedrates, and Quantities of the Feeds....36
Table 5-1 Stack Gas Sampling 38
Table 6-1 Tentative Test Schedule 41

LIST OF FIGURES

Figure 3-1 Process Flow Diagram 18

LIST OF APPENDICES

Appendix I Quality Assurance Project Plan (QAPP)
Appendix II Stack Detection Limit and Feedrate Calculations
Appendix III Continuous Emissions Monitoring System

LIST OF ACRONYMS

APCS	Air Pollution Control System
As	Arsenic
AWFCO	Automatic Waste Feed Cutoff
Be	Beryllium
Cd	Cadmium
CEMS	Continuous Emissions Monitoring System
CFR	Code of Federal Regulations
Cl_2	Chlorine
Co	Cobalt
CO	Carbon Monoxide
Cr	Chromium
Cr_2O_3	Chromium Oxide
DAC	Defense Ammunition Center
DRE	Destruction and Removal Efficiency
DODIC	Department of Defense Identification Code
DSI	Dry Sorbent Injection
EPA	Environmental Protection Agency
ESD	EnviroSafe Demil, LLC
FTIR	Fourier Transform Infrared Spectroscopy
HBC	Hybrid Burn Chamber
HCl	Hydrogen Chloride
Hg	Mercury
HMI	Human Machine Interface
HRA	Hourly Rolling Average
HWC	Hazardous Waste Combustor
HWC MACT	Hazardous Waste Combustor Maximum Achievable Control Technology
LVM	Low Volatile Metals
MACS	Munitions Analytical Compliance System
MACT	Maximum Achievable Control Technology
MIDAS	Munitions Item Disposition Action System
MLRS	Multiple Launch Rocket System
Mn	Manganese
MTEC	Maximum Theoretical Emission Concentration
NEMA	National Electrical Manufacturer Association

LIST OF ACRONYMS (CONTINUED)

NESHAP	National Emissions Standards for Hazardous Air Pollutants
NEW	Net Explosive Weight
Ni	Nickel
NOx	Nitrogen Oxides
O_2	Oxygen
OPL	Operating Parameter Limit
Pb	Lead
PbO	Lead Oxide
PCDD/PCDF	Polychlorinated Dibenzo-*p*-Dioxins/Polychlorinated Dibenzofurans, Dioxins/Furans, D/F
PFD	Process Flow Diagram
PLC	Programmable Logic Controller
PM	Particulate Matter
POHC	Principal Organic Hazardous Constituents
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
Sb	Antimony
SCR	Selective Catalytic Reduction
Se	Selenium
SOx	Sulfur Oxides
SVM	Semivolatile Metals
TCEQ	Texas Commission on Environmental Quality
TEQ	Toxic Equivalency to 2,3,7,8-Tetrachlorodibenzo-*p*-Dioxin
THC	Total Hydrocarbons (as propane)
UDRI	University of Dayton Research Institute
VOC	Volatile Organic Compound

1.0 INTRODUCTION, BACKGROUND, AND REGULATORY OVERVIEW

EnviroSafe Demil, LLC (ESD) is installing a Hybrid Burn Chamber (HBC) at its facility in Hooks, Texas. The HBC is not an incinerator and there is no controlled flame combustion. The HBC operation most closely resembles open burning/open detonation but is more environmentally responsible. As opposed to open burning/open detonation, the HBC has the advantage of containing and cleaning the exhaust gases.

The HBC is subject to 40 CFR Part 264 Subpart X (40 CFR §264.600-§264.603) – Miscellaneous Units. 40 CFR §264.601 requires that Subpart X permit terms and provisions include those requirements of 40 CFR Part 264 Subparts I through O and Subparts AA through CC, 40 CFR Part 270, 40 CFR Part 63 Subpart EEE, and 40 CFR Part 146 that are appropriate for the miscellaneous unit being permitted. Even though the HBC is not an incinerator, the Texas Commission on Environmental Quality (TCEQ) recommends that the emission limits and relevant operating parameter limits (OPLs) described in the National Emissions Standards for Hazardous Air Pollutants (NESHAP) from Hazardous Waste Combustors (HWC) found at 40 CFR Part 63 Subpart EEE would be most appropriate for the HBC and its air pollution control system (APCS). This standard is commonly referred to as the HWC Maximum Achievable Control Technology (MACT) standard.

This document is submitted in accordance with 40 CFR §270.23(e) and presents a plan for a Trial Burn test that will be conducted to show compliance with the Hazardous Waste Combustor Maximum Achievable Control Technology emission standards for new hazardous waste incinerators specified in 40 CFR §63.1219. After the test, ESD will submit a Trial Burn Report which will include the results of the Trial Burn, demonstrating that the HBC meets the applicable Final Subpart EEE emission standards. The Trial Burn Report will establish OPLs that allow adequate operational flexibility while meeting the HWC MACT emission standards. These OPLs will then be incorporated into ESD's permit.

The purposes of this Trial Burn Plan are to describe the HBC system and define the target process operating conditions that will be demonstrated during the test. The Trial Burn Plan describes the sampling activities, analytical methods, and data collection and reduction techniques that will be used to:

- Demonstrate compliance with the emission standards for new hazardous waste incinerators specified in 40 CFR §63.1219, and
- Establish OPLs for the HBC system.

ESD is requesting that the agency review and approve this Trial Burn Plan for the HBC. ESD also specifically requests approval of the following items:

- As discussed in Section 2.4, ESD intends to disable OPLs during operational pretesting for a period of time not to exceed 720 hours per 40 CFR §63.1207(h)(2).
- As discussed in Section 2.7.6, ESD is requesting the agency approve using a Continuous Emissions Monitoring System (CEMS) to measure HCl in lieu of the OPLs specified in 40 CFR §63.1209(o)(4) for the Dry Sorbent Injection System, as allowed in 40 CFR §63.1209(a)(5).
- As discussed in Section 2.9, ESD intends to use extrapolation to determine the metals feedrates per 40 CFR §63.1209(n)(2)(vii) and §63.1209(l)(1)(v).

The appendices to this Trial Burn Plan include:

- Quality Assurance Project Plan (QAPP) for the Trial Burn
- Spiking Rate Calculations
- Continuous Emissions Monitoring System

2.0 TRIAL BURN OBJECTIVES

The objectives of this Trial Burn are to demonstrate compliance with the HWC MACT emission limits and to establish limits for operating parameters that ensure compliance with the emission standards.

This section provides a summary of the objectives for the Trial Burn, including a discussion on how the operating data and emission data collected during the Trial Burn will be utilized to establish OPLs that will assure ongoing compliance with the HWC MACT standards.

2.1 Test Conditions

One test condition will be demonstrated during the proposed test. The data collected during the test will be utilized to develop OPLs.

2.2 Emission Performance Objectives

The emissions performance objectives of the Trial Burn are to demonstrate compliance with emission standards for each constituent of concern for new hazardous waste incinerators. These emissions standards are shown in Table 2-1.

2.3 Alternative to the Particulate Matter Standard

Under 40 CFR §63.1219, ESD has two compliance options for particulate matter (PM) emissions:

(1) A limit on particulate matter emissions of 0.0016 gr/dscf corrected to 7% oxygen per 40 CFR §63.1219(b)(7); or
(2) An alternative to the particulate matter standard under 40 CFR §63.1219(e)(3).

ESD will comply with the alternative to the particulate matter standard described in 40 CFR §63.1219(e)(3). Under this compliance alternative, ESD must not discharge or cause combustion gases to be emitted into the atmosphere that contain the following:

- Cadmium (Cd), lead (Pb), and selenium (Se) in excess of 10 µgm/dscm, combined emissions, corrected to 7 percent oxygen; or
- Arsenic (As), beryllium (Be), chromium (Cr), antimony (Sb), cobalt (Co), manganese (Mn), and nickel (Ni) in excess of 23 µgm/dscm, combined emissions, corrected to 7 percent oxygen.

In order to ensure compliance with the alternative emission limitations described above, ESD will establish Semivolatile Metals (SVM) and Low Volatile Metals (LVM) feedrates. The SVM

Table 2-1
Emissions Performance Requirements

Regulatory Citation [a]	Constituent	Maximum Allowable Emissions
40 CFR §264.343	Particulate Matter (PM)	0.08 gr/dscf, corrected to 7% O_2
40 CFR §63.1219(b)(1)(ii)	Dioxins/Furans (PCDD/PCDF)	0.11 ng TEQ/dscm [b], corrected to 7% O_2
40 CFR §63.1219(b)(2)	Mercury	8.1 µg/dscm, corrected to 7% O_2
40 CFR §63.1219(b)(3), (b)(7), (e)(3)(i) [c]	Semivolatile Metals (SVM includes cadmium, lead, and selenium) [c]	10 µg/dscm, corrected to 7% O_2, for Cd, Pb, and Se combined
40 CFR §63.1219(b)(4), (b)(7), (e)(3)(ii) [c]	Low Volatile Metals (LVM includes antimony, arsenic, beryllium, chromium, cobalt, manganese, and nickel) [c]	23 µg/dscm, corrected to 7% O_2, for As, Be, Cr, Sb, Co, Mn, and Ni combined
40 CFR §63.1219(b)(5)(i)	Carbon Monoxide (CO) [d]	100 ppmv, dry, corrected to 7% O_2
40 CFR §63.1219(b)(5)(ii)	Total Hydrocarbons (THC as propane) [d]	10 ppmv, dry, corrected to 7% O_2
40 CFR §63.1219(b)(6)	Hydrogen Chloride/Chlorine gas (HCl/Cl_2) (expressed as a chloride (Cl^-) equivalent)	21 ppmv, dry, corrected to 7% O_2
40 CFR §63.1219(c)	DRE of POHCs	99.99% destruction and removal efficiency

Notes:

[a] As noted in Section 1.0, the HBC is not an incinerator. ESD is applying for a RCRA 40 CFR Part 264 Subpart X permit. After discussions with TCEQ, TCEQ recommends that the emission limits and relevant OPLs of 40 CFR Part 63 Subpart EEE (HWC MACT) would be most appropriate for the HBC and its APCS. Therefore, the emission limits shown in this table are from 40 CFR §63.1219 for new hazardous waste incinerators.

[b] TEQ is toxic equivalency to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin.

[c] In accordance with 40 CFR §63.1219(e)(3), ESD elects to comply with the alternative to the particulate matter standard by establishing SVM and LVM feedrate limits for an expanded list of metals. This is described further in Section 2.3.

[d] Per 40 CFR §63.1219(b)(5), either CO or THC can be used for compliance. ESD has chosen to continuously monitor CO. Since ESD has chosen to monitor CO, compliance with the THC emission standards must be demonstrated during the DRE of POHC test runs.

feedrate will include lead, cadmium, and selenium. The LVM feedrate will include arsenic, beryllium, chromium, antimony, cobalt, manganese, and nickel. These metal feedrates will be established based on the results of the Trial Burn and an extrapolation procedure as described in Section 2.9.

Additionally, ESD will comply with the particulate matter emission limit included in 40 CFR §264.343 of 0.08 gr/dscf, corrected to 7% O_2.

2.4 Waiver of Operating Parameter Limits during Pretesting

40 CFR §63.1207(h)(2) provides that current OPLs established under 40 CFR §63.1209 are waived during pretesting prior to performance testing for an aggregate time not to exceed 720 hours of operation under an approved test plan or if the source records the result of pretesting. Pretesting is defined as:

- Operations when stack emissions testing for dioxin/furan, mercury, semivolatile metals, low volatile metals, particulate matter, or hydrogen chloride/chlorine gas is being performed; and
- Operations to reach steady-state operating conditions prior to stack emissions testing.

Prior to conducting the test, ESD plans to conduct pretests to prepare for conducting the actual Trial Burn. This pretesting will be conducted at conditions as close as practicable to those described in this plan. Since some of these conditions may be at levels beyond ESD's existing OPLs when the initial permit is issued, a waiver of the OPLs is necessary to ensure that exceedances of existing limits during pretesting are not deemed to constitute violations of ESD's permit.

Only the OPLs in Table 2-3 under the heading "Not Established Based on Trial Burn Results" will be active during pretesting.

Any active OPL exceedances that occur during pretesting will be logged in the operating record. ESD will record and keep a log of all pretesting periods. The aggregate pretesting time will not exceed a total of 720 hours, in accordance with 40 CFR §63.1207(h)(2).

2.5 Waiver of Operating Parameter Limits during the Trial Burn

OPLs that will be established based on Trial Burn results will be disabled during the Trial Burn. Disabling these OPLs will allow for demonstration of the worst-case conditions for these

parameters. This is consistent with 40 CFR §63.1207(h)(1) which provides a waiver of OPLs during a test.

Only the OPLs in Table 2-3 under the heading "Not Established Based on Trial Burn Results" will be active during Trial Burn.

The disabled OPLs will be reactivated at their pre-test values at the conclusion of the Trial Burn. Any active OPL exceedances that occur during the Trial Burn will be logged in the operating record.

2.6 Establishing Operating Parameter Limits

The regulatory requirements applicable to the HBC and APCS are presented in Table 2-2. This table was used to develop the list of proposed OPLs which is presented in Table 2-3. Table 2-3 shows the approach to establishing each OPL.

The results of the Trial Burn will be used to establish limits for operating parameters that ensure compliance with the emission standards. Many OPLs will be established based on data collected during testing per 40 CFR §63.1209. For the purposes of calculating LVM, SVM, mercury, chlorine, and ash feedrates, the concentration of any constituents determined not to be present in the feeds based on information provided by the manufacturer, will be assumed to be "zero." Extrapolation will be used to develop the final SVM and LVM feedrate OPLs, as discussed in Section 2.9.

Some OPLs will be based on manufacturer specifications, good engineering practice, and/or regulatory guidance. The basis for establishing the values for each of these parameters is shown in Table 2-3.

2.7 Site-Specific Considerations for OPLs

ESD's HBC and the process feeds treated have unique features that are not considered by the HWC MACT standard. Due to these unique features, several of the required OPLs are not attainable or are not applicable to the system. ESD has proposed several OPLs to meet the intent of the HWC MACT OPL requirements and these specific OPLs are discussed in this section

Table 2-2
Operating Parameter Limits Specified in 40 CFR, Part 63, Subpart EEE

Emission Parameter	Requirements in 40 CFR §63.1209	Proposed OPL	Averaging Period
DRE of POHCs	(j)(1) Minimum combustion chamber temperature	- Minimum Afterburner Temperature (ºF)	HRA
	(j)(2) Maximum flue gas flowrate or production rate	- Maximum Stack Gas Flowrate (scfm)	HRA
	(j)(3) Maximum pumpable hazardous waste feedrate	N/A – No wastes are pumpable	N/A
	(j)(3) Maximum total hazardous waste feedrate	- Maximum Total NEW Charge Rate (lb/hr)	HRA
	(j)(4) Waste firing parameters - specified by operator [a]	- Maximum Stack Gas Carbon Monoxide (CO) Concentration (ppmdv, 7% O_2)	HRA
Dioxins/ Furans [b]	(k)(1) Gas temperature at the inlet to a dry particulate matter control device	- Maximum Ceramic Filter Housing Inlet Temperature (ºF)	HRA
	(k)(2) Minimum combustion chamber temperature	- Minimum Afterburner Temperature (ºF)	HRA
	(k)(3) Maximum flue gas flowrate or production rate	- Maximum Stack Gas Flowrate (scfm)	HRA
	(k)(4) Maximum pumpable hazardous waste feedrate	N/A – No wastes are pumpable	N/A
	(k)(4) Maximum total hazardous waste feedrate	- Maximum Total NEW Charge Rate (lb/hr)	HRA
Mercury	(l)(1) Maximum feedrate of mercury	- Maximum Mercury Charge Rate (lb/hr) – MTEC (Section 2.10)	12-HRA
	(l)(2) Wet scrubber	N/A	N/A
	(l)(3) Activated carbon injection	N/A	N/A
	(l)(4) Activated carbon bed	N/A	N/A
PM	(m)(1)(i) Wet scrubbers	N/A	N/A
	(m)(1)(ii)-(iii) [Reserved]	N/A	N/A
	(m)(1)(iv) Other PM control devices that are not fabric filters, high energy wet scrubbers, electrostatic precipitator or ionizing wet scrubber	-Minimum Ceramic Filter Differential Pressure (in. w.g.) -Maximum Ceramic Filter Differential Pressure (in. w.g.)	HRA HRA

Notes:

[a] See Section 2.8 for discussion of waste firing parameters.

[b] 40 CFR §63.1209(k)(5) – (k)(9) are not applicable to the APCS.

NEW = Net Explosive Weight

Table 2-2
Operating Parameter Limits Specified in 40 CFR, Part 63, Subpart EEE (continued)

Emission Parameter	Requirements in 40 CFR §63.1209	Proposed OPL	Averaging Period
PM (continued)	(m)(2) Maximum flue gas flowrate or production rate	- Maximum Stack Gas Flowrate (scfm)	HRA
	(m)(3) Maximum ash feedrate	- Maximum Ash Charge Rate (lb/hr)	12-HRA
	§63.1206(c)(8) Bag Leak Detection System	- FTIR CEMS (measures ammonia slip) - Triboelectric Broken Filter Detector	Instantaneous
SVM & LVM	(n)(1) Maximum inlet temperature to dry PM APCD	- Maximum Ceramic Filter Housing Inlet Temperature (ºF)	HRA
	(n)(2) Maximum feedrate of semivolatile and low volatile metals	- Maximum SVM Charge Rate (lb/hr) - Maximum LVM Charge Rate (lb/hr)	12-HRA
	(n)(3) Control device operating parameter limits	OPLs on the PM control device as specified by §63.1209(m)(1) – see above	
	(n)(4) Maximum total chlorine and chloride feedrate	- Maximum Total Chlorine/Chloride Charge Rate (lb/hr)	12-HRA
	(n)(5) Maximum flue gas flowrate or production rate	- Maximum Stack Gas Flowrate (scfm)	HRA
	§63.1206(c)(8) Bag Leak Detection System	- FTIR CEMS (measures ammonia slip) - Triboelectric Broken Filter Detector	Instantaneous
HCl/Cl_2	(o)(1) Maximum total chlorine & chloride feedrate	- Maximum Total Chlorine/Chloride Charge Rate (lb/hr)	12-HRA
	(o)(2) Maximum flue gas flowrate or production rate	- Maximum Stack Gas Flowrate (scfm)	HRA
	(o)(3) Wet scrubbers	N/A	N/A
	Dry Scrubber: **Dry Sorbent Injection System** [c]		
	(o)(4)(i) Minimum sorbent feedrate	N/A (See Section 2.7.6)	N/A
	(o)(4)(ii) Minimum carrier fluid flowrate or nozzle pressure drop	N/A (See Section 2.7.6)	N/A
	(o)(4)(iii) Sorbent specifications - either specify brand/type or document key parameters that affect adsorption	N/A (See Section 2.7.6)	N/A
Fugitives	(p) Maximum combustion chamber pressure	N/A - HBC is sealed during treatment	N/A

Notes:
[a] See Section 2.8 for discussion of waste firing parameters.
[b] 40 CFR §63.1209(k)(5) – (k)(9) are not applicable to the APCS.

NEW = Net Explosive Weight

Table 2-3
Basis for Establishing Operating Parameter Limits

Parameter	Averaging Period	Approach to Establishing Operating Limit	POHC	PCDD/PCD	Mercury	PM	LVM	SVM	HCl/Cl_2	Fugitives	CO/THC
Established Based on Trial Burn Test Results											
Maximum Total NEW Charge Rate	HRA	Average of the maximum HRA for each test run	X	X							
Maximum Ash Charge Rate	12-HRA	Average of the test run averages				X					
Maximum Total Chlorine/Chloride Charge Rate	12-HRA	Average of the test run averages					X	X	X		
Maximum LVM Charge Rate (As, Be, Cr, Sb, Co, Mn, Ni)	12-HRA	Average of the test run averages; Extrapolated				X[a]	X				
Maximum SVM Charge Rate (Cd, Pb, Se)	12-HRA	Average of the test run averages; Extrapolated				X[a]		X			
Minimum Afterburner Temperature [b]	10-minute RA [b]	Average of the minimum one-minute average (OMA) values when emissions are actively being treated during each run of the trial burn (see Section 2.7.3 for more information)	X	X							
Maximum Stack Gas Flowrate [b]	10-minute RA [b]	Average of the maximum one-minute average (OMA) values when emissions are actively being treated during each run of the trial burn (see Section 2.7.4 for more information)	X	X		X	X	X	X		

Notes:

[a] The expanded LVM and SVM charge rate limits are required for compliance with the alternative particulate matter standard. Section 2.3 provides more information.

[b] The operating parameters associated with the APCS will only be in effect when emissions from a batch are actively being controlled.

[c] ESD will use the MTEC approach for mercury. See Section 2.10.

Table 2-3
Basis for Establishing Operating Parameter Limits (continued)

Parameter	Averaging Period	Approach to Establishing Operating Limit	POHC DRE	PCDD/PCDF	Mercury	PM	LVM	SVM	HCl/Cl_2	Fugitives	CO/THC
Not Established Based on Trial Burn Results											
Maximum Ceramic Filter Housing Inlet Temperature [b]	HRA [b]	Manufacturer's recommendation (750ºF)		X			X	X			
Minimum Ceramic Filter Differential Pressure (in. w.g.) [b]	HRA [b]	Manufacturer's Recommendation (1 in w.g.)				X	X	X			
Maximum Ceramic Filter Differential Pressure (in. w.g.) [b]	HRA [b]	Manufacturer's Recommendation (20 in w.g.)				X	X	X			
Bag Leak Detection System [b] - FTIR CEMS (measures ammonia slip) - Triboelectric Broken Filter Detector	Instant-aneous	Manufacturer's Recommendation				X	X	X			
Maximum Mercury Charge Rate [c]	N/A	MTEC [c]			X						
Maximum Stack Gas Carbon Monoxide (CO) Concentration	HRA	Limit specified in the HWC MACT Rule (100 ppmv, dry, corrected to 7% O_2)									X

Notes:
[a] The expanded LVM and SVM charge rate limits are required for compliance with the alternative particulate matter standard. Section 2.3 provides more information.
[b] The operating parameters associated with the APCS will only be in effect when emissions from a batch are actively being controlled.
[c] ESD will use the MTEC approach for mercury. See Section 2.10.

2.7.1 Maximum Total NEW Charge Rate

As shown in Table 2-2, the HWC MACT standard has proposed operating limits in 40 CFR §63.1209 on the total hazardous waste feedrate for proving compliance with the DRE of POHCs and Dioxin/Furan emission standards. The HBC system is different than a traditional incinerator in the type of material that it feeds. The entire amount of material sent to the HBC does not "incinerate" or "combust." The material fed to the HBC consists of munition items such as rocket motors, flares, smoke munitions, and other munitions that are ignitable and non-mass detonating. These materials can consist of motor casings and other non-explosive portions of the item, along with the explosive material. The motor casings and other non-explosive portions of the item will not combust during treatment in the HBC and will remain in the HBC after treatment. Large pieces of metal remaining after processing in the HBC will be inspected to ensure no energetic material remains and then will be shipped off-site for disposal or for recycling.

Due to the fact that large metal pieces, motor casings, and other non-explosive portions of the items are fed to the HBC and will not affect the combustion process, a limit on the total hazardous waste feedrate for the HBC is not an appropriate operating limit. For the HBC, the important part of the feed to set a limit on is the amount of net explosive weight (NEW) fed to the unit. The NEW is the amount of explosive material that will combust during treatment. Therefore, instead of a limit on the total overall material fed to the HBC, ESD will set a limit on the total amount of NEW fed to the HBC.

ESD will set a limit on the maximum total NEW charge rate (lb/hr) to satisfy the requirement for maximum total hazardous waste feedrate. This limit will be based upon the average of the maximum hourly rolling average (HRA) for each test run demonstrated during the test.

2.7.2 Feedrates vs. Charge Rates

Because the HBC is operated in a batch mode of operation, a "feedrate" in the traditional sense cannot be directly applied. Therefore, ESD's feedrate limits in lb/hr will be calculated based upon the "charge rates." ESD will ensure the "charge rates" comply with the "lb/hr" limits by calculating the effective feedrate in "lb/hr" as follows:

$$Effective\ Feedrate\left(\frac{lb}{hr}\right) = Charge\ Rate\left(\frac{lb}{batch}\right)\ x\ Number\ of\ Batches\ per\ Hour\left(\frac{batches}{hr}\right)$$

2.7.3 Minimum Afterburner Temperature

As shown in Table 2-2, the HWC MACT standard has proposed an operating limit in 40 CFR §63.1209 on the minimum combustion chamber temperature for proving compliance with the Destruction and Removal Efficiency (DRE) of Principal Organic Hazardous Constituents

(POHCs) and Dioxin/Furan emission standards. The HBC is operated in a batch mode of operation. The HBC temperature will rise during treatment and will return to close to ambient after treatment so that the chamber can be opened and the next batch can be fed to the HBC. There is no direct control of the temperature within the HBC's combustion chamber.

The afterburner's temperature can be controlled more precisely than the HBC combustion chamber temperature and provides additional residence time and a high temperature in order complete combustion of any volatile organic compounds (VOCs). Therefore, ESD will set a limit on the minimum afterburner temperature to satisfy the requirement for minimum combustion chamber temperature.

While the afterburner temperature can be controlled, the afterburner temperature will still vary depending on the stage in the cycle since the HBC process is operated in a batch mode of operation. The afterburner temperature scenarios are as follows:

- When the emissions from a batch are actively being treated, the afterburner will be at full operating temperature.
- In between batches, the afterburner will be at a lower temperature.
- The afterburner will be in a "low-burn" setting outside of normal operating hours to keep the afterburner and catalytic ceramic filter systems warm.

The afterburner temperature scenario which will affect the destruction of VOCs is the first scenario (when emissions from a batch are actively being treated). Therefore, the minimum afterburner temperature OPL established during the trial burn will only be in effect during the following afterburner temperature scenario.

- When the emissions from a batch are actively being treated.

Typically, the combustion chamber temperature OPL is determined as the "average of the test run averages" demonstrated during the test for HWC MACT compliance. The HWC MACT specified approach to setting this OPL works well when the system and APCS operates in a continuous mode. However, due to this being a batch mode of operation and the afterburner temperature not being kept constant throughout the batch cycle during the test or during normal operations, this OPL will be determined based upon the average of the minimum one-minute average values when emissions are actively being treated during each run of the trial burn. For ongoing compliance, this OPL will be complied with on a 10-minute rolling average basis.

2.7.4 Maximum Stack Gas Flowrate

Due to the HBC being operated in a batch mode of operation, the other operating parameters associated with the APCS will have varying values depending on the stage in the cycle, much like the afterburner temperature. Therefore, the operating parameters associated with the APCS will only be in effect when emissions from a batch are actively being controlled.

Typically, for HWC MACT compliance, the maximum stack gas flowrate OPL is determined by the "average of the maximum HRA demonstrated during each test run". The HWC MACT specified approach to setting OPLs works well when the system and APCS operates in a continuous mode. However, due to this being a batch mode of operation and the APCS parameters not being kept constant throughout the batch cycle during the test or during normal operations, this OPL will be determined based upon the average of the maximum one-minute average values when emissions are actively being treated during each run of the trial burn. For ongoing compliance, this OPL will be complied with on a 10-minute rolling average basis.

2.7.5 APCS-Related OPLs

Due to the HBC being operated in a batch mode of operation, the operating parameters associated with the APCS will have varying values depending on the stage in the cycle, much like the afterburner temperature. Therefore, the operating parameters associated with the APCS will only be in effect when emissions from a batch are actively being controlled.

2.7.6 Using CEMS for Compliance with the Dry Scrubber OPLs

The Dry Sorbent Injection (DSI) System is used to treat acid gases by metering powdered caustic material into the gas stream prior to distribution through the ceramic filter housings. The sorbent neutralizes the acid gases and is filtered out of the gas stream directly on the outer surface of the ceramic filters. The sorbent develops a filter cake which is pulse cleaned to control differential pressure and remove spent sorbent. The spent sorbent is discharged from the filter housing waste hopper.

40 CFR §63.1209(o)(4) contains OPLs for systems that are equipped with a dry scrubber. 40 CFR §63.1209(a)(5) allows using Continuous Emissions Monitoring System (CEMS) for compliance monitoring in lieu of compliance with the corresponding OPLs for hydrogen chloride and chlorine. The HBC APCS will be equipped with a FTIR CEMS to monitor HCl. Therefore, ESD requests approval to use a CEMS to measure HCl in lieu of the OPLs specified in 40 CFR §63.1209(o)(4) for the Dry Sorbent Injection System, as allowed in 40 CFR §63.1209(a)(5).

2.8 Operation of Waste Firing System

In 40 CFR §63.1209(j)(1)-(4), EPA specifies OPLs that must be maintained to ensure compliance with the DRE standard. The required OPLs specified in 40 CFR §63.1209(j)(1) – (3) are:

- Minimum combustion chamber temperature (OPL will be Minimum Afterburner Temperature, see Section 2.7.3 for more information)
- Maximum flue gas flowrate or production rate (OPL will be Maximum Stack Gas Flowrate, see Section 2.7.4 for more information)
- Maximum hazardous waste feedrate (OPL will be Maximum Total NEW Charge Rate, see Section 2.7.1 for more information)

As shown in Table 2-2 and Table 2-3, ESD proposes to establish OPLs for these requirements.

In 40 CFR §63.1209(j)(4), the HWC MACT rule requires that an operator must specify operating parameters and limits to ensure that good operation of each hazardous waste firing system is maintained. ESD will operate with the following OPL to fulfill this requirement.

- Maximum Stack Gas CO Concentration.

ESD will maintain the stack gas CO less than 100 ppmv, dry, corrected to 7 percent O_2, on an hourly rolling average basis. This parameter, in conjunction with other parameters discussed in this subsection, will provide assurance that the waste firing system is in good operation and is well maintained.

2.9 Metals Feedrate Extrapolation Procedures

In accordance with 40 CFR §63.1209(n)(2)(vii) and §63.1209(l)(1)(v), ESD is proposing a procedure for extrapolating the SVM and LVM feedrates achieved during the Trial Burn. ESD proposes to extrapolate SVM and LVM feedrates to the respective HWC MACT emission standard.

Upon completion of the Trial Burn, the following extrapolation procedure will be used to establish SVM and LVM feedrate OPLs.

1. Determine the ratio of the HWC MACT emission standards for SVM and LVM to the demonstrated concentration measured during the trial burn.

$$SVM\ Ratio = \frac{10\ \frac{\mu g}{dscm} @\ 7\%\ O2}{Demonstrated\ SVM\ concentration\ (\frac{\mu g}{dscm} @\ 7\%\ O2)}$$

$$LVM\ Ratio = \frac{23\ \frac{\mu g}{dscm} @\ 7\%\ O2}{Demonstrated\ LVM\ concentration\ (\frac{\mu g}{dscm} @\ 7\%\ O2)}$$

2. Calculate the possible mercury, LVM, and SVM feedrate OPL based on the ratios from Step #1.

$$SVM\ feedrate\ OPL\ \left(\frac{lb}{hr}\right) = Demonstrated\ SVM\ feedrate\left(\frac{lb}{hr}\right)\ x\ SVM\ Ratio$$

$$LVM\ feedrate\ OPL\ \left(\frac{lb}{hr}\right) = Demonstrated\ LVM\ feedrate\left(\frac{lb}{hr}\right)\ x\ LVM\ Ratio$$

3. The values determined in Step #2 will be the OPL. For ongoing compliance, these OPLs will be complied with on a 12-hourly rolling average (12-HRA) basis.

ESD requests approval of this metals feedrate extrapolation procedure per 40 CFR §63.1210(n)(2)(vii) and §63.1209(l)(1)(v).

2.10 Mercury Maximum Theoretical Emission Concentration

ESD does not plan to feed munitions containing mercury and will use the maximum theoretical emission concentration (MTEC) approach to document ongoing compliance with the mercury emission standard per 40 CFR §63.1207(m)(1). This approach is based on all the mercury fed to the HBC being emitted through the stack (i.e., no credit is taken for mercury removal in the APCS). Because the munitions do not contain mercury, the MTEC will be zero. If ESD chooses to feed mercury-containing munition items in the future, the items will be fed at rates that will result in an MTEC that does not exceed the mercury emissions standard. For example, a maximum mercury feedrate limit will be calculated using the MACT limit of 8.1 µg/dscm at 7% O_2 and the stack gas flowrate and the stack gas oxygen. An example of this calculation is shown below, assuming a stack gas flowrate of 9,300 dscfm and a stack gas oxygen concentration of 14.0%.

$$\frac{8.1\mu gHg}{dscm},7\%O_2 \times \frac{20.9 - 14.0\%O_2}{13.9} \times 9{,}300 dscfm \times \frac{dscm \cdot 60min \cdot g \cdot lb}{35.315 dscf \cdot hr \cdot 10^6 \mu g \cdot 453.6 g}$$

$$= \quad 0.00014 \text{ lbHg/hr}$$

ESD will ensure that the mercury emission standard is not exceeded by calculating the MTEC based on the actual feedrate of mercury and the stack gas flowrate and oxygen concentration. The amount of mercury in the munitions will be determined as described in Section 5.2. If mercury is not listed as a component in the item, the mercury concentration is assumed to be zero. As mentioned above, the actual feedrate of mercury is anticipated to be zero since ESD does not plan to feed munitions containing mercury.

2.11 Expected Levels of Regulated Constituents in Certain Feedstreams

In 40 CFR §63.1207(f)(1)(xi) and 40 CFR §63.1209(c)(5), the HWC MACT standard requires documentation of the expected levels of the regulated constituents (metals and chlorine) in natural gas, process air and feedstreams from vapor recovery systems.

Natural Gas

The HBC does not use natural gas.

Process Air

The combustion air (process air) for the unit is drawn from ambient air near the unit. Since the HBC system is sealed during treatment and the resulting combustion gases are routed through the APCS, the fugitive emissions of regulated constituents (metals and chlorine) from the unit will be negligible. Therefore, the feedrate of regulated constituents in the process air introduced to the HBC is considered negligible as compared to the regulated constituents contained in the process feed. The process air is not considered when documenting compliance with the feed limits for metals and chlorine/chloride on an ongoing basis.

Feedstreams from Vapor Recovery Systems

The HBC does not have any feedstreams from vapor recovery systems.

3.0 DETAILED ENGINEERING DESCRIPTION

The following sections provide a detailed engineering description of the HBC system. It should be noted that the currently planned configuration of equipment and instrumentation are described in this section and may be changed to equivalent or superior materials or items. A process flow diagram (PFD) is included as Figure 3-1. The PFD is a representation of the combustion and air pollution control systems and includes all major process flow streams.

The HBC provides demilitarization for numerous munition items such as rocket motors, flares, smoke munitions, and other munitions that are ignitable and non-mass detonating. After the materials are prepared for processing, they are transferred through the Rocket Motor Ops Building to the feed sled of the HBC. The HBC system is a contained burn system followed by air pollution control equipment.

Contained burn technology can be thought of as "open burning indoors." This proven technology provides a modern and environmentally responsible alternative to replace open burning. These robust systems are designed to be simple, safe, and flexible from an operations standpoint, while limiting pollution and potentially harmful emissions which are a concern from open burning operations.

Materials are prepared in batches and are ignited in a manner similar to traditional open burning operations, maintaining simplicity and flexibility. The exhaust gases, however, are contained and cleaned prior to release to protect human health and the environment. The design of the APCS to scrub the off gases is tailored to the chemistry of the materials being processed.

The basic components of the contained burn system include the feed system, the HBC, an ignition system and an APCS. Ancillary systems include an HBC wash system and utilities. The components and systems presented in the following sections are used to achieve energetic destruction and pollution abatement.

3.1 Feed System

The feed system design is customized based on the type and quantity of material to be processed to maximize throughput, process material type flexibility, and minimize personnel handling of the process feed material, thus minimizing risk. All feeding into the HBC is performed by operators in the control room (Range Control) which is separated from the HBC by a substantial barricade wall designed to prevent injury to operators. Safety systems throughout the HBC include a series of interlocks and alarms for abnormal conditions.

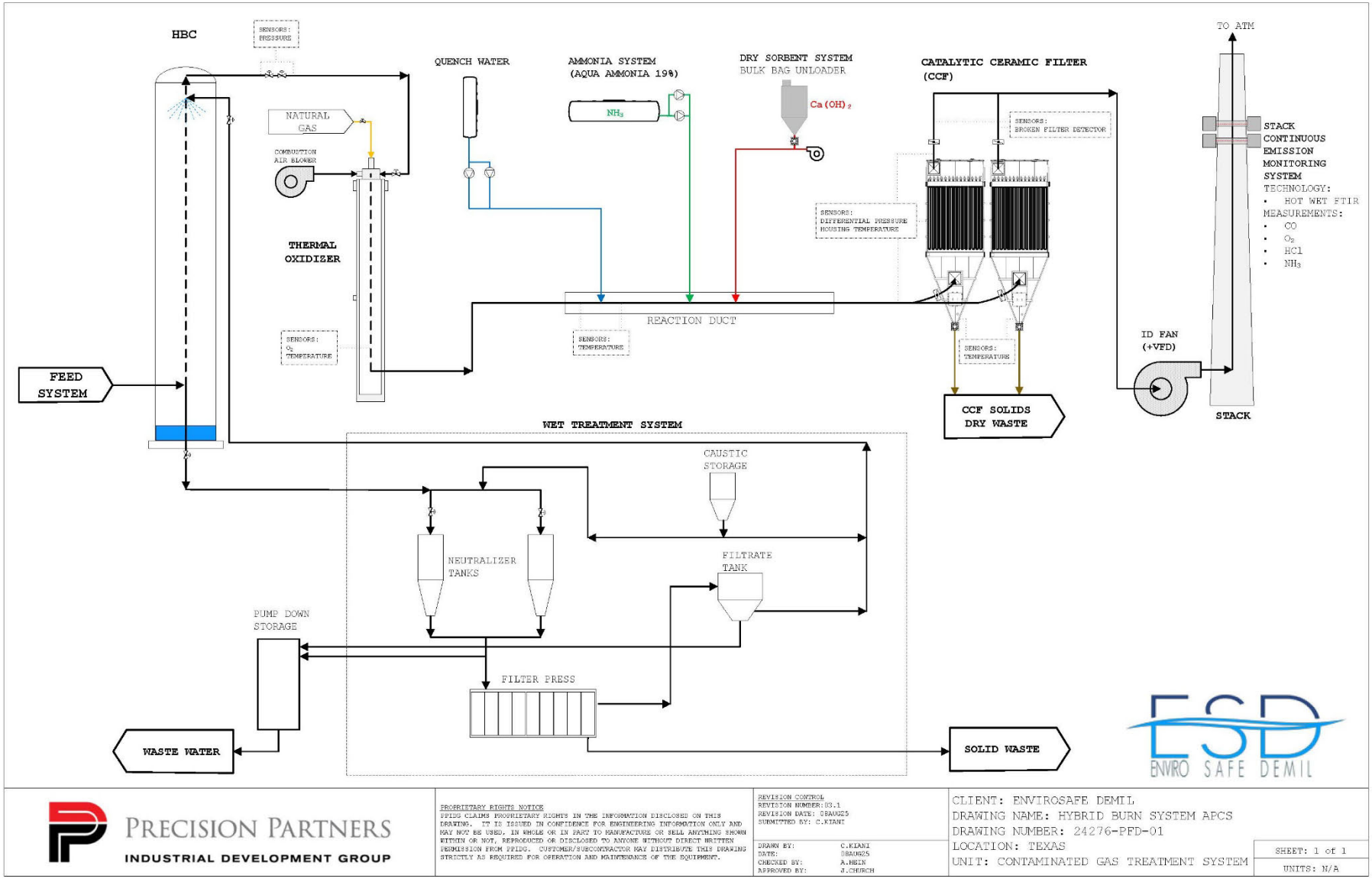

Figure 3-1
Process Flow Diagram

The feed system operates in a batch feed mode. Bulk materials are prepared for processing and are placed into a removable burn pan. Rocket motor components or other items that create thrust when burned are secured using a holding fixture to restrain the motor during firing. The burn pan or rocket motor is then remotely loaded into the HBC using an automated loading system. The material is ignited remotely. After thermal processing is complete, the burn pan is remotely extracted from the HBC.

3.2 Hybrid Burn Chamber (HBC)

The HBC is a steel pressure vessel specially designed and sized to contain the exhaust products generated from burning. It is designed to ensure both the safety of personnel and to protect equipment in the case of a maximum credible event. It is sized to provide proper combustion of the process materials and to withstand the process operating pressures and temperatures.

3.3 Ignition System

An electrically actuated ignition source is incorporated in the contained burn system so that materials loaded for processing can be ignited remotely by an operator. The ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is operational. Once the chamber is closed and ignition initiated, the operators have no further active control.

3.4 Air Pollution Control System (APCS)

After processing the energetic materials within the HBC, emissions are exhausted through a series of air pollution control equipment that make up the APCS.

The pressure and flow of the gas will be regulated by a multi-damper recirculation loop at the outlet of the HBC. The HBC gas will be evacuated from the top of the chamber directly into a thermal oxidizer (also known as an afterburner) for VOC destruction where the gas temperature will be increased to approximately 2,000ºF for 2 seconds of residence time to provide effective thermal oxidation of VOCs.

The hot flue gas will be quenched by water injection down to approximately 750ºF and will enter the reaction duct. In the reaction duct, dry sorbent (hydrated lime) and aqueous ammonia (19% solution) are injected into the gas stream to mix prior to distribution through the ceramic filter housings. At the ceramic filter housings, the process PM and reacted sorbent containing captured HCl and SOx are filtered out of the gas stream directly on the outer surface of the ceramic filters and discharged from the filter housing waste hopper. The catalyst in the filters will react with the NOx and ammonia resulting in NOx destruction. The clean gas exits the filter housing and flows through the high temperature induced draft fan and out the stack.

3.4.1 Thermal Oxidizer (Afterburner)

A natural gas direct-fired thermal oxidizer is provided and includes a certified combustion management system. The system increases gas temperatures to 2,000°F with approximately 2 seconds of residence time to achieve thermal oxidation. This design enhances the effectiveness of the oxidation process.

3.4.2 Ammonia Injection System

To control NOx with the catalytic ceramic filters, atomized aqueous ammonia (19% vol.) is injected directly into the flue gas inlet duct upstream from the dry sorbent injection (DSI) point. The ammonia system utilizes a metering pump with pulse dampeners and pressure transmitters to ensure proper system operation. Ammonia is atomized using compressed air at the nozzle to ensure proper mixing with NOx in the flue gas. All wetted components are chemical resistant plastic and 316 grade stainless. The pump skid is contained in an impact resistant steel structure with a spill containment and plastic spray shields.

3.4.3 Dry Sorbent Injection (DSI) System

Dry sorbent is stored in supersacks with a capacity of 1,100 lbs. Supersacks of fresh sorbent are loaded on the bag unloader system designed to inject sorbet into the flue gas duct within the operating injection range of 10-40 lbs/hr. The bag unloader system has a screw feeder to control the feed rate and a high pressure centrifugal blower to convey sorbent to the injection point. Supersack fluidizing paddles keep the fresh sorbent flowing out of the supersack. The bag unloader system uses level sensors and alarms to notify operators that a supersack change is required.

3.4.4 Ceramic Filter Housing and Elements

The prefabricated filter housings include the tube sheet, filter cleaning system, inlet/outlet duct connection flanges, housing body, hopper, insulation, and cladding. The filter housing is welded internally to eliminate air or water leakage into the housing while under negative pressure during operation.

The CFA Cerafil catalytic ceramic filters have been proven to operate for over 10 years without replacement. Due to the mechanism of the filters, both the embedded catalyst and the mechanical integrity of the filter, do not observe meaningful performance degradation for the life of the filter. This significantly reduces the cost, downtime and risk observed when compared against traditional selective catalytic reduction (SCR) catalyst and fabric filter bags which often require replacement in <3 years.

3.4.5 Waste Collection and Handling

The spent sorbent material temperature at the discharge of the filter housing hoppers will be approximately 600ºF.

3.4.6 ID Fan

The high temperature induced draft fan features a direct drive configuration for improved performance. It includes integrated vibration and temperature sensors for enhanced monitoring. This design ensures efficient operation and reliable performance at all times during operation.

3.4.7 Stack

The exhaust system features a freestanding 50-foot carbon steel stack, complete with EPA test ports and CEMS ports.

3.4.8 Instrumentation and Control Cabinet

All instrumentation for process monitoring is included, such as thermocouples, flow monitors, and pressure transmitters. The control cabinet contains all control components, including a Programmable Logic Controller (PLC). These components are assembled inside a National Electrical Manufacturer Association (NEMA) 4X outdoor-rated cabinet for durability. This ensures reliable process control and monitoring in all environments.

3.5 HBC Wash System

This system provides for automated remote washing of the interior of the chamber to periodically remove ash or condensate materials from the chamber. The spray water is drained from the HBC and passes through a neutralization system to neutralize any acid present and a filter press system to remove solids. The filtered liquid stream can then be re-used for future HBC wash cycles or pumped into storage tanks where it is characterized prior to final disposal off-site.

3.6 Monitoring of Process Conditions and Safety Interlocks

Items are fed to the chamber in batches and are allowed to consume themselves (in the manner in which they were originally designed) inside of the chamber. When operating conditions are within the specified ranges, the items are then removed to be replaced by the next batch or item. If conditions are incorrect for another batch based on the chamber sensors or APCS sensors, the batch is not fed or processed until conditions are remedied.

The HBC does not utilize a traditional automatic waste feed cutoff (AWFCO) system. However, the ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and

the APCS is within the appropriate operating ranges. A Human Machine Interface (HMI), which is a series of computers and monitors, displays information on the temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. HBC process cycles are not allowed to commence if all safe conditions are not met or remedied.

3.7 Stack Gas Monitoring – CEMS

Stack gas is continuously monitored using a Fourier transform infrared spectroscopy (FTIR) based Continuous Emissions Monitoring System (CEMS). The CEMS measures the following:

- Carbon monoxide (CO)
- Oxygen (O_2)
- Ammonia slip (serves as a bag leak detection system)
- Hydrogen Chloride (HCl)

The CO and O_2CEMS will be installed, calibrated, maintained, and continuously operated in compliance with Performance Specification 4B.

The primary functions of the CEMS are to:

- Continuously measure, display, and record the gas concentrations in the stack, and
- Activate alarms and provide input into safety interlocks.

Additionally, the CEMS performs these important functions:

- Remotely displays stack gas composition and CEMS operational status, and
- Performs calibration of monitoring systems.

More information on the CEMS is included in Appendix III.

4.0 TRIAL BURN PROTOCOL

The purpose of this section is to describe in detail the protocol for the Trial Burn. The Trial Burn will be conducted under worst-case test conditions that maximize the potential for emissions of the pollutants of concern. The Trial Burn for the HBC will consist of one test condition with three replicate runs.

The Trial Burn operating conditions represent the theoretical worst-case conditions for emissions of the following pollutants:

- Principle Organic Hazardous Constituents;
- Total hydrocarbons;
- Carbon monoxide;
- Dioxins/Furans;
- Particulate matter;
- Hydrogen chloride/chlorine (HCl/Cl_2);
- Semivolatile metals (Cd, Pb, Se); and
- Low volatile metals (As, Be, Cr, Sb, Co, Mn, Ni).

Typical process feeds treated in the HBC will be fed during the Trial Burn. Ash, chlorine, and metals will be spiked to increase the feeds of these constituents to worst-case levels.

A summary of the test protocol is presented in Table 4-1. This table presents the key operating conditions, emission test parameters, spiking materials, and process feeds that will be fed during the test.

4.1 Target Operating Conditions

Operating conditions during the test are discussed in 40 CFR §63.1207(g)(1). In accordance with 40 CFR §63.1207(g)(1)(i)(A) and (B), the dioxin/furan emission testing will be conducted with significant chlorine feed and the LVM and SVM emission tests will be conducted with significant ash feed. The APCS will be operated at worst case conditions for pollutant removal during the test.

Target operating conditions for the test are intended to be worst-case conditions for the demonstration of the Trial Burn objectives discussed in Section 2.0. Table 4-2 presents the target values for operational parameters for the Trial Burn.

Table 4-1
Protocol for Test

Key Operating Conditions	Emissions Test Parameters	Process Feed [a]	Spiking Materials [b,c]
Maximum Total NEW Charge Rate Maximum Ash Charge Rate Maximum Total Chlorine/Chloride Charge Rate Maximum SVM Charge Rate Maximum LVM Charge Rate Minimum Afterburner Temperature Maximum Stack Gas Flowrate	PM HCl/Cl_2 LVM (As, Be, Cr, Sb, Co, Mn, Ni) SVM (Cd, Pb, Se) PCDD/PCDF POHCs THC CO	V878 (MK56) Rocket Motors	Lead Spike Lead Oxide Chromium Spike Chromium Oxide Chlorine Spike Potassium Chloride POHC Spike Diphenylamine Ash Spike See note d

Notes:

[a] The anticipated process feed during the test is shown. Actual process feed during the test may vary based on availability at the time of the test and suitability to meet the test objectives. The Trial Burn Report will document the process feed used during the test.

[b] These are the anticipated spiking materials, but the spiking materials may change based on availability or compatibility with the process feed. The Trial Burn Report will document the spiking materials used during the test.

[c] These spiking materials will be fed in packets.

[d] The metals spikes and the chlorine spike will also provide ash. If additional ash needs to be spiked during the test to meet test objectives, the ash spike used during the test will be documented in the Trial Burn Report.

Table 4-2
Operating Condition Targets

Parameter	Units	Target for Trial Burn
HBC Operating Parameters		
Maximum Total NEW Charge Rate	lb/hr	680
Maximum Ash Charge Rate	lb/hr	90
Maximum Total Chlorine/Chloride Charge Rate	lb/hr	175
Maximum SVM Charge Rate (Pb, Cd, Se)	lb/hr	5.05
Maximum LVM Charge Rate (As, Be, Cr, Sb, Co, Mn, Ni)	lb/hr	4.26
APCS Operating Parameters [a]		
Maximum Stack Gas Flowrate	scfm	9,300
Minimum Afterburner Temperature	ºF	2,000

Notes:
[a] The targets related to the APCS are for when emissions from a batch are actively being treated. See Section 2.7.5 for more information.

During the test, the HBC and APCS will be operated under the following conditions:

- Maximum total NEW charge rate;
- Maximum ash charge rate;
- Maximum total chlorine/chloride charge rate;
- Maximum LVM charge rate;
- Maximum SVM charge rate;
- Minimum afterburner temperature;
- Maximum stack gas flowrate.

Maximum feedrates of ash, metals, and chlorine/chloride will maximize the potential emissions of these pollutants. The maximum ash feedrate will stress the capability of the APCS to control particulate emissions. The maximum feedrate of chlorine/chloride is a worst-case parameter for HCl/Cl_2 emissions as well as SVM and LVM emissions. Maximum ash, metals, and chlorine/chloride feedrates will be achieved by the use of spiking materials.

A high chlorine feedrate and minimum afterburner temperature are worst-case conditions for emissions of dioxins/furans. The minimum afterburner temperature will minimize organics combustion.

Maximum stack gas flowrate is a worst-case condition for all pollutants. This condition represents minimum residence time in the combustion chamber and afterburner, which minimizes the destruction of organic compounds. Maximum stack gas flowrate is also a worst-case condition for the APCS, because the gas velocity is maximized and therefore the pollutant residence time in each stage of the APCS is minimized.

4.2 Process Feeds

The HBC provides demilitarization for numerous munition items such as rocket motors, flares, smoke munitions, and other munitions that are ignitable and non-mass detonating.

The process feeds to be treated during the Trial Burn are typical of the materials planned to be treated in the HBC. It is anticipated that ammonium perchlorate motors (either V878 (MK56) motors or Multiple Launch Rocket System (MLRS) motors) will be fed during the test. While this is the planned process feed, actual process feeds to be used during the test will be selected on the basis of availability at the time of testing and suitability to meet the test objectives.

This section describes the ammonium perchlorate rocket motors that are planned to be fed to the HBC during the test as well as another type of rocket motor (V298). The V298 rocket motors are not planned to be fed during the test but are included to show the expected lead content of the motors. The amount of lead contained in the V298 rocket motors was used to determine the amount of lead that will be spiked during the test.

4.2.1 Ammonium Perchlorate Motors: V878 (MK56) and MLRS

The process feed planned to be used during the test will be either V878 (MK56) rocket motors or MLRS rocket motors. These motors are very similar in composition. The basis for this test plan is designed using the V878 (MK56) rocket motors because the V878 (MK56) rocket motors will have a higher NEW content per batch than the MLRS rocket motors.

The composition of the V878 (MK56) rocket motors can be seen in Table 4-3. As can be seen from the composition, the rocket motors contain a significant amount of ammonium perchlorate. The amount of chlorine in each rocket motor is calculated in Table 4-4. The amount of ash in each rocket motor is calculated in Table 4-5. These rocket motors contain no HWC MACT metals, so spiking materials will be used to increase the feedrate of HWC MACT metals. Additional chlorine will also be spiked during the test in order to allow for motors with a higher chlorine content (MLRS) to be fed during normal operations.

4.2.2 V298 Rocket Motors (not planned to be fed)

As previously mentioned, the V298 rocket motors are not planned to be fed during the test. Information is presented to show the expected lead content of the motors, which will be used to establish the lead spiking amount for the test.

The composition of the V298 rocket motors can be seen in Table 4-6. As can be seen from the composition, the rocket motors contain lead. The amount of lead in each rocket motor is calculated in Table 4-7.

4.3 Spike Selection Rationale

Spikes have been selected to achieve the feedrate goals for ash, chlorine, and metals and to demonstrate the performance of the HBC system for control of PM, HCl/Cl_2, and metals. The spikes proposed for the test are discussed below, but alternative spikes may be used based upon

Table 4-3
V878 (MK56) Rocket Motor Composition [a,b]

Component	Percentage (%)	Net Explosive Weight (NEW) (lb)
Prop Booster MK56	100	380.881932
Ammonium Perchlorate	46.2	175.97
Aluminum Powder	22	83.79
Ammonium Perchlorate	19.8	75.41
Isodecyl Pelargonate	3.548	13.51
Polybutadiene Carboxyl-Terminated	3.378	12.87
Sebacoyl-1-(2-ethyl aziridine)(BISA)(N/F)	2.703	10.30
MAPO	2.196	8.36
Ferric Oxide	0.1	0.38
Resin Expoxy Bisphenol	0.075	0.29
Total	100	380.881932
Prop Sustainer MK56		
Ammonium Perchlorate	64	191.44
Nitroguanidine	19	56.8324333
Triethyl Phosphate	3.83875	11.4823949
2,4 Toluene Diisocyanate (TDI)	2.94928	8.82182941
C36 Aliphatic Dissocyante (DDI)	2.94928	8.82182941
Polyester Hydroxyl Terminated (N/F)	2.52795	7.56155525
Glyceryl Monoricinoleate	1.96619	5.88122958
Propylene Glycol	0.56178	1.68038549
Triethanolamine	0.56177	1.68035558
Graphite	0.5	1.49559035
Phenylamine-based Antioxidant	0.5	1.49559035
Zirconium Carbide	0.5	1.49559035
Lecithin	0.1	0.29911807
Ferric Acetylacetonate	0.035	0.10469132
Polydimethyl Siloxane	0.01	0.02991181
Total	100	299.11807

Notes:

[a] This motor consists of both the Prop Booster and the Prop Sustainer.

[b] These motors are too large to feed into the HBC whole. These motors will be segmented and fed to the HBC in 3 different pieces.

Table 4-4
V878 (MK56) Rocket Motor Chlorine Composition [a]

Parameter	Prop Booster MK56	Prop Sustainer MK56
Ammonium Perchlorate (NH_4ClO_4)		
Weight Ammonium Perchlorate (lb) [b]	251.38	191.44
Molecular Weight Ammonium Perchlorate (g/mol)	117.49	117.49
Chlorine Weight in Ammonium Perchlorate (g)	35.453	35.453
Chlorine total (lb) [b]	75.86	57.77
Total Chlorine in V878 (MK56) (lb) [b]	133.62	
Total Chlorine per Segment (lb) [b,c]	**44.54**	

Notes:
[a] These motors are too large to feed into the HBC whole. These motors will be segmented and fed to the HBC in 3 different pieces.
[b] Weights shown are net explosive weight (NEW).
[c] The weight per segment is calculated assuming the motor is segmented into 3 pieces.

Table 4-5
V878 (MK56) Rocket Motor Ash Composition [a]

Parameter	Prop Booster MK56	Prop Sustainer MK56
Per Item Weights (lb) [b]		
Aluminum	83.79	-
Phosphorus	1.20	1.95
Ferric Oxide	0.38	-
Graphite	-	1.50
Zirconium Carbide	-	1.50
Iron	-	0.017
Silicon	-	0.01
Total Ash in V878 (MK56) (lb) [b]	90.35	
Total Ash per Segment (lb) [b,c]	**30.12**	

Notes:
[a] These motors are too large to feed into the HBC whole. These motors will be segmented and fed to the HBC in 3 different pieces.
[b] Weights shown are net explosive weight (NEW).
[c] The weight per segment is calculated assuming the motor is segmented into 3 pieces.

Table 4-6
V298 Rocket Motor Composition

Parameter	Percentage (%)	Net Explosive Weight (NEW) (lb)
Prop Dual Grain MK73 MOD 0	100	1,202
Nitrocellulose	82.4	990.4
Nitroglycerin	12	144.2
Lead Salicylate	2.3	27.65
Lead 2-Ethyl Hexoate	2.26	27.17
2-Nitrodiphenylamine	1	12.02
Graphite	0.04	0.4808
Total	100	1,202
Prop Grain MK53 MOD 0	100	1,300
Nitrocellulose	82.4	1,071.2
Nitroglycerin	12	156
Lead Salicylate	2.3	29.9
Lead 2-Ethyl Hexoate	2.26	29.38
2-Nitrodiphenylamine	1	13
Graphite	0.04	0.52
Total	100	1,300

Notes:
[a] These motors are too large to feed into the HBC whole. These motors will be segmented into approximately 250 lb pieces for treatment during the test. Therefore, each motor will be segmented into approximately 5 pieces.

Table 4-7
V298 Rocket Motor Lead Composition [a]

Parameter	Prop Dual Grain MK73 MOD 0	Prop Grain MK53 MOD 0
Lead Salicylate ($C_{14}H_8O_6Pb$)		
Weight Lead Salicylate (lb) [b]	27.65	29.90
Weight Lead Salicylate (g) [b]	12,540	13,562
Molecular Weight Lead Salicylate (g/mol)	479.41	479.41
Lead Weight in Lead Salicylate (g)	207.2	207.2
Lead total (g) [b]	5,420	5,862
Lead total (lb) [b]	11.95	12.92
Lead 2-Ethyl Hexoate ($C_{16}H_{30}O_4Pb$)		
Weight Lead 2-Ethyl Hexoate (lb) [b]	27.17	29.38
Weight Lead 2-Ethyl Hexoate (g) [b]	12,322	13,327
Molecular Weight Lead 2-Ethyl Hexoate (g/mol)	493.61	493.61
Lead Weight in Lead 2-Ethyl Hexoate (g)	207.2	207.2
Lead total (g) [b]	5,172	5,594
Lead total (lb) [b]	11.40	12.33
Total Lead per Item (g)	10,592	11,456
Total Lead per Item (lb)	23.35	25.26
Total Lead per Segment (g) [c]	**2,118**	**2,291**
Total Lead per Segment (lb) [c]	**4.67**	**5.05**

Notes:
[a] These motors are too large to feed into the HBC whole. These motors will be segmented into approximately 250 lb segments for treatment during the test. Therefore, each motor will be segmented into approximately 5 pieces.
[b] Weights shown are net explosive weight (NEW).
[c] The weights per segment are calculated assuming the motor is segmented into 5 pieces.

availability at the time of testing, compatibility with the process feed, and suitability to meet the test objectives.

4.3.1 POHC Spike

The University of Dayton Research Institute (UDRI) incinerability index is included in Appendix D of US EPA's *Guidance on Setting Permit Conditions and Reporting Trial Burn Results*. This list classifies compounds into classes, with Class 1 being the most difficult to destroy. US EPA indicates that it is acceptable to select POHCs based on the class designation of the compound. If the facility achieves 99.99% DRE for a Class 1 POHC, then any compound in Class 1, or in a lower class, can be successfully destroyed. The guidance suggests that a POHC from Class 2 or higher be chosen to demonstrate that the unit can destroy hazardous organic compounds.

Diphenylamine will be used as a POHC during the test. Diphenylamine is a Class 2 compound (ranked 67^{th}-70^{th}) on the thermal stability list compiled by the UDRI and is included in US EPA's *Guidance on Setting Permit Conditions and Reporting Trial Burn Results*. While there are many compounds ranked higher than diphenylamine in the UDRI ranking, these compounds were not selected for use as POHCs based on one or more of the following criteria:

- The compounds are gaseous at ambient temperature (such as cyanogen)
- The compounds are dangerous to handle due to acute toxicity, flammability, or explosiveness (such as hydrogen cyanide or acetonitrile)
- The compounds are fluorinated (such as sulfur hexafluoride)
- The compounds are common products of incomplete combustion (PICs), which could artificially bias the DRE stack test results (such as benzene or naphthalene)

Diphenylamine is commonly used as a POHC in testing for other demilitarization facilities across the industrial base. Diphenylamine was chosen based on its state at ambient temperature (solid), its ability to be fed with the normal process feeds in packets, and because it is representative of the types of constituents the HBC will handle. Achieving a 99.99% DRE for diphenylamine at worst-case operating conditions during the test will demonstrate the ability of the HBC system to effectively destroy a variety of volatile and semivolatile organic compounds.

A known quantity of the POHC spike will be fed in packets along with the process feed to the HBC. The quantity of POHC fed during each batch will be recorded on field data sheets.

The total quantity of the POHC to be spiked during the test is based on the target feedrate of POHC and the expected duration of the test. The target feedrate was established to provide a sufficient

amount of POHC for detection in the stack at 99.99% DRE. A copy of the spreadsheet calculation for minimum POHC quantity to be fed is provided in Appendix II of this document.

The minimum feedrate is determined by dividing the expected emission rate by the minimum allowable fraction of uncombusted POHC (0.01% for a DRE of 99.99%). Because in-stack detection limits are not precise, vary depending on the analytical laboratory selected, and cannot be determined absolutely until the actual analysis, the target feedrate has been set at least ten times the minimum feedrate to allow a comfortable margin of error.

4.3.2 Chlorine Spike

Potassium chloride will be used as a source of additional chlorine during the test. Potassium chloride was chosen based on its state at ambient temperature (solid), its ability to be fed with the normal process feeds in packets, and because it is commonly used in testing for other demilitarization facilities across the industrial base.

Potassium chloride is approximately 47.56% chlorine and will provide adequate additional chlorine input during the test. Potassium chloride also contributes to the ash feedrate. A known quantity of the chlorine spike will be fed in packets along with the process feed to the HBC. The weight of potassium chloride in each packet will be determined based on the weight of additional chlorine needed to achieve the target feedrate for chlorine in Table 4-2. The quantity of chlorine spike fed during each batch will be recorded on field data sheets.

4.3.3 Metal Spikes

Chromium (representative of the LVM group) and lead (representative of the SVM group) will be spiked as solid oxides of the respective metals during the test. Pre-weighed packets containing chromium oxide (Cr_2O_3) and lead oxide (PbO) will be placed with the process feeds fed to the HBC.

These metal oxides were chosen based on their state at ambient temperature (solid), their ability to be fed with the normal process feeds in packets, and because they are commonly used in testing. Additionally, these metals (Cr and Pb) are less toxic than the other metals in their respective groups, and are therefore safer for personnel to handle during testing.

The weight of Cr_2O_3 and PbO in each packet will be determined based on the weight of metal spikes needed to achieve the target feedrates for chromium and lead in Table 4-2. These metal spikes will also contribute to the ash feedrate. The quantity of metal spikes fed during each batch will be recorded on field data sheets.

4.3.4 Ash Spike

As mentioned above, the anticipated chlorine spike and the anticipated metal spikes will contribute to the ash feedrate. At this time, additional spiking of ash is not planned. However, if it is determined that additional ash needs to be spiked during the test to meet test objectives, the ash spike used during the test will be documented in the Trial Burn Report.

4.4 Characteristics, Feedrates, and Quantities of Process Feeds and Spiking Materials

A summary of the characteristics, feedrates, and quantities of the expected process feed and spiking streams is presented in Table 4-8. The expected quantities are based on providing 20 hours of materials at the target feedrates. The basis for 20 hours is to provide sufficient materials for the time required for pre-test shakedown, establishing steady state each test day, stack sampling, time between test runs, and contingency time, in case a run must be repeated. Any excess process feeds or spiking materials can be treated at the conclusion of testing.

Target feedrates for each of the process feed and spiking streams are also shown in Table 4-8. These feedrates are designed to allow demonstration of maximum NEW and constituent feedrates and the target operational parameters. Based on these target feedrates, the constituent feedrates of ash, chlorine, and metals are also shown in Table 4-8.

4.5 Operating Conditions and Steady-State Operation

In 40 CFR §63.1207(g)(1)(iii) the HWC MACT Standard requires that prior to obtaining performance test data, the system must function under performance test conditions until steady-state operation is reached with respect to emissions of pollutants that are to be measured during the performance test and operating parameters for which limits will be established.

Since the HBC is operated in batch feed mode, steady state of the feed system cannot be achieved. As discussed in Section 2.7.5, steady state of the APCS also cannot be achieved due to the batch cycle stages. Therefore, ESD will operate the APCS for a minimum of 30 minutes at as close to steady state as possible before stack testing begins. Prior to the initiation of stack sampling, the HBC APCS will be brought as close as possible to the target levels for the APCS parameters shown in Table 4-2. The Trial Burn Coordinator will monitor these parameters and determine when the targets are as close as possible to being achieved before the batch process begins and the emissions make their way through the APCS. After a batch is commenced, the APCS will then be operated at the target levels during the time the APCS is actively treating the emissions.

Table 4-8
Characteristics, Feedrates, and Quantities of the Feeds [a]

Parameter	Units	V878 (MK 56) Rocket Motor [b]	Diphenylamine Spike [c]	Chlorine Spike [c]	Chromium Spike [c]	Lead Spike [c]	Ash Spike [d]	Total	Target
Characteristics									
Expected Composition		See Table 4-3 to Table 4-5	Diphenylamine ($(C_6H_5)_2NH$)	Potassium Chloride (KCl)	Chromium oxide (Cr_2O_3)	Lead oxide (PbO)	TBD [d]	-	-
Storage Device		Rocket Motor Casing; Segmented	Packets	Packets	Packets	Packets	Packets	-	-
Feed Location		HBC burn pan with holding fixture	HBC burn pan	HBC burn pan	HBC burn pan	HBC burn pan	HBC burn pan	-	-
Physical Form		Solid	Solid	Solid	Solid	Solid	Solid	-	-
Diphenylamine	wt. %	0	100	0	0	0	0		
Ash	wt. %	13.3	0	100	100	100	100	-	-
Chlorine/chloride	wt. %	19.7	0	47.56	0	0	0	-	-
Low Volatile Metals (as Cr)	wt. %	0	0	0	68.42	0	0	-	-
Semivolatile Metals (as Pb)	wt. %	0	0	0	0	92.83	0	-	-
Target Feedrate and Quantity									
Feedrate per batch	lb/batch	227	15.3	30.0	2.08	1.81	TBD [d]	276	-
Batch Frequency	batch/hr	3	3	3	3	3	3	3	3
NEW Feedrate	lb/hr	680	0	0	0	0	0	680	680
Total Feedrate	lb/hr	680	46.0	90.0	6.23	5.44	TBD [d]	828	-
Quantity Required for Test [e]	lb	13,600	920	1,800	125	109	TBD [d]	-	-
Diphenylamine	lb/hr	0	46.0	0	0	0	0	46	46
Ash	lb/hr	90.4	0	90.0	6.23	5.44	TBD [d]	192	90
Chlorine/chloride	lb/hr	134	0	42.8	0	0	0	176	175
Low Volatile Metals (as Cr)	lb/hr	0	0	0	4.26	0	0	4.26	4.26
Semivolatile Metals (as Pb)	lb/hr	0	0	0	0	5.05	0	5.05	5.05

Notes:

[a] Target feedrates may be adjusted as needed in order to achieve overall test targets.

[b] The anticipated process feed during the test is shown. Actual process feed during the test may vary based on availability at the time of the test and suitability to meet the test objectives. The Trial Burn Report will document the process feed used during the test.

[c] These are the anticipated spiking materials, but the spiking materials may change based on availability or compatibility with the process feed. The Trial Burn Report will document the spiking materials used during the test.

[d] At this time, additional spiking of ash is not planned. However, if it is determined that additional ash needs to be spiked during the test to meet test objectives, the ash spike used during the test will be documented in the Trial Burn Report.

[e] Quantity is based on feeding materials for 20 hours.

5.0 SAMPLING AND ANALYSIS

Stack gas emissions will be sampled and analyzed during the Trial Burn. The feed and spikes will not be sampled during the Trial Burn.

This program is structured to provide the necessary information for demonstrating that performance criteria are achieved at the target process conditions. A detailed discussion of the sampling and analytical equipment, procedures, equipment calibrations, quality assurance /quality control, and sample handing procedures is provided in the Quality Assurance Project Plan (QAPP) included as Appendix I.

5.1 Stack Gas Sampling and Analytical Program

A summary of the stack gas sampling and analytical program is presented in Table 5-1. A stack sampling contractor will perform all of the stack sampling for the test, except for the CO and O_2 sampling which will be performed by the permanently-installed CEMS. This contractor will be responsible for all emissions samples collected during the test. The emissions samples will be sent to qualified laboratories for analysis. Additional information on the project team roles and responsibilities is provided in the QAPP in Appendix I.

5.2 Feed Sampling and Analytical Program

The off-site generators of the energetic materials are responsible for providing the information needed in order to safely and properly treat, store, or dispose of the energetic materials.

The military munitions to be used during the Trial Burn have been manufactured following U.S. Government specifications. The military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS), which is an ammunition information databased located within the Defense Ammunition Center (DAC) Munitions Analytical Compliance System (MACS). The database information is based upon military specifications and specific production records and contains the chemical constituent information for all ammunition, components, and parts.

Due to the dangers associated with sampling and analyzing explosives, ESD does not intend to rely on sampling and analysis to characterize the materials using during the Trial Burn. In lieu of sampling the feeds, ESD will use information from the manufacturer to determine the composition of the feeds.

Table 5-1
Stack Gas Sampling

Sampling Method [a]	Number of Sampling Runs	Sampling Time per Run	Analytical Parameters	Analytical Method [a]
EPA Method 1	1	N/A	Sampling and Traverse Point Locations	EPA Method 1
EPA Method 2	See note b	Continuous	Volumetric Flowrate	EPA Method 2
EPA Method 3A	See note b	Continuous	Molecular Weight	EPA Method 3A
EPA Method 4	See note b	Continuous	Moisture	EPA Method 4
EPA Method 5/26A	3	2 hours	Particulate Matter	EPA Method 5
			HCl/Cl_2	EPA Method 26A
EPA Method 29	3	2 hours	SVM (Cd, Pb, Se) LVM (As, Be, Cr, Sb, Co, Mn, Ni)	EPA Method 29
EPA Method 23	3	3 hours **AND** a minimum sample volume of 2.5 dscm	PCDD/PCDF [c]	EPA Method 23
SW-846 Method 0010	3	3 hours **AND** a minimum sample volume of 3 dscm (105.9 dscf)	POHC (Diphenylamine)	SW-846 Method 8270
EPA Method 25A	3	3 hours (concurrent with SW-846 Method 0010)	Total Hydrocarbons (THC)	EPA Method 25A
Installed CEMS: Performance Specification 4B	3	Continuous	Oxygen (O_2)	O_2 CEMS PS-4B
			Carbon Monoxide (CO)	CO CEMS PS-4B

Notes:
[a] Methods are from 40 CFR §60 Appendix A or US EPA SW-846. The method listed, or an equivalent method, will be used during the test.
[b] Methods 2, 3A, and 4 are performed as part of the other isokinetic sampling methods.
[c] Per 40 CFR §63.1208(b)(1)(iii), ESD may assume that nondetects are present at zero concentration.

5.3 Spike Sampling and Analytical Program

The spiking materials will not be sampled and analyzed during the Trial Burn. These will be pure materials purchased for testing. The suppliers will certify the spiking materials composition.

5.4 Quality Assurance / Quality Control Program

The QAPP presented in Appendix I describes procedures that will be implemented to ensure the quality of the data acquired during implementation of the Trial Burn Plan. The procedures define the management organization, quality assurance (QA) objectives, calibration procedures, sample custody, quality control (QC) checks, performance and system audits, along with data reduction, validation and reporting.

6.0 TRIAL BURN SCHEDULE AND TRIAL BURN REPORT

This section provides details on the test schedule and the information that will be submitted with the Trial Burn Report.

6.1 Trial Burn Schedule

ESD plans to conduct the Trial Burn within 720 hours of commencing operation of the HBC and feeding materials to the HBC. An additional 720 hours of operation may be requested if circumstances prevent ESD from performing the Trial Burn within the allotted time. An overall test schedule is presented in Table 6-1.

The Trial Burn will consist of one test condition with three replicate runs. Minimum sampling times for each sample train are summarized in Table 5-1 and vary depending on the amount of gas sample required to have adequate volume for analysis. These sampling times do not account for sampling port changes, sampling train leak checks, and choreography of the sampling trains.

The total test time for the Trial Burn can be approximated based on the sampling times in Table 5-1, and planning for a total of three test runs. Each run will require a minimum sampling time of 180 minutes (3 hours) per run, for a total of 540 minutes (9 hours). As previously mentioned, these sampling times are approximate and only include time for the actual sampling.

A typical day of testing is expected to last from 8 to 12 hours, including time for performing pretest calibrations, establishing steady state operations, setup of sampling equipment, and sample recovery. It is expected that one to two test runs can be conducted per day and that the three test runs will be conducted over a period of two days.

6.2 Trial Burn Report

The results of the Trial Burn will be submitted within 90 days after the test has been completed and the results have been prepared in report format. The Trial Burn Report will contain, at a minimum, the following information:

- Results of emissions sampling for pollutants of concern
- Results of constituent feedrates based on manufacturer information
- Operating data summaries
- Any other appropriate test data, including field logs
- Identification and explanation of any deviations from the Trial Burn Plan

Table 6-1
Tentative Test Schedule

Test Day	Activity
Day 1	• Subcontractors arrive on-site • Safety orientation • Pretest meeting • Sampling and spiking equipment setup
Day 2	• Perform Trial Burn; Runs 1 and 2
Day 3	• Perform Trial Burn; Run 3
Day 4 (contingency day)	• Process data collection • Sample shipping • Subcontractors leave site

- OPLs established as a result of the Trial Burn

The following information will be included as appendices to the Trial Burn Report:

- Emission Sampling Report
- Process Feed Composition Data
- Process Operating Data
- Example Calculations

Final OPLs are expected to be based on either demonstrated performance of the HBC during the Trial Burn, manufacturer specifications, good engineering practice, and/or regulatory guidance. ESD has specified the basis for establishing OPLs in the discussion of proposed OPLs in Section 2.0 of this Trial Burn Plan.

APPENDIX I

QUALITY ASSURANCE PROJECT PLAN (QAPP)

QUALITY ASSURANCE PROJECT PLAN
FOR THE
TRIAL BURN TEST
OF THE
ENVIROSAFE DEMIL, LLC
HYBRID BURN CHAMBER

APPENDIX I

EnviroSafe Demil, LLC
401 Demil Way
Hooks, Texas 75561-0019

AUGUST 2025

Revision 0

QUALITY ASSURANCE PROJECT PLAN FOR THE TRIAL BURN TEST OF THE ENVIROSAFE DEMIL, LLC HYBRID BURN CHAMBER

Expected Trial Burn Test Dates: _____

Project Approvals and Distribution

Trial Burn Coordinator: _____

Printed Name _____ Title_____

Signature _____ Date_____

Stack Sampling Coordinator: _____

Printed Name _____ Title_____

Signature _____ Date_____

Laboratory Analysis Coordinator: _____

Printed Name _____ Title_____

Signature _____ Date_____

Laboratory Analysis Coordinator: _____

Printed Name _____ Title_____

Signature _____ Date_____

Quality Assurance Manager: _____

Printed Name _____ Title_____

Signature _____ Date_____

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

Note: 2) The individuals listed above agree that no testing methods to be used in the upcoming plan testing event have been modified. If modifications are planned please identify and explain all sampling and analytical specific method modifications in your designated testing submittal plan. Also, a formal letter should be addressed to EPA Region 6 Kishor Fruitwala PhD, P.E. requesting an approval for the method modification (s) with justification for each method modification as well as a predetermined statement if the modification is felt to be a minor, intermediate or major modification.

TABLE OF CONTENTS

1.0 PROJECT DESCRIPTION AND GENERAL OVERVIEW 1

2.0 ORGANIZATION OF PERSONNEL, RESPONSIBILITIES, AND QUALIFICATIONS 4

2.1 Trial Burn Coordinator 4

2.2 Stack Sampling Coordinator 4

2.3 Laboratory Analysis Coordinator(s) 6

2.4 Quality Assurance Manager 6

2.5 Other Project Responsibilities 6

2.6 Report Preparation 6

3.0 SUMMARY OF QUALITY ASSURANCE OBJECTIVES AND GOALS 9

3.1 Quality Assurance Objectives for Precision, Accuracy, and Completeness 9

3.2 Representativeness and Comparability 11

3.3 Method Detection and Quantitation Limits 12

4.0 SAMPLING PROCEDURES 13

4.1 Field Quality Control Samples 13

4.2 Pre-sampling Activities 13

4.2.1 Equipment Calibration 13

4.2.2 Glassware Preparation 13

4.2.3 Sample Media Preparation 13

4.2.4 Other Pre-sampling Activities 14

4.3 Exhaust Gas Sample Collection 14

4.3.1 Sampling Point Determination – EPA Method 1 14

4.3.2 Flue Gas Velocity and Volumetric Flow Rate – EPA Method 2 14

4.3.3 Flue Gas Composition and Molecular Weight – EPA Method 3A 16

4.3.4 Flue Gas Moisture Content – EPA Method 4 16

4.3.5 Particulate Matter and Hydrogen Chloride/Chlorine –Combined EPA Methods 5 and 26A 16

4.3.6 Multiple Metals – EPA Method 29 19

4.3.7 Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans – EPA Method 23 23

4.3.8 Diphenylamine (POHC) – SW-846 Method 0010 28

4.3.9 Total Hydrocarbons – EPA Method 25A 32

4.3.10 Continuous Emission Monitoring System (CEMS) 32

4.4 Process and Spiking Materials 32

4.5 Total Samples for Testing 34

5.0 SAMPLE HANDLING, TRACEABILITY, AND HOLDING TIMES 36
5.1 Field Sampling Operations.....36
5.2 Chain-of-Custody Procedures 36
5.2.1 Field Custody Procedures 37
5.2.2 Transfer of Custody and Shipment.....37
5.3 Sample Holding Times 39
6.0 CALIBRATION PROCEDURES AND FREQUENCY 41
6.1 Sampling Equipment 41
6.1.1 Pitot Tubes.....42
6.1.2 Differential Pressure Gauges 42
6.1.3 Digital Temperature Indicator 42
6.1.4 Dry Gas Meter and Orifice.....44
6.1.5 Barometer.....44
6.2 Analytical Instruments.....44
7.0 ANALYTICAL PROCEDURES.....47
8.0 DATA REDUCTION, VALIDATION, AND REPORTING 48
8.1 Field Data Reduction 48
8.2 Laboratory Data Reduction.....48
8.3 Blank Correction Procedures 49
8.4 Data Validation.....50
8.5 Data Reporting and Test Report Contents 51
9.0 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY.....53
9.1 Sampling Equipment Operational QC Checks and Frequency 53
9.2 Sample Collection QC Checks and Frequency 55
9.3 Analytical Quality Control Checks.....56
9.3.1 Laboratory Quality Control Samples and Blanks.....56
9.3.2 Laboratory Data Evaluation 58
10.0 PERFORMANCE AND SYSTEM AUDITS 59
10.1 System Audits.....59
10.2 Performance Audits 59
11.0 CALCULATION OF DATA QUALITY INDICATORS 61
11.1 Precision.....61
11.2 Accuracy 61
11.3 Completeness.....62
11.4 Method Detection Limit and Estimated Detection Limits 62
12.0 PREVENTATIVE MAINTENANCE.....63
12.1 Sampling Equipment Inspection and Maintenance 63

12.2 Laboratory Analytical Instrument Maintenance....63
13.0 CORRECTIVE ACTION....64
14.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT....67

LIST OF TABLES

Table I-1-1 Tentative Test Schedule....3
Table I-2-1 Sampling Analysis Responsibilities....7
Table I-3-1 Summary of Quality Assurance Objectives and Goals....10
Table I-4-1 Stack Gas Sampling and Analytical Procedures Summary....15
Table I-4-2 Number of Stack Samples Generated....35
Table I-5-1 Summary of Sample Containers, Preservation, and Holding Times....40
Table I-6-1 Sampling Equipment Calibration Requirements....43
Table I-6-2 Analytical Instrument Calibration Requirements....45
Table I-9-1 Quality Control Validity Checks....57

LIST OF FIGURES

Figure I-2-1 Test Organization Chart....5
Figure I-4-2 Diagram of Methods 5 and 26A Sampling Train....17
Figure I-4-3 Diagram of Methods 5 and 26A Recovery Procedure....20
Figure I-4-4 Diagram of Method 29 Sampling Train....22
Figure I-4-5 Diagram of Method 29 Recovery Procedure....24
Figure I-4-6 Diagram of Method 23 Sampling Train....26
Figure I-4-7 Diagram of Method 23 Recovery Procedures....29
Figure I-4-8 Diagram of SW-846 Method 0010 Sampling Train....30
Figure I-4-9 Diagram of SW-846 Method 0010 Recovery Procedures....33
Figure I-5-1 Example Chain-of-Custody Form....38
Figure I-13-1 Example Corrective Action Form....66

1.0 PROJECT DESCRIPTION AND GENERAL OVERVIEW

EnviroSafe Demil, LLC (ESD) is installing a Hybrid Burn Chamber (HBC) at its facility in Hooks, Texas. A detailed engineering description of the HBC and a process flow diagram are provided in Section 3.0 of the Trial Burn Plan.

The overall objective for this project is to demonstrate compliance of the HBC with the National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Hazardous Waste Combustors (HWC), codified as 40 CFR, Part 63, Subpart EEE. The NESHAP specifies emissions standards that reflect emissions performance of Maximum Achievable Control Technologies (MACT) and is commonly referred to as the HWC MACT Standard.

The objective of this Quality Assurance Project Plan (QAPP) is to address the quality assurance objectives of the Trial Burn Test for the HBC. Data collected according to this plan will be used to:

- Demonstrate compliance with the emission standards for new hazardous waste incinerators contained in the HWC MACT standard
- Establish operating parameter limits (OPLs) for the HBC system

ESD intends to conduct the Trial Burn for this unit on a schedule agreed upon by ESD and the Texas Commission on Environmental Quality (TCEQ). A test program has been developed that includes sampling of the stack emissions under one test condition, utilizing three separate runs to collect data for the Trial Burn.

Samples of the stack gas will be collected for analysis of the following compounds using the indicated method during the Trial Burn:

- Particulate matter (PM), hydrogen chloride (HCl), and chlorine (Cl_2) will be collected using a combined EPA Method 5/26A sampling train.
- Metals emissions (arsenic (As), beryllium (Be), chromium (Cr), antimony (Sb), cobalt (Co), manganese (Mn), nickel (Ni), cadmium (Cd), lead (Pb), and selenium (Se)) will be collected using an EPA Method 29 sampling train.
- Polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) emissions will be collected using an EPA Method 23 sampling train.
- The Destruction and Removal Efficiency (DRE) of Principle Organic Hazardous Constituents (POHCs) will be calculated by using a SW-846 Method 0010 sampling train to collect emissions of a POHC. The POHC used during this test will be diphenylamine.

- Total hydrocarbons (THC) will be measured using Method 25A.
- Data from the permanently installed continuous emission monitoring systems (CEMS) will be collected for carbon monoxide (CO) and oxygen (O_2).

A stack sampling contractor will collect the stack emission samples using the methods described in Section 4.0. Contract laboratories will perform all analyses referenced in Section 4.0.

The stack testing will be performed under conditions that are designed to maximize the potential for emissions of pollutants of concern. The test will consist of one test condition with three replicate runs. The test is expected to take three days including set-up and removal of test equipment. Another day is reserved for contingency, in case of delays. Situations that would temporarily halt and potentially extend a test run include: extreme weather, broken glassware, a leak in the sampling trains, power outages, plant failure, and any other test equipment failures. A tentative test schedule for the test is shown in Table I-1-1.

This Quality Assurance Project Plan (QAPP) will serve as an essential guidance by which the sampling and analysis will be performed. The QAPP defines all aspects of quality assurance and quality control procedures and establishes sampling and analytical quality indicators that will demonstrate achievement of the test objectives. Additionally, this QAPP defines precision and accuracy criteria for all required measurements that will be used to set the acceptable boundaries for the evaluation of all test data. If these criteria are met, then the data will be deemed valid and usable for the purposes of the Trial Burn.

Table I-1-1
Tentative Test Schedule [a,b]

Day	Time	Tasks
1	-	Subcontractors arrive, safety orientation, pretest meeting, sampling equipment set-up
		Conduct CEMS RATA [c]
		Agency audit of sampling equipment
2	0700	Stack sampling personnel prepare for Run 1
	0900	**Start Run 1** for all sampling methods Method 5/26A (PM and HCl/Cl_2) Method 29 (Metals) Method 23 (PCDDs/PCDFs) SW-846 Method 0010 (Diphenylamine)
	1200	Discontinue Run 1 for PM, HCl/Cl_2, and Metals sampling trains (M5/26A and M29 – Run for 120 minutes)
	1300	Discontinue Run 1 for PCDDs/PCDFs and Diphenylamine sampling train (M23 and M0010 – Run for 180 minutes)
	1300	**Finish Run 1.** Set up for Run 2.
	1400	**Start Run 2** for all sampling methods (M5/26A, M29, M23, M0010)
	1700	Discontinue Run 2 for PM, HCl/Cl_2, and Metals sampling trains (M5/26A and M29 – Run for 120 minutes)
	1800	Discontinue Run 2 for PCDDs/PCDFs and Diphenylamine sampling train (M23 and M0010 – Run for 180 minutes)
	1800	**Finish Run 2.** End of testing for the day.
3	0700	Stack sampling personnel prepare for Run 3
	0900	**Start Run 3** for all sampling methods (M5/26A, M29, M23, M0010)
	1200	Discontinue Run 3 for PM, HCl/Cl_2, and Metals sampling trains (M5/26A and M29 – Run for 120 minutes)
	1300	Discontinue Run 3 for PCDDs/PCDFs and Diphenylamine sampling train (M23 and M0010 – Run for 180 minutes)
	1300	**Finish Run 3**. End of Trial Burn
4	-	**Contingency Day** Contingency runs (if needed), process data collection, sample shipping, subcontractors leave site

Notes:

[a] Schedule is tentative and is subject to change.

[b] Run time estimates include an extra hour per run to account for port change times and other possible pauses. Run times and duration are subject to change based on local test conditions.

[c] A Relative Accuracy Test Audit (RATA) will be conducted prior to emissions sampling.

2.0 ORGANIZATION OF PERSONNEL, RESPONSIBILITIES, AND QUALIFICATIONS

ESD assumes responsibility for all measurements made in connection with this project and therefore, responsibility for the implementation of an adequate Quality Assurance (QA) Program. This section discusses the approach to management of the QA aspects of the subject test program. Provisions and procedures, which are incorporated in the overall management structure to promote implementation of QA procedures and adherence to QA guidelines, are described.

The organization of the Project Team, including QA functions, is shown in the Test Organization Chart in Figure I-2-1. Note that the QA structure is independent of the organizational groups who will generate environmental measurement data during this project. The focus of the QA Program is the Quality Assurance Manager (QA Manager). The QA Manager is responsible for the day-to-day overseeing of QA activities and occupies a level higher than the Stack Sampling Coordinator and reports directly to the Trial Burn Coordinator.

2.1 Trial Burn Coordinator

The Trial Burn Coordinator oversees the Stack Sampling Coordinator, Laboratory Analysis Coordinator and Process and Spiking Coordinator's test program planning, organization and performance of the Trial Burn. The Trial Burn Coordinator provides technical supervision and oversees protocol development and review, data interpretation, and report preparation.

The Trial Burn Coordinator supervises the planning, oversight, and review functions associated with the various elements of the test program. The Trial Burn Coordinator will be responsible for the implementation of the test, as well as the coordination and oversight of all testing activities.

2.2 Stack Sampling Coordinator

The Stack Sampling Coordinator (SC) oversees and supervises all stack-sampling activities during the Trial Burn. The SC is responsible for ensuring that all exhaust gas samples are collected and for coordinating analytical activities with the laboratories. The stack sampling contractor chosen for the test will assign an SC for the test.

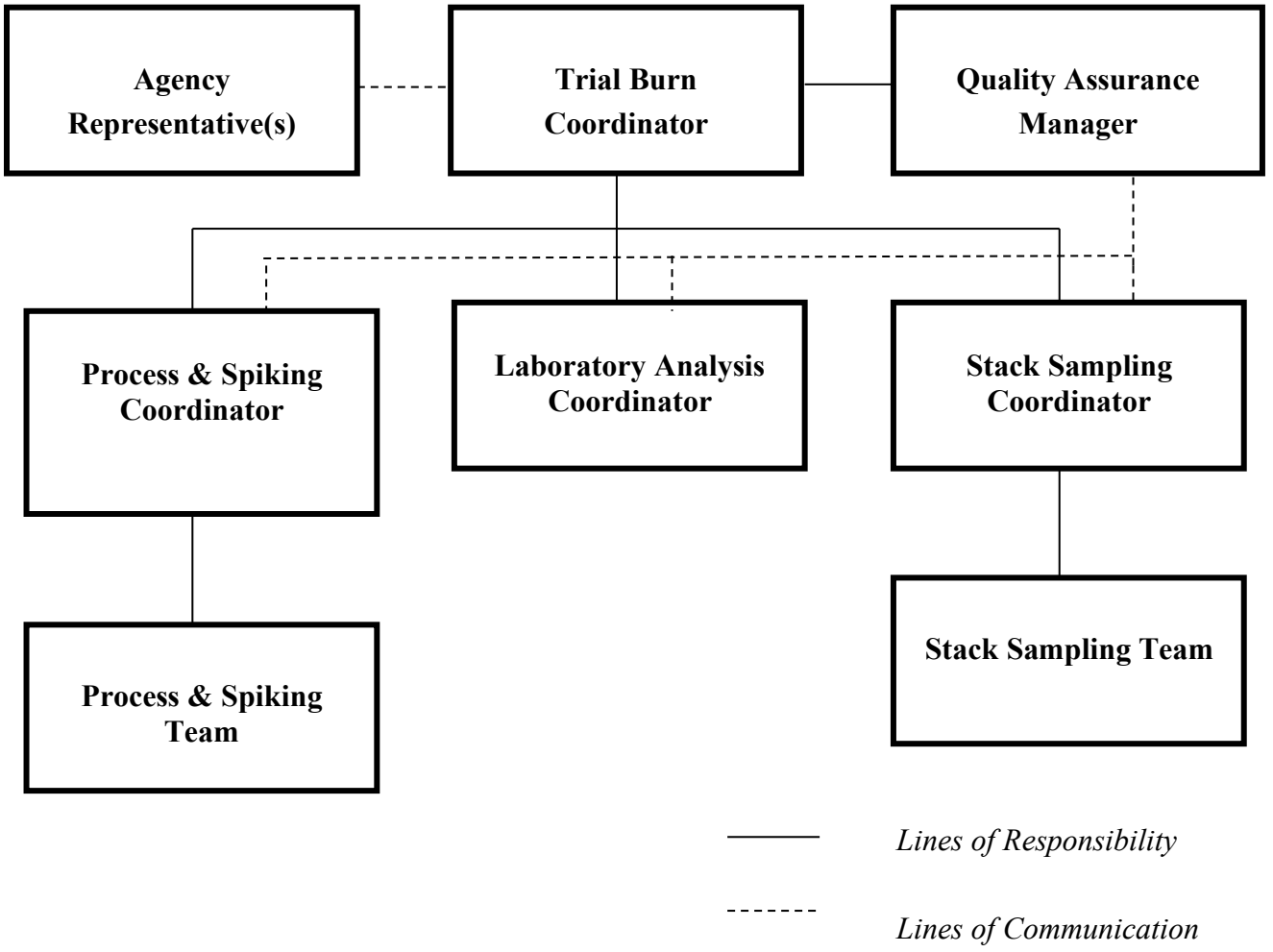

Figure I-2-1
Test Organization Chart

2.3 Laboratory Analysis Coordinator(s)

The Laboratory Analysis Coordinator(s) will manage the handling and analysis of all stack samples. The analysis of all samples will be performed by a qualified contract laboratory, under the supervision of the laboratory manager.

2.4 Quality Assurance Manager

The Quality Assurance Manager (QA Manager) has the primary responsibility for ensuring that all reported data meet the QA objectives associated with the measurement project. The QA Manager is independent of all other testing activities and reports directly to the Trial Burn Coordinator. The QA Manager is responsible for preparing the QA/QC section of the Trial Burn Report following the test. The QA Manager is responsible for monitoring the quality of laboratory work and taking appropriate actions to ensure that quality standards are being met. The QA Manager is specifically responsible for the following:

- Review quality control data
- Communicating the effectiveness of the laboratory quality system to laboratory management

2.5 Other Project Responsibilities

Other positions are shown in Figure I-2-1, but their responsibilities should be evident based on the title and will not be discussed. Sampling and analysis responsibilities are summarized in Table I-2-1.

2.6 Report Preparation

The information for the stack sampling report will be prepared under the direction of the SC, who may also serve as Reporting Manager. The Reporting Manager's main responsibilities include:

- Determine customer and/or regulatory needs
- Complete pre-field testing reviews and planning
- Coordinate field-testing activities
- Keep apprised of and check analytical results
- Analyze data to make conclusions and recommendations, as appropriate
- Prepare and distribute sampling and analysis report

Table I-2-1
Sampling and Analysis Responsibilities [a]

Sample Matrix	Parameter	Sampling Responsibility	Analysis Responsibility
Stack Gas	Particulate Matter (PM)	Stack Sampling Contractor	Contract Laboratory
	HCl/Cl_2	Stack Sampling Contractor	Contract Laboratory
	Metals	Stack Sampling Contractor	Contract Laboratory
	PCDDs/PCDFs	Stack Sampling Contractor	Contract Laboratory
	POHC (Diphenylamine)	Stack Sampling Contractor	Contract Laboratory
	Total Hydrocarbons (THC)	Stack Sampling Contractor	Stack Sampling Contractor
	Carbon Monoxide (CO) / Oxygen (O_2)	CEMS	CEMS

Notes:

[a] The anticipated laboratory/contractor for the test will be determined prior to the test and communicated to TCEQ. In the event that the anticipated laboratory/contractor is not available, the alternate laboratory/contractor will be noted in the Trial Burn Report.

- Compile a historical project file and initiate appropriate records retention

Reports will be prepared discussing sampling, analytical results, and quality assurance results. The QA Manager will review all of the sampling and analytical data, as well as other information pertaining to quality assurance and control and this information will be included in the QA/QC section of the Trial Burn Report.

3.0 SUMMARY OF QUALITY ASSURANCE OBJECTIVES AND GOALS

In order to support the overall objectives of this project, data used to characterize the stack gas require that trained personnel conduct the sampling and analysis procedures with properly operating and calibrated equipment. The measurements obtained must meet certain criteria in order to be considered valid for use in meeting the objectives of the Trial Burn Plan. The accepted criteria may include requirements for precision, accuracy, completeness, representativeness and comparability. Additionally, the limitations of the analytical instrumentation used must be considered and the resulting method detection limits and reporting limits discussed.

3.1 Quality Assurance Objectives for Precision, Accuracy, and Completeness

Table I-3-1 depicts the goals for precision, accuracy, and completeness for the critical measurements of this program. Numerical QA objectives for accuracy and precision of the sampling system calibration, sample preparation, and analysis procedures can be established based on previous experience in applying comparable procedures to a variety of complex sample matrices.

Precision is defined as the degree of mutual agreement between individual measurements made under prescribed conditions. Precision goals have been provided for analytical measurements that will be made in replicate, or as part of matrix spiking duplicate measurements.

For some methods, such as those developed by the American Society for Testing and Materials (ASTM), precision is gauged as the repeatability of results. The values presented for these intervals, or limits, are applicable to confidence levels of 95%. That is, the calculated repeatability and reproducibility values should not exceed the limits in more than 5% of the analyses.

Repeatability is defined as the difference in absolute value between two consecutive test results, carried out on the same sample in the same laboratory, by the same operator, using the same apparatus.

Accuracy is defined as the degree of agreement of a measurement with an accepted reference or true value. The true value can be determined through either a matrix or a surrogate spike into the actual sample. The reference value can be determined through the analysis of a reference standard material.

Table I-3-1
Summary of Quality Assurance Objectives and Goals

Sample Matrix	Parameter	Analysis Method [a]	Precision	Accuracy (% Recovery)	Completeness (% of Total)
Stack Gas	Particulate Matter	EPA Method 5	N/A	N/A	100%
	HCl/Cl_2	EPA Method 26A	10% RPD	90 - 110% MS, MS DUP	100%
	Metals	EPA Method 29	± 20% RPD	75 - 125% PS, PS DUP	100%
	PCDDs/PCDFs	EPA Method 23	≤ 20% RSD	Pre-sampling adsorbent standard: 70%-130% [b] Pre-extraction filter recovery standard: 70%-130% [c] Pre-extraction standard: 20-130% [d]	100%
	Diphenylamine	SW-846 Method 8270	≤ 20% RSD	LCL for MS and MS DUP	100%
	Total Hydrocarbons (THC)	EPA Method 25A	N/A	N/A	100%
	CO	CEMS	N/A	N/A	100%
	O_2	CEMS	N/A	N/A	100%

Notes:

DUP Duplicate LCL Laboratory Control Limit MS Matrix spike
PS Post spike RPD Relative percent difference RSD Relative Standard Deviation

[a] The analytical method listed or an equivalent method will be used.

[b] If the pre-sampling adsorbent standard average percent recovery is below 70%, the sampling run is not valid, and the stack test must be repeated. The alternative described in the method may also be used to eliminate the need to repeat the stack test.

[c] If the percent recovery of all the pre-extraction filter recovery standard compounds is below 70%, samples may be reanalyzed. If the recovery criteria are still not met, the filter extraction is not valid, and the run must be repeated.

[d] This requirement is on a per sample basis. If the recovery criteria are not met, the sample may be reanalyzed and/or the archive sample may be prepared and analyzed. If the recovery criteria are still not met, the sampling run is not valid, and the stack test must be repeated.

Completeness is defined as the percentage of samples judged valid compared to the total number of samples collected. Every attempt will be made to have all generated data to be judged valid data. However, realistically, some samples may be lost in laboratory/shipping accidents and some results may be deemed questionable based on internal quality control procedures. The data quality objective for completeness has been set at 100% for all data points considered critical to the project. Any data report with less than 100% completeness will be assessed on a case-by-case basis according to the priority of the data, with the potential for a repeat of sampling and/or analysis.

Samples for which the critical data points fail accuracy or precision data quality objectives, and therefore, completeness objectives, will be thoroughly investigated to determine if the test goals have been compromised. These samples may require reanalysis to ensure that the quality objectives are met. In the event that data quality objectives specified in this QAPP cannot be met, the QA/QC section of the Trial Burn Report will include a discussion on why the objectives could not be met, as well as an explanation on how the validity of the data was verified.

Evaluation of the precision and accuracy of the analytical program will be completed by examining results from the analysis of internal and calibration check standards, surrogate compounds, and laboratory, reagent and method blanks, as well as field and trip blanks. Additionally, results from the analysis of matrix or surrogate spike samples will be used in the evaluation.

3.2 Representativeness and Comparability

The usefulness of the data is also contingent upon meeting the criteria for representativeness and comparability. Whenever possible, reference methods and standard sampling procedures will be used. The QA objective is that all measurements be representative of the media and process being evaluated. For example, each of the stack gas samples will represent the average composition of the stack gas during each test run that the sample is collected.

The corresponding QA objective is that all data resulting from sampling and analysis be comparable with other representative measurements made by ESD or a contracted organization on this or a similar process operating under similar conditions. The use of published sampling and analytical methods, as well as standard reporting units, ensures the comparability of the data. All data will be reported in terms of mass of analyte per unit volume of sample matrix. Results from the analyses of all samples for a given matrix will be reported in the same units.

3.3 Method Detection and Quantitation Limits

Each laboratory in this test program may encounter measurements that are below detection or quantitation. The method detection limit (MDL) for these parameters or analytes will be determined by each laboratory on a periodic basis using the statistical procedures given in 40 CFR 136, Appendix B. No attempt will be made in this program to develop MDLs or reporting limits specific to this test program. Analytical reporting will generally follow the standard convention of using data qualifiers to indicate situations such as whether an analyte was found in the blank as well as in the sample (e.g., B) or the analyte was positively identified but the concentration is estimated (e.g., J). The method detection limit and reporting limits provided by the analytical laboratory will be noted in the analytical laboratory reports, along with the data qualifier "U" (or other specified qualifier), when the analyte was not detected. All data qualifiers utilized will be fully explained in the analytical reports.

4.0 SAMPLING PROCEDURES

The following subsections provide descriptions and methodologies of the sampling techniques to be employed during this Trial Burn. Deviations from the specified methodologies will be discussed with on-site regulatory personnel and fully documented in the Trial Burn Report.

4.1 Field Quality Control Samples

For stack gas samples, the number of reagent or field blanks per applicable parameter will be collected as specified in Section 4.5.

4.2 Pre-sampling Activities

Pre-sampling activities include equipment calibration, sample media preparation, pre-cleaning of sample train glassware, and other miscellaneous tasks, which are described or referenced in the following subsections. Other pre-sampling activities include such details as team meetings, equipment preparation, equipment setup, and finalization of details before initiation of the sampling program.

4.2.1 Equipment Calibration

The inspection and calibration of sampling equipment is an important step in assuring the successful completion of the field effort. Equipment is inspected for proper operation and durability before calibration. Calibrations will be performed before the field sampling effort. Detailed information on specific calibration procedures for sampling equipment is provided in Section 6.0.

4.2.2 Glassware Preparation

Sample train glassware and sample containers will require specialized cleaning to avoid contamination of the sample from the collection container or devices. Sample containers will be pre-cleaned to specified EPA protocols. Cleaning procedures for each of the sampling train's glassware are summarized in the procedural descriptions in Section 4.3 and are described in detail in the applicable method.

4.2.3 Sample Media Preparation

All sample reagents will be checked to minimize the probability of using contaminated reagents. This includes the use of reagents from the same lot and the collection and analysis of appropriate blanks. All filters for the particulate trains will be desiccated at 20 ± 5.6 °C and weighed to the nearest 0.1 mg. Preparations of other sampling media are summarized in the procedural descriptions in Section 4.3 and are described in detail in the applicable method.

4.2.4 Other Pre-sampling Activities

Sample team meetings are held to designate responsibilities to each team member. Assignments are based on individual experience and relative importance to the assigned task. Many team members have participated in similar projects. Other pre-sampling activities may include the generation of sample lists, printing of computer generated sample labels, procurement of supplies, and proper packing of all equipment.

Site setup is the final pre-sampling activity. This task involves moving the sampling equipment to the vicinity of the sample collection area. All sample trains will be assembled and recovered in a clean area designated for sample recovery.

Before sampling starts, preliminary measurements are made at the stack locations to determine flue gas moisture, velocity, and absence of cyclonic flow. These measurements facilitate the determination of nozzle size selection and operation rates for isokinetic trains.

4.3 Exhaust Gas Sample Collection

The collection of stack gas samples will be conducted according to the methods listed in Table I-4-1. A brief summary of each of the methods follows. Information on sample container type and volume requirements, as well as additional sample handling and preservation information is presented in Section 5.0.

4.3.1 Sampling Point Determination – EPA Method 1

The location of the traverse points in the stack will be determined according to the procedures outlined in EPA Method 1.

During preliminary sampling, a cyclonic flow check will be conducted. Sampling will not occur at the sampling point if the check does not meet method requirements until the flow pattern has been changed. Another cyclonic flow check will be done to confirm the effectiveness of the change.

4.3.2 Flue Gas Velocity and Volumetric Flow Rate – EPA Method 2

The flue gas velocity and volumetric flow rate will be determined according to the procedures outlined in EPA Method 2. Velocity measurements will be made using Type S pitot tubes, conforming to the geometric specifications outlined in the method. Each pitot tube is calibrated

Table I-4-1
Stack Gas Sampling and Analytical Procedures Summary

Sampling Method [a]	**Number of Sampling Runs**	**Sampling Time per Run**	**Analytical Parameters**	Analytical Method [a]
EPA Method 1	1	N/A	Sampling and Traverse Point Locations	EPA Method 1
EPA Method 2	See note b	Continuous	Volumetric Flowrate	EPA Method 2
EPA Method 3A	See note b	Continuous	Molecular Weight	EPA Method 3A
EPA Method 4	See note b	Continuous	Moisture	EPA Method 4
EPA Method 5/26A	3	2 hours	Particulate Matter	EPA Method 5
			HCl/Cl_2	EPA Method 26A
EPA Method 29	3	2 hours	SVM (Cd, Pb, Se) LVM (As, Be, Cr, Sb, Co, Mn, Ni)	EPA Method 29
EPA Method 23	3	3 hours **AND** a minimum sample volume of 2.5 dscm	PCDD/PCDF [c]	EPA Method 23
SW-846 Method 0010	3	3 hours **AND** a minimum sample volume of 3 dscm (105.9 dscf)	POHC (Diphenylamine)	SW-846 Method 8270
EPA Method 25A	3	3 hours (concurrent with SW-846 Method 0010)	Total Hydrocarbons (THC)	EPA Method 25A
Installed CEMS: Performance Specification 4B	3	Continuous	Oxygen (O_2)	O_2 CEMS PS-4B
			Carbon Monoxide (CO)	CO CEMS PS-4B

Notes:
[a] Methods are from 40 CFR §60 Appendix A or US EPA SW-846. The method listed, or an equivalent method, will be used during the test.
[b] Methods 2, 3A, and 4 are performed as part of the other isokinetic sampling methods.
[c] Per 40 CFR §63.1208(b)(1)(iii), ESD may assume that nondetects are present at zero concentration.

and a specific calibration coefficient is calculated. Differential pressures will be measured with fluid manometers of the appropriate range. Effluent gas temperatures will be measured with chromel-alumel thermocouples equipped with a digital temperature indicator.

4.3.3 Flue Gas Composition and Molecular Weight – EPA Method 3A

EPA Method 3A will be used to determine the oxygen and carbon dioxide concentrations in the flue gas stream. Using this method, a gas sample is extracted from the stack at a constant rate for determination of O_2, CO_2 and molecular weight. A continuous instrumental analyzer will be used for analysis of the sample. This sample will be collected continuously during each run throughout the test. Alternatively, one integrated bag sample may be collected in a Tedlar® bag for each set of concurrent sampling trains for each test run using the procedures in Method 3A. An instrumental analyzer will be used to determine the oxygen and carbon dioxide concentration of the sample. The nitrogen concentration will be determined by difference, and the three concentrations will be used to calculate the dry gas molecular weight.

4.3.4 Flue Gas Moisture Content – EPA Method 4

The flue gas moisture content will be determined in conjunction with each isokinetic EPA Method 5-type train according to the procedures outlined in EPA Method 4. The impingers will be connected in series and will contain the reagents necessary for the train. The impingers will be surrounded by an ice bath to ensure condensation of the moisture in the flue gas stream. Any moisture that is not condensed in the impingers is captured in the silica gel. For determination of total moisture in the stack gas, the moisture condensed in the impingers and captured in the silica gel will be weighed, summed, and entered into moisture content calculations.

4.3.5 Particulate Matter and Hydrogen Chloride/Chlorine –Combined EPA Methods 5 and 26A

The sampling and analytical procedures outlined in Methods 5 and 26A will be utilized to collect samples for determination of PM and HCl/Cl_2 concentrations in the exhaust gases. Using this method, gaseous and particulate pollutants are withdrawn from the sampling port at an isokinetic sampling rate, and are collected in an optional cyclone, on a filter, and in absorbing solutions. The Teflon mat or quartz-fiber filter collects particulate matter, other than liquid droplets, including chloride salts. The acidic and alkaline absorbing solutions are used to collect gaseous HCl and Cl_2, respectively.

A diagram of the sampling train, which is adapted from the EPA Method 5 procedures, is presented in Figure I-4-2. In addition to those components included in the EPA Method 5 train, the Method 26A train includes a required glass nozzle and probe, a Teflon union, a quartz-fiber

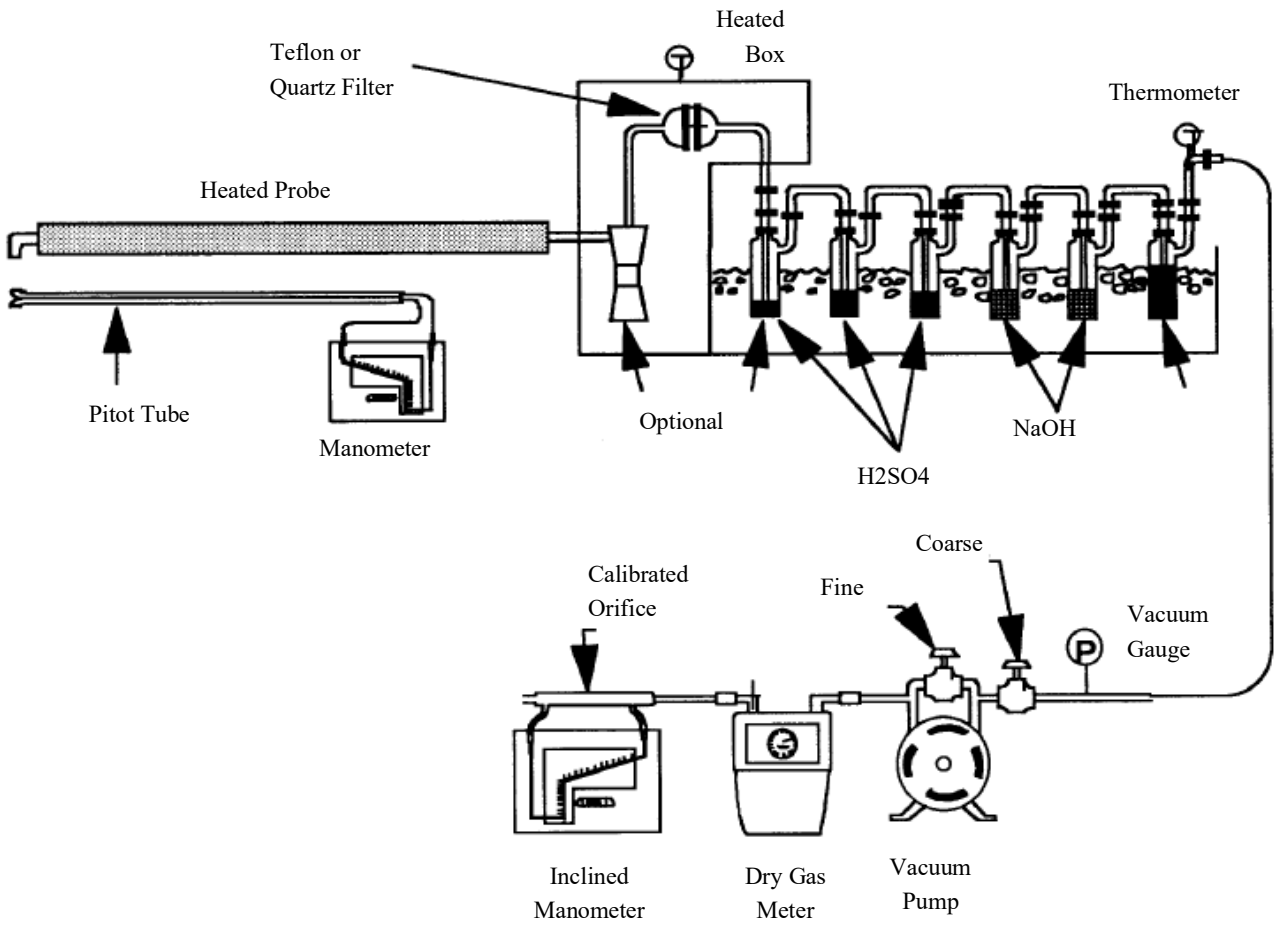

Figure I-4-2
Diagram of Methods 5 and 26A Sampling Train

or Teflon mat filter, a Teflon frit, and acid and alkaline absorbing solutions. The following provides a description of the sample extraction and filter system.

- Probe Nozzle: Glass
- Probe Liner: Borosilicate or quartz glass tubing with a heating system. The heating system will be capable of maintaining the gas temperature at 120 ± 14 °C
- Pitot Tube: Type S (Meeting specifications of EPA Method 2)
- Cyclone: Optional, Glass
- Filter Holder: Borosilicate glass with a Teflon frit filter support and a sealing gasket (The sealing gasket will be made of Teflon)
- Filter Heating System: Designed to maintain a temperature of 120 ± 14 °C around the filter holder and cyclone during sampling

Following the sample extraction and filter system, the impinger train is used to determine stack gas moisture content, and to collect HCl/Cl_2. This impinger train will consist of five or six impingers, connected in series. The first impinger, if included, is used as a knockout trap. It will be similar in design to the alkaline impingers, except for a shorter stem length, and will contain 50 mL of 0.1 N H_2SO_4. The second and third impingers, referred to as the acid impingers, will each contain 100 mL of 0.1 N H_2SO_4. These impingers will be of Greenburg-Smith design with the standard tip. The fourth and fifth impingers, referred to as the alkaline impingers, will each contain 100 mL of 0.1 N NaOH. The final impinger will contain the silica gel. The fourth, fifth and six impingers will be of the Greenburg-Smith design with a modified tip.

To ensure proper operation of the sampling train, both pre-test and post-test leak checks will be conducted. Additionally, a leak test will be conducted during the run if a component change becomes necessary as described below. The leakage rates for all leak checks will not exceed 4% of the average sampling rate, or 0.02 cfm, whichever is less. Should a pre-test leak check not meet these specifications, the leak check will be stopped, the problem determined, and the leak test restarted. Should a leak check during the run not meet the specifications, the run will be stopped and voided. If the post-test leak check exceeds the specifications above, one of two options will be employed: a) the leakage rate will be recorded, the sample volume corrected, and the reliability of the data will be questioned, or b) the sampling run will be voided.

During the sampling run, the sample train will be operated in accordance with the procedures and specifications outlined in Method 5 and 26A, except as noted. Special attention will be given to the following operating specifications:

- The temperature around the filter will be maintained at a temperature of 120 ± 14 °C.
- The temperature at the condenser/silica gel outlet will be maintained less than 20 °C.
- An isokinetic sampling rate within 90 – 110% will be maintained.

Immediately following completion of the sampling run, the nozzle end of the sampling probe will be sealed with cleaned aluminum foil and disconnected from the filter holder. Once the probe has cooled enough to be handled, any excess particulate matter will be wiped from the tip of the probe, and both ends of the probe will be capped with cleaned aluminum foil. Additionally, all openings on the filter holder, transfer line, and impinger train will be disconnected and sealed.

For recovery of the train, the probe, filter, and the impinger/condenser assembly will be transferred to a cleanup area free from uncontrolled dust and protected from the weather to minimize sample contamination or loss. Portions of all washing solutions used for cleanup and for the absorbing reagents will be saved and will be treated as blanks. Recovery procedures will follow those outlined in the method and shown in Figure I-4-3. Five sample containers, outlined below, will be created during the recovery process.

- Container 1: Filter catch for particulate determination
- Container 2: Front half rinse for particulate determination
- Container 3: Knockout and acid impinger catch for moisture and HCl determination
- Container 4: Alkaline impinger catch for Cl_2 and moisture determination
- Container 5: Silica gel for moisture determination

It should be noted that Method 26A requires the addition of sodium thiosulfate to the caustic impinger contents after sampling is complete in order to reduce any hypochlorite ion (OCl^-) to the chloride ion (Cl^-) for analysis. The sodium thiosulfate may be added at the laboratory in order to avoid adding too much, which can cause analytical interferences.

4.3.6 Multiple Metals – EPA Method 29

The sampling and analytical procedures outlined in Method 29 will be utilized to collect samples for determination of multiple metals. Using this method, stack gas emissions are withdrawn from

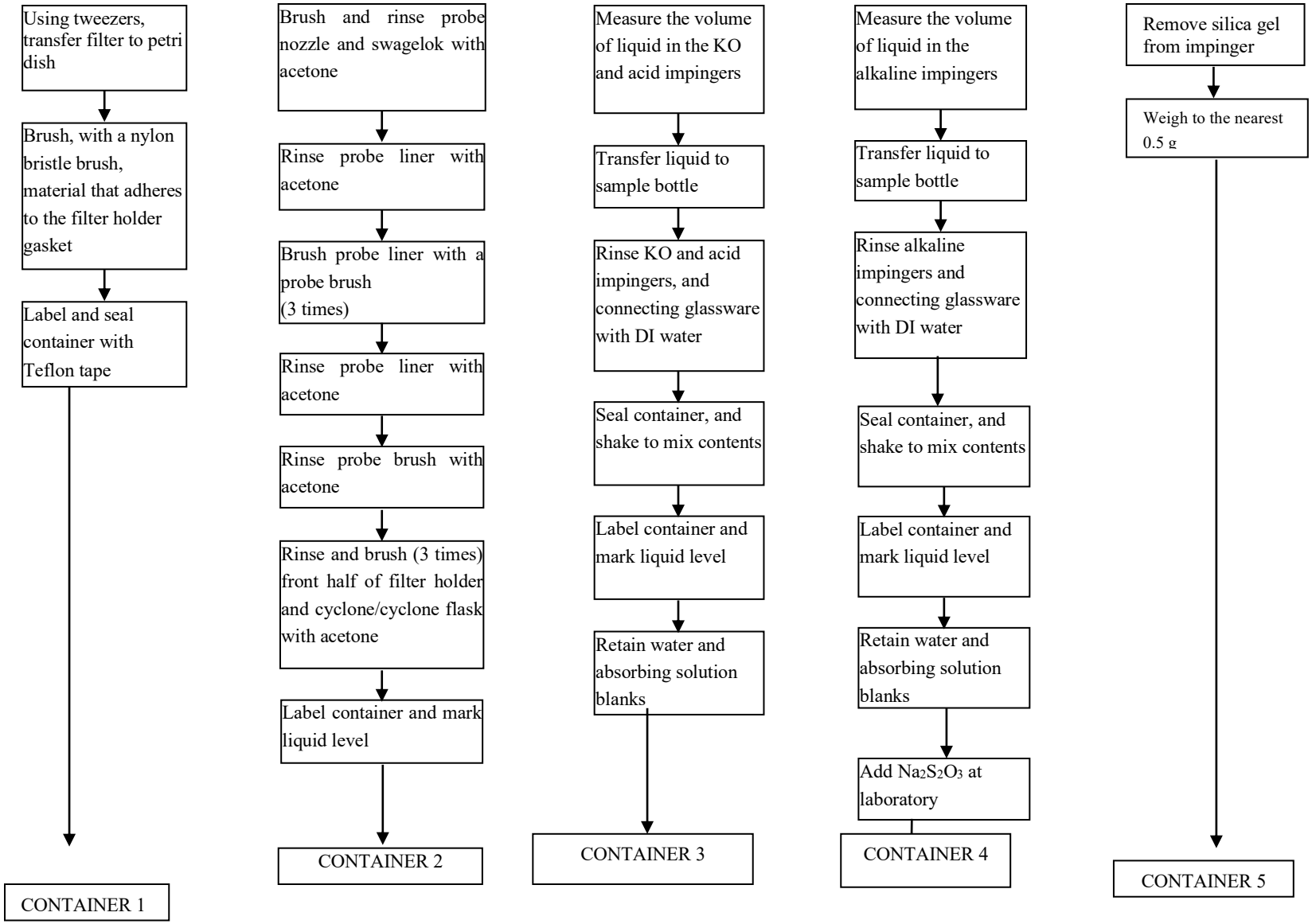

Figure I-4-3
Diagram of Methods 5 and 26A Recovery Procedure

the sampling port at an isokinetic sampling rate and are collected in a multi-component sampling train that consists of a heated filter and a series of chilled impingers.

A diagram of the sampling train, which is adapted from the EPA Method 5 procedures, is presented in Figure I-4-4. The following provides a description of the sample extraction system.

- Probe Nozzle: Glass
- Probe Liner: Borosilicate or quartz-glass tubing with a heating system
- Pitot Tube: Type S (Meeting specifications of EPA Method 2)
- Filter: Quartz or glass fiber filters without organic binders
- Filter Holder: Borosilicate glass with a Teflon frit filter support
- Filter Heating System: Designed to maintain a temperature of 120 ± 14 °C around the filter holder during sampling

The actual condensation and collection of gaseous metals and determination of moisture content occur using a series of three to seven impingers. The first impinger, which is optional, is empty and is used as a moisture knockout impinger. The second and third impingers will contain 100 mL of nitric acid/hydrogen peroxide solution. When analyzing for mercury, this sampling train would contain three more impingers. The fourth impinger would function as another knockout impinger. The fifth and sixth impingers would typically contain 100 mL of acidic potassium permanganate solution. However, since mercury determination is not required in this test plan, these impingers will be eliminated. The final impinger will contain a known quantity of silica gel, or equivalent desiccant.

To ensure proper operation of the sampling train, both pre-test and post-test leak checks will be conducted. Additionally, a leak test will be conducted during the run if a component change becomes necessary. The leakage rates for all leak checks will not exceed 4% of the average sampling rate, or 0.02 cfm, whichever is less. Should a pre-test leak check not meet these specifications, the leak check will be stopped, the problem determined, and the leak test restarted. Should a leak check during the run not meet the specifications, the run will be stopped and voided. If the post-test leak check exceeds the specifications above, one of two options will be employed: a) the leakage rate will be recorded, the sample volume corrected, and the reliability of the data will be questioned, or b) the sampling run will be voided.

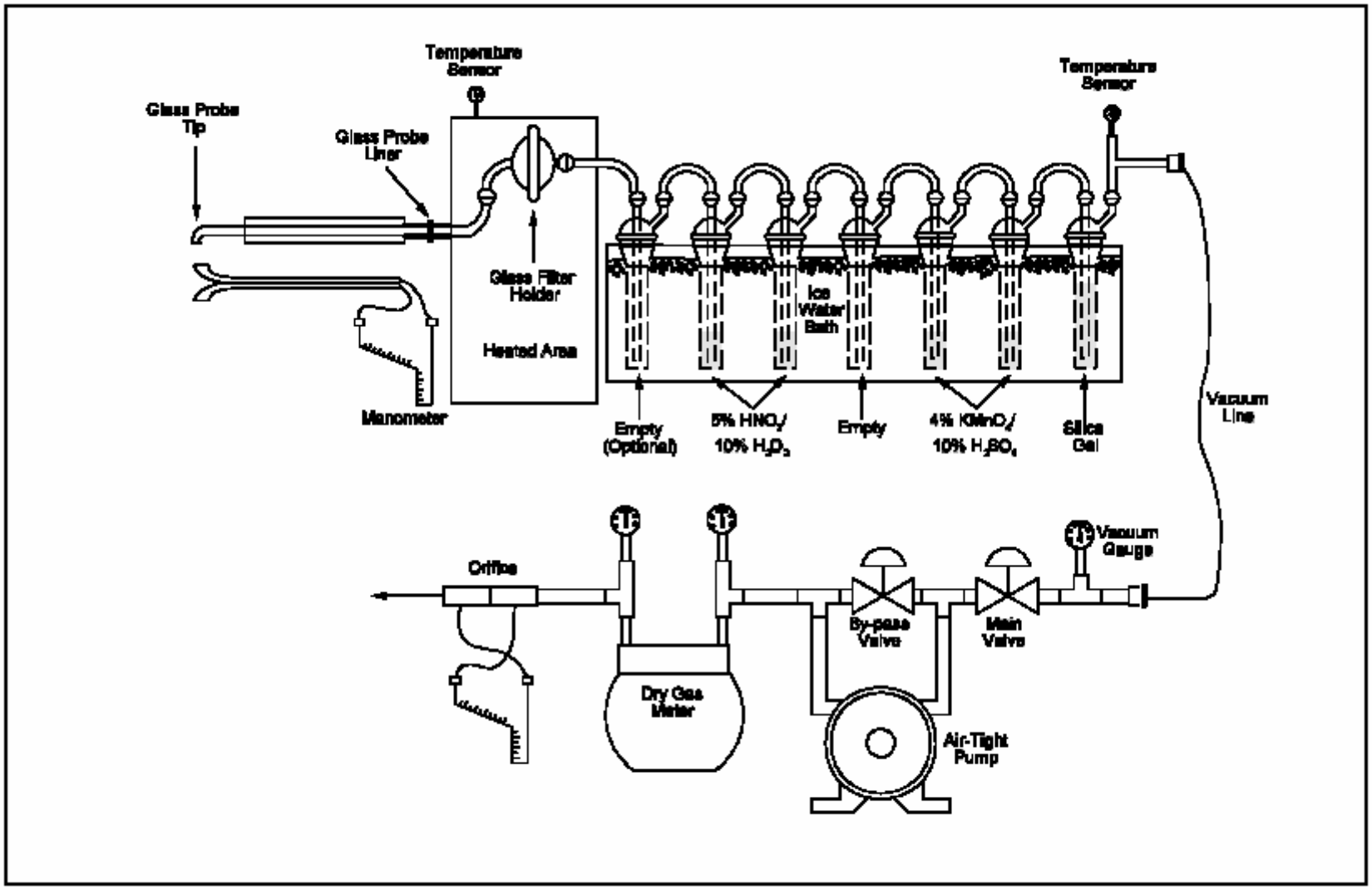

Figure I-4-4
Diagram of Method 29 Sampling Train

During the sampling run, the sample train will be operated in accordance with the procedures and specifications outlined in Method 29. Special attention will be given to the following operating specifications:

- The temperature around the filter holder will be maintained at a temperature of 120 ± 14 °C.
- The condenser/silica gel outlet temperature will never exceed 20 °C.
- An isokinetic sampling rate within 90 – 110% will be maintained.

Immediately following completion of the sampling run, the nozzle end of the sampling probe will be sealed with cleaned aluminum foil and disconnected from the filter holder. Once the probe has cooled enough to be handled, any excess particulate matter will be wiped from the tip of the probe, and both ends of the probe will be capped with cleaned aluminum foil. Additionally, all openings on the filter holder, transfer line, condenser, sorbent trap, and impinger train will be disconnected and sealed.

For recovery, the entire sampling train will be transferred to a cleanup area free from uncontrolled dust and protected from the weather to minimize sample contamination or loss. Recovery procedures will follow those outlined in the method and shown in Figure I-4-5. The sample containers outlined below will be created during the recovery process.

- Container 1: Filter
- Container 2: *Not used – only for particulate determination*
- Container 3: Probe rinse
- Container 4: Contents and rinses of Impingers 1 through 3 (HNO_3/H_2O_2 impingers and moisture knockout Impinger)
- Container 5A: *Not used – only for mercury determination*
- Container 5B: *Not used – only for mercury determination*
- Container 5C: *Not used – only for mercury determination*
- Container 6: Silica gel

4.3.7 Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans – EPA Method 23

The sampling and analytical procedures outlined in US EPA Method 23 will be utilized to collect samples for determination of selected polychlorinated dibenzo-*p*-dioxin and polychlorinated dibenzofuran (PCDD/PCDF) concentrations.

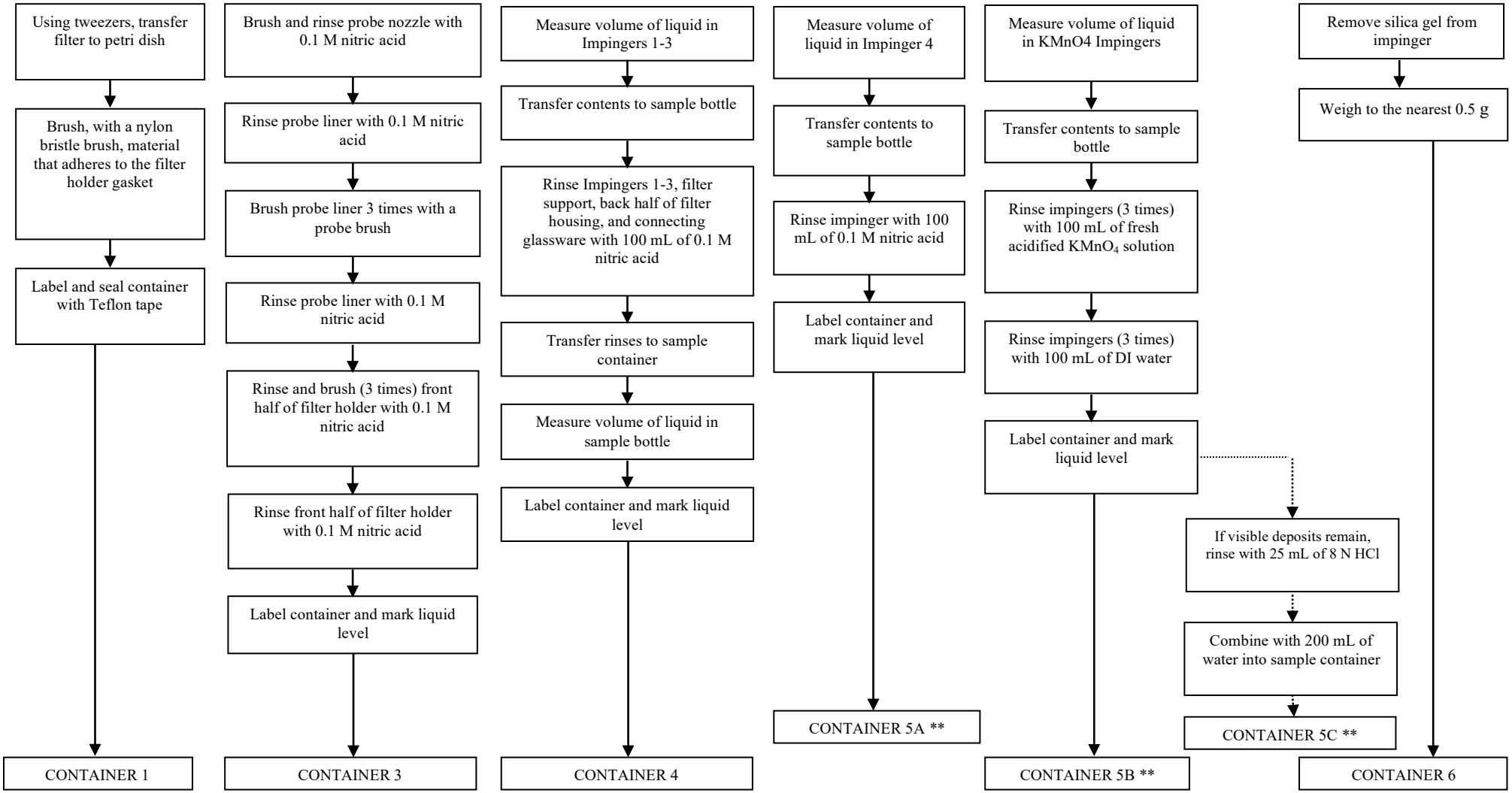

Figure I-4-5

Diagram of Method 29 Recovery Procedures

***Containers 5A, 5B, and 5C are not used during this test. They are only used for mercury determination.*

Using this method, stack gas emissions are withdrawn from the sampling port at an isokinetic sampling rate and are collected in a multicomponent sampling train that consists of front half, glassware surfaces, the glass fiber filter, adsorbent resin module (XAD-2 resin), and the back half glassware surfaces.

A diagram of the Method 23 sampling train, which is adapted from the EPA Method 5 procedures, is presented in Figure I-4-6. In addition to those components included in the EPA Method 5 train the Method 23 train includes a condenser, XAD-2 adsorbent module, and connecting glassware. The following provides a description of the sampling extraction system components:

- Nozzle: Quartz, borosilicate glass, or titanium
- Probe Liner: Polytetrafluoroethylene (PTFE), borosilicate or quartz glass liners with a heating system capable of maintaining a probe gas temperature of 120 ± 14 °C during sampling
- Filter Holder: borosilicate glass with a PTFE frit or PTFE-coated wire filter support
- Filter Heating System: Capable of monitoring and maintaining probe gas temperatures around the filter to ensure that the sample gas temperature exiting the filter is 120 ± 14 °C during sampling
- Filter Temperature Sensor: Capable of measuring temperature to within ±3 °C so that the sensing tip protrudes at least 1.3 centimeters (cm) (into the sample gas exiting the filter.
- Sample Transfer Line: Must be heat traced and constructed of glass or PTFE with connecting fittings that form leak-free, vacuum-tight connections without using sealing greases or tapes. Maintain the lines at a temperature of 120 °C ± 14 °C.
- Condenser: Glass, water-jacketed, coil-type with compatible fittings.
- Adsorbent Module: Use a water-jacketed glass container to hold up to 40 grams (g) of the solid adsorbent. The adsorbent module will be oriented vertically to facilitate condensate drainage. The connecting fittings must form leak-free, vacuum-tight seals. Include a coarse glass frit in the adsorbent module to retain the adsorbent.
- Water Circulating Bath: Bath pump circulating system capable of providing chilled water flow to the condenser and adsorbent module water jackets. Maintain temperature <20 °C.
- Impingers: Five impingers connected in series with leak-free noncontaminating fittings.
  - Impinger 1: empty; short-stem (water-dropout) impinger, or equivalent
  - Impinger 2: contains 100 mL of reagent water; Greenburg-Smith design, modified by replacing the tip with a 1.3 cm (1/2 in.) inside diameter (ID) glass tube extending to approximately 1.3 cm (1/2 in.) from the bottom of the flask tip

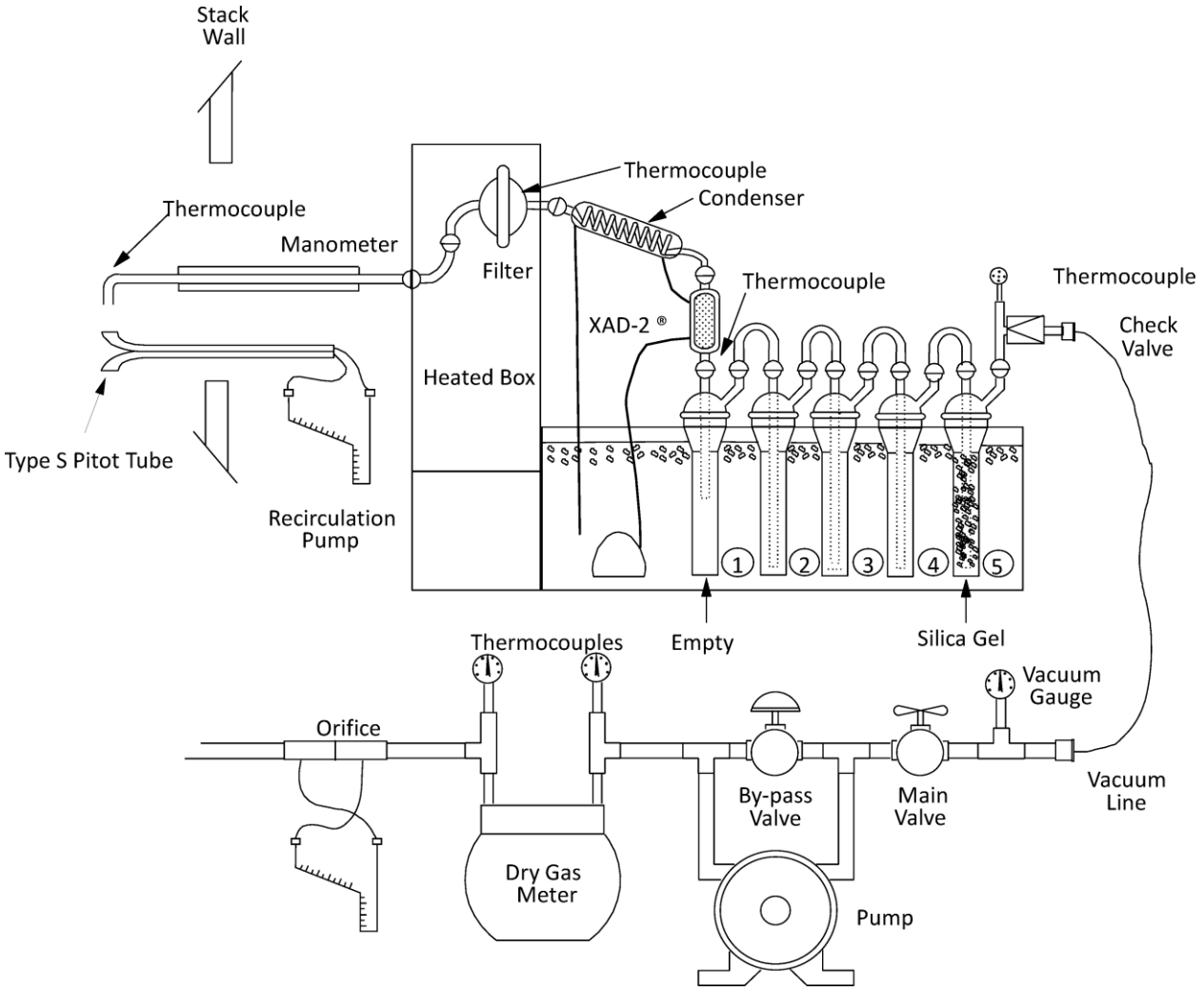

Figure I-4-6
Diagram of Method 23 Sampling Train

- Impinger 3: contains 100 mL of reagent water; Greenburg-Smith design with the standard
- Impinger 4: empty; modified as described for the second impinger
- Impinger 5: contains 200 g or more of silica gel; modified as described for the second impinger

Additional components of the sampling train include: a water circulating bath, a pitot tube, a differential pressure gauge, a metering system, a barometer, and gas density determination equipment. All these components will be designed and configured in accordance with the specifications outlined in EPA Method 23.

To ensure proper operation of the sampling train, a pre-test leak check is recommended, and post-test leak checks are required. Additionally, a leak test will be conducted during the run if a component change becomes necessary. The leakage rates for all leak checks will not exceed 4% of the average sampling rate, or 0.02 cfm, whichever is less. Should a pre-test leak check not meet these specifications, the leak check will be stopped, the problem determined, and the leak test restarted. Should either a leak check during the run or following the run not meet the specifications, one of two options will be employed: a) the leakage rate will be recorded, the sample volume corrected, and the reliability of the data will be questioned, or b) the sampling run will be voided.

During the sampling run, the sample train will be operated in accordance with the procedures and specifications outlined in EPA Method 23. Special attention will be given to the following operating specifications:

- The temperature around the probe, the filter, and the sample transfer line should be maintained at 120 ± 14 °C during sampling.
- The temperature around the impingers should be maintained to keep the adsorbent module entrance and the silica gel exit temperature below 20 °C.
- An isokinetic sampling rate within 90 – 110% will be maintained.
- The filter vacuum will be monitored, and the filter will be changed if the filter vacuum is too high.

Immediately following completion of the sampling run, the nozzle end of the sampling probe will be sealed with cleaned aluminum foil or PTFE tape and disconnected from the filter holder. Once the probe has cooled enough to be handled, any excess particulate matter will be wiped from the tip of the probe, and both ends of the probe will be closed off with cleaned aluminum

foil or PTFE tape. Additionally, all openings on the filter holder, transfer line, condenser, adsorbent module, and impinger train will be disconnected and sealed. For recovery of the train, all train components will be transferred to a cleanup area free from uncontrolled dust and protected from the weather to minimize sample contamination or loss. The recovery procedure is presented in Figure I-4-7.

Additionally, the adsorbent module, impingers, and silica gel impinger will be weighed to within ±0.5 g using the field balance and the weights will be recorded. The liquid, unless determined otherwise, will be discarded and not placed in a separate container. The color of the silica gel and its condition will also be noted on the field data sheet. Analysis of the silica gel is not necessary.

At least one complete field train proof blank (field blank) will be submitted with the Method 23 samples. This field blank will include one complete sampling train, the sample bottles containing aliquots of sample recovery solvents, unused filters, and resin cartridges. The field blank sampling train will be assembled in the field staging area, taken to the sampling area, and leak-checked for the same total number of times as the actual Method 23 sampling train. During the test, the filter housing and probe of the blank train will be heated, and following the test, the blank train will be recovered as if it were an actual test sample. By definition, no gaseous sample will actually be passed through the sampling train.

4.3.8 Diphenylamine (POHC) – SW-846 Method 0010

EPA SW-846 Method 0010 will be used to collect stack gas samples for the analysis of diphenylamine (the selected POHC for the test). Using this method, gaseous and particulate pollutants are isokinetically withdrawn from the stack gas and are collected in a multi-component sampling train.

A diagram of the SW-846 Method 0010 sampling train, which is adapted from the EPA Method 5 procedures, is presented in Figure I-4-8. Organic-laden particulate materials are collected on a high-efficiency glass or quartz-fiber filter, and semi-volatile organic species are collected on a packed bed of porous polymeric adsorbent resin. This train will be operated for a minimum of 3 hours to ensure collection of the minimum amount of gas required to obtain the analyte.

In addition to those components included in the EPA Method 5 train, the SW-846 Method 0010 sampling train includes a condenser coil and a sorbent module. The following provides a description of the sampling extraction system components:

- Probe Nozzle: Stainless steel or glass

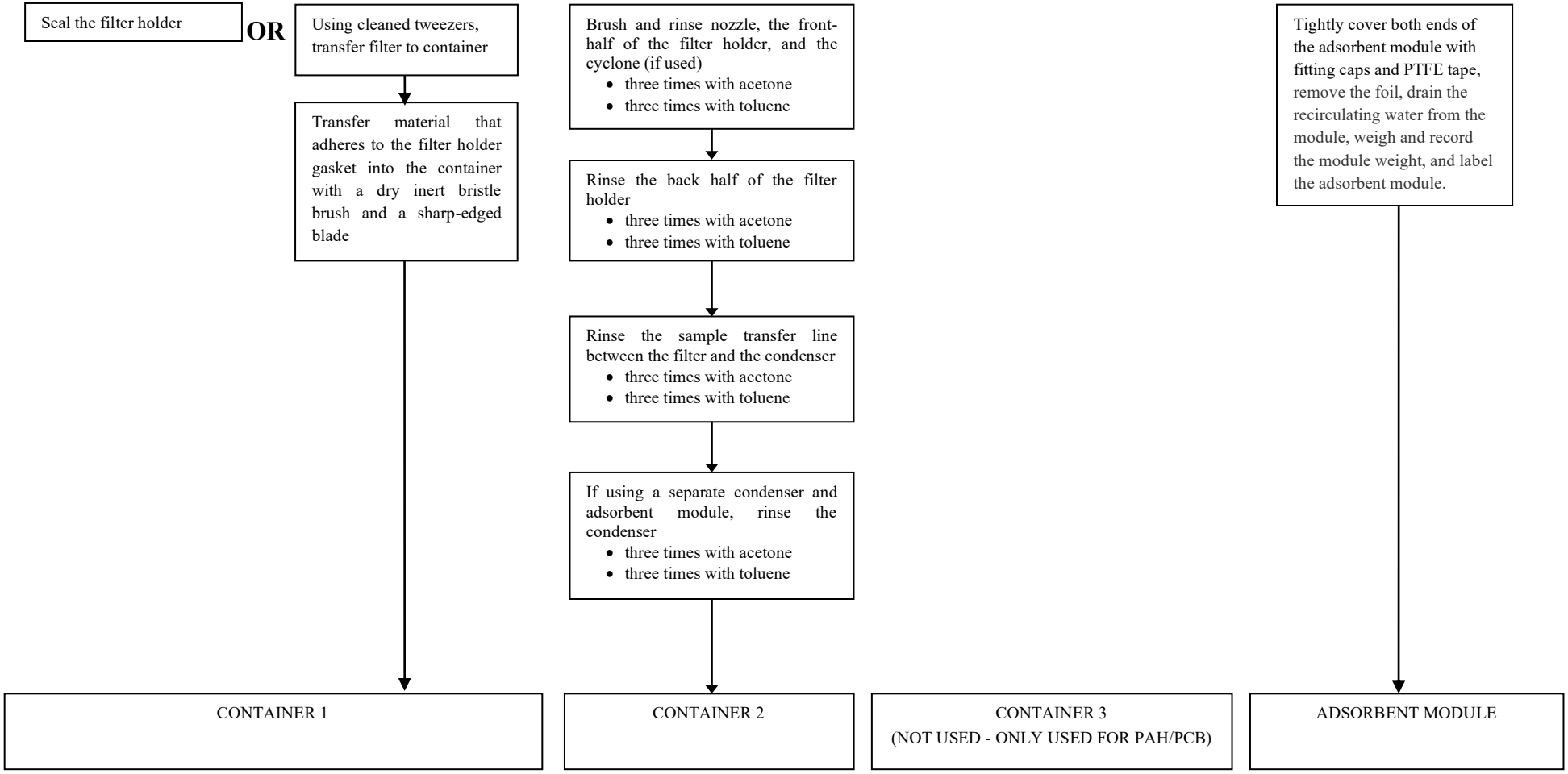

Figure I-4-7
Diagram of Method 23 Recovery Procedures

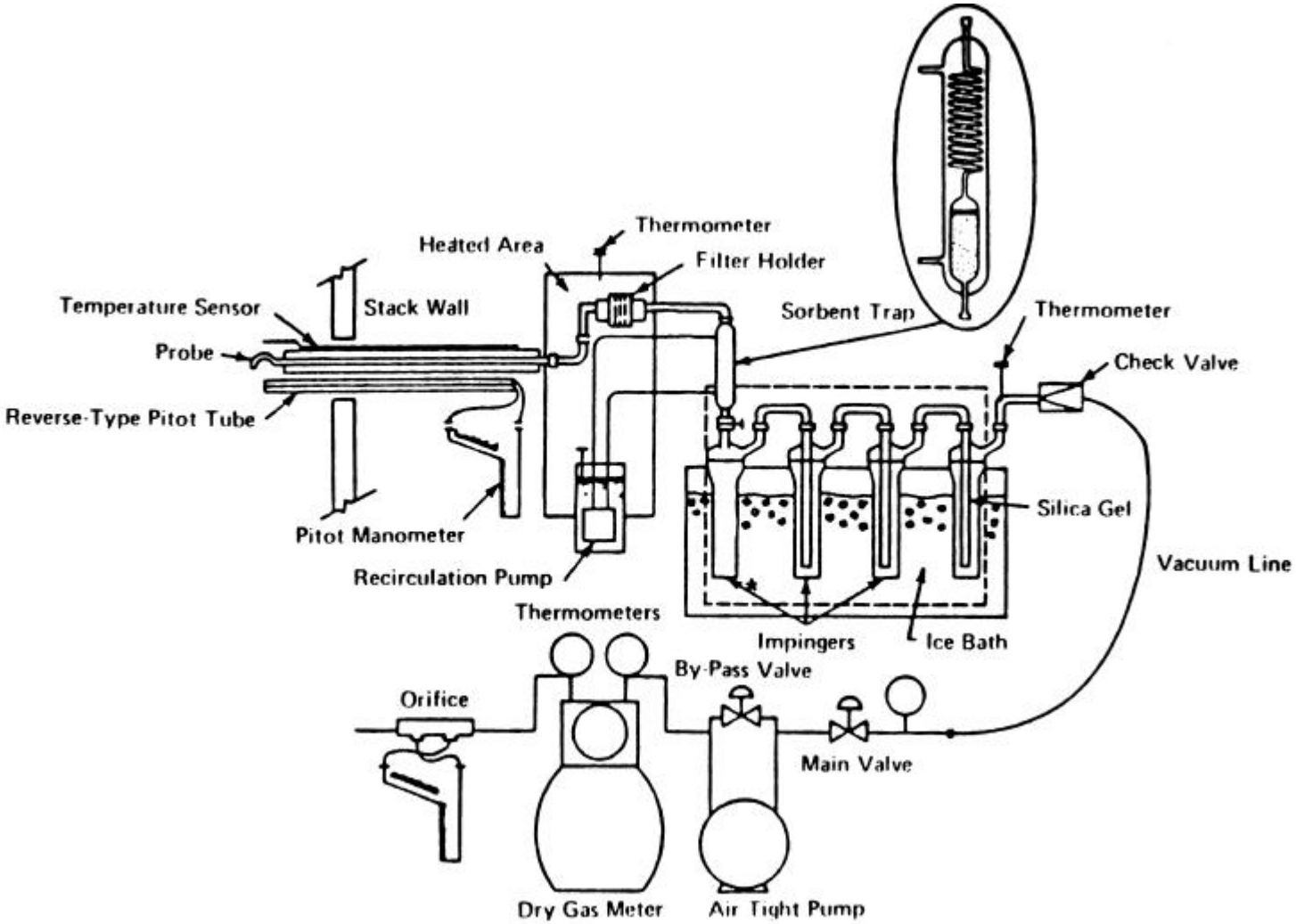

Figure I-4-8
Diagram of SW-846 Method 0010 Sampling Train

- Probe Liner: Borosilicate or quartz tubing with a heating system capable of maintaining a probe gas temperature of 120 ± 14 °C at the exit during sampling
- Pitot Tube: Type S
- Differential pressure gauge
- Filter Holder: borosilicate glass with a glass frit filter support and a sealing gasket
- Filter Heating System: Capable of monitoring and maintaining a temperature of 120 ± 14 °C around the filter holder during sampling
- Organic Sampling Module: This module consists of the following three sections: gas-conditioning section, a sorbent trap, and a condensate knockout trap.
- Impingers Train: Four impingers connected in series with leak-free ground-glass joints.
    - Impinger 1: Greenburg-Smith design, modified by replacing the tip with a 1.3 cm (1/2 in.) inside diameter (ID) glass tube extending to approximately 1.3 cm (1/2 in.) from the bottom of the outer cylinder; contains 100 mL of water
    - Impinger 2: Greenburg-Smith design with the standard tip; contains 100 mL of water
    - Impinger 3: modified as described for the first impinger; empty or charged with a caustic solution (if the stack contains HCl)
    - Impinger 4: modified as described for the first impinger; contains 200-300 g of silica gel or equivalent dessicant
- Metering System: vacuum gauge, leak-free pump, thermometers, dry-gas meter
- Barometer (or a reading from a nearby National Weather Service station can be used)
- Gas Density Determination Equipment: Temperature sensor and pressure gauge and gas analyzer

All these components will be designed and configured in accordance with the specifications outlined in SW-846 Method 0010.

During each run, the sampling train will be assembled and leak checked before sampling commences. To ensure proper operation of the sampling train, both a pre-test leak check and a post-test leak check are required. Additionally, a leak test will be conducted during the run if a component change becomes necessary. The leakage rates for all leak checks will not exceed 4% of the average sampling rate, or 0.02 cfm, whichever is less. Should a pre-test leak check not meet these specifications, the leak check will be stopped, the problem determined, and the leak test restarted. Should either a leak check during the run or following the run not meet the specifications, one of two options will be employed: a) the leakage rate will be recorded, the sample volume corrected, and the reliability of the data will be questioned, or b) the sampling run will be voided.

For recovery of the train, all train components will be transferred to a cleanup area free from uncontrolled dust and protected from the weather to minimize sample contamination or loss. The recovery procedure is presented in Figure I-4-9.

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

4.3.9 Total Hydrocarbons – EPA Method 25A

A continuous emissions monitor will be used to measure exhaust gas concentrations of total hydrocarbons (THC), according to EPA Method 25A. Using this method, a gas sample is extracted through a heated sample line to a flame ionization analyzer (FIA). Results from this analysis are reported as volume concentration equivalents of propane. The THC measurement is performed on a wet basis and will therefore be corrected for moisture to obtain the THC measurement on a dry basis. The THC measurement will also be corrected to 7% oxygen. The monitor will operate continuously throughout the duration of each test run.

4.3.10 Continuous Emission Monitoring System (CEMS)

Sampling for the CO and O_2 measurement will be obtained from the permanently installed carbon monoxide and oxygen CEMS and is performed on a dry basis and corrected to 7% oxygen. This system is described in Section 3.7 of the Trial Burn Plan. A Relative Accuracy Test Audit (RATA) of the CEMS will be conducted in conjunction with the Trial Burn.

4.4 Process and Spiking Materials

As discussed in the Trial Burn Plan, ESD will not rely on sampling and analysis to characterize the materials used during the Trial Burn. ESD will use information from the manufacturer to determine the composition of the process feeds.

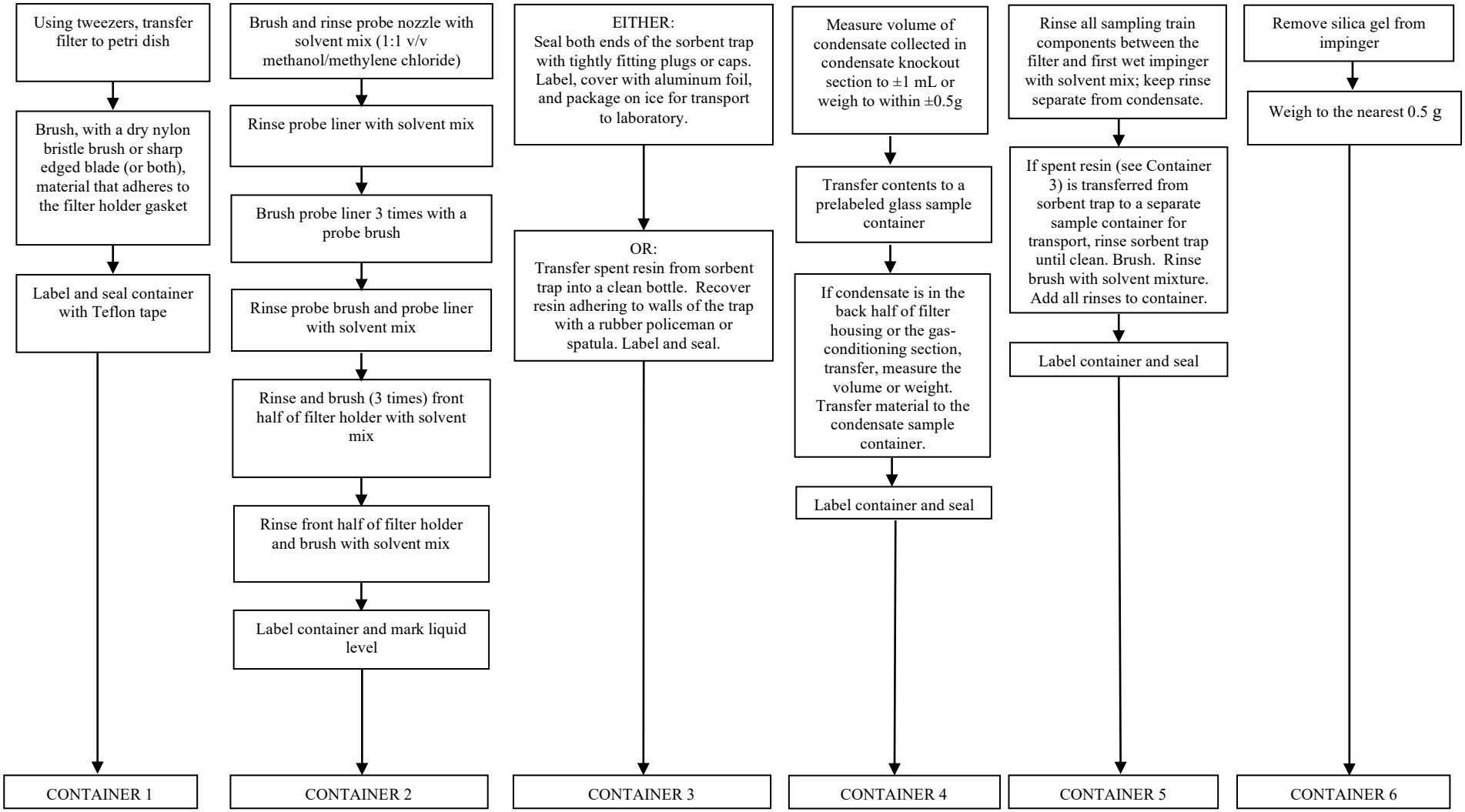

Figure I-4-9
Diagram of SW-846 Method 0010 Recovery Procedures

The spiking materials will not be sampled and analyzed during the Trial Burn. These will be pure materials purchased for testing. The suppliers will certify the spiking materials composition.

4.5 Total Samples for Testing

Table I-4-2 lists the total number of samples that will be collected and analyzed.

Table I-4-2
Number of Stack Samples Generated

Sampling Train	Containers	Test Run			Field Blank	Reagent Blank	Total
		1	2	3			
Method 5/26A	C1 – filter	1	1	1	-	-	3
	C2 – acetone probe wash and reagent blank	1	1	1	-	1	4
	C3 – acid impingers & C6 – reagent blank	1	1	1	-	1	4
	C4 – caustic impingers & C7 – reagent blank	1	1	1	-	1	4
	C5 – silica gel	1	1	1	-	-	3
	C8 – DI water reagent blank	-	-	-	-	1	1
Method 29	C1 – filter and C12 filter blank	1	1	1	-	-	3
	C3 – HNO_3 probe rinse and C8A – reagent blank	1	1	1	-	1	4
	C4 – Contents and rinses of Impingers 1 through 3 (HNO_3/H_2O_2 impingers and moisture knockout Impinger) and C9 HNO_3/H_2O_2 reagent blank	1	1	1	-	1	4
	C5A – *Not used – only for mercury determination*	-	-	-	-	-	0
	C5B and C10 reagent blank- *Not used – only for mercury determination*	-	-	-	-	-	0
	C5C-8 and C11 reagent blank *Not used – only for mercury determination*	-	-	-	-	-	0
	C6 – silica gel	1	1	1	-	-	3
	C8B – DI water reagent blank	-	-	-	-	1	1
Method 23	C1 – Filter	1	1	1	1	-	4
	C2 – Acetone and toluene rinses of nozzle, front half of filter holder, cyclone (if used), back half of filter holder, sample transfer line, and condenser (if using a separate condenser and adsorbent module)	1	1	1	1	-	4
	C3 – N/A; used for PAH/PCB analysis	-	-	-	-	-	0
	Adsorbent Module	1	1	1	1	-	4
SW-846 Method 0010	C1 – filter	1	1	1	-	-	3
	C2 – methanol/methylene chloride probe rinse and distilled water rinse (retain a 200 mL blank of the methanol/methylene chloride and a 200 mL blank of the distilled water)	1	1	1	-	2	5
	C3 – sorbent trap	1	1	1	-	-	3
	C4 – condensate knockout-trap catch	1	1	1	-	-	3
	C5 – methanol/methylene chloride rinses	1	1	1	-	-	3
	C6 – silica gel	1	1	1	-	-	3

Notes:

DI	Deionized water	H_2O_2	Hydrogen peroxide
HNO_3	Nitric acid	XAD	Adsorbent resin

5.0 SAMPLE HANDLING, TRACEABILITY, AND HOLDING TIMES

Sample custody procedures for this program are based on EPA recommended procedures.[1] The custody procedures emphasize careful documentation of sample collection and field analytical data and the use of chain-of-custody records for samples being transported.

5.1 Field Sampling Operations

The Stack Sampling Coordinator will be responsible for ensuring that the proper custody and documentation procedures are followed for the field sampling efforts. Key sampling personnel involved in sample recovery will assist them in this effort.

Samples will be collected, transported, and stored in clean containers that are constructed of materials inert to the analytical matrix. Only containers that allow airtight seals, such as those with Teflon-lined lids, will be used. Opaque containers, such as amber glass jars, will be employed when containers are needed to inhibit photochemical reactions.

All sampling data, including information regarding sampling times, locations, and any specific considerations associated with sample acquisition, will be recorded on pre-formatted data sheets or on the appropriate chain-of-custody form.

Following sample collection, all samples that will be analyzed or archived will be given a unique alphanumeric sample identification code with indelible ink. Actual sample codes could vary slightly depending on sample location and type. Chain-of-custody forms will be maintained for all samples that will be analyzed or archived.

The Trial Burn Coordinator and the Stack Sampling Coordinator will maintain a daily activity log. These will be informal logs used to record various types of information, such as minor problems which arise, sketches of sampling locations, names, and phone numbers of key contacts, and daily activity summaries.

5.2 Chain-of-Custody Procedures

The history of each sample and its handling will be documented from its collection through all transfers of custody until it is transferred to an analytical laboratory. The laboratory will then maintain internal custody according to the laboratory's QC program.

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[1] *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, Stationary Source-Specific Methods (EPA-600/R-94/038c, September 1994*).

A sample will be considered to be in a person's custody if one of the following applies:

- It is in one's actual physical possession.
- It is in one's view, after being in one's physical possession.
- It is in one's physical possession and locked or otherwise sealed so tampering will be evident.
- It is kept in a secure area, restricted to authorized personnel only.

In order to maintain and document sample possession, the following chain-of-custody procedure shall be implemented.

5.2.1 Field Custody Procedures

The Laboratory Analysis Coordinator will be personally responsible for the care and custody of the samples collected until they are properly transferred or dispatched. Sample labels shall be completed for each sample that will be analyzed or archived using waterproof ink. Any deviation will be documented in a logbook notation.

The Trial Burn Coordinator, through communication with the QA Manager, will determine whether proper custody procedures were followed during the field work and will decide if analyses of additional samples are required.

5.2.2 Transfer of Custody and Shipment

A chain-of-custody form, such as that shown in Figure I-5-1, will accompany all samples that will be analyzed or archived. The actual chain-of-custody form(s) may differ in format from the one shown in Figure I-5-1, but the same essential information will be present. When transferring the possession of samples, the individuals relinquishing and receiving the samples will sign, date and note the time on the record. This record will document sample custody transfer from the sampler, often through another person, to the laboratory.

Samples will be packaged for transportation from the field to the laboratory in appropriate packaging to prevent leakage or breakage. Samples requiring cold storage will be placed on ice for transport. Sample transport boxes will always be secured except when in use. Vans containing equipment and samples will be locked whenever they are left unattended.

Chain-of-Custody

Project Number		Plant, Location, Building	
Samples Prepared by:		Sampling Location	

Sample ID	Sample Description	Container	Analysis	Preservation	Sampling Technique	Sampling Date & Time*	Comments
						Date: Time*:	
						Date: Time*:	
						Date: Time*:	
						Date: Time*:	
						Date: Time*:	
						Date: Time*:	
						Date: Time*:	

Received by:	Date:	Time*:
Received by:	Date:	Time*:
Received by:	Date:	Time*:
Received by:	Date:	Time*:

* Use military time

To be filled out by the receiving lab sample custodian:

Were all samples in good condition upon receipt? Y N

If not, please note which sample(s) and describe condition of sample(s).

Figure I-5-1

Example Chain-of-Custody Form

The original chain-of-custody record will accompany the samples in each shipment box and the Laboratory Analysis Coordinator or their designee will retain a copy in a secure location. These records will be included in the final report along with the completed analytical results and raw data.

5.3 Sample Holding Times

Table I-5-1 outlines the types of samples to be collected for the testing program, the applicable sample matrix, sample container to be used, preservation technique, and holding times before extraction and/or analysis. The holding times indicated on Table I-5-1 begin on the day of sample collection.

Sample preservation information will be included on the chain-of-custody form and laboratory receipt procedures will include temperature measurement for samples requiring preservation with ice.

Table I-5-1
Summary of Sample Containers, Preservation, and Holding Times

Sample Matrix	Parameter	Sampling/Analysis Methods [a]	Container(s)	Preservation	Allowable Holding Time
Stack Gas	Particulate Matter	EPA Method 5	Polyethylene petri dish, w/ 1" Teflon tape	None	N/A
			Glass bottle, 1-L, w/Teflon lined screw cap		
	HCl/Cl_2	EPA Method 26A	Polyethylene bottle, 500 mL and 1 L, w/leak free screw cap	None	28 days
	Metals	EPA Method 29	Polyethylene petri dish, w/ 1" Teflon tape	None	6 months
			Polyethylene bottle, 500 mL and 1 L, w/leak free screw cap		
	PCDDs/PCDFs	EPA Method 23	Filter: sealed filter holder, wide-mouth amber glass jar with PTFE-lined cap, or glass petri dish sealed with PTFE tape	Field/Shipping: ≤ 20 ºC (68 ºF); Remove from light Laboratory: Store ≤ 6 ºC (43 ºF); Remove from light; Extract and Archive can be kept at room temperature	One year
			Amber glass bottle, 500-mL or 1-L, w/ leak free PTFE-lined caps		
			Adsorbent module: ends covered with fitting caps and PTFE tape		
	Diphenylamine (POHC)	SW-846 Method 0010/ SW-846 Method 8270	Filter: glass petri dish sealed with PTFE tape	Ship particulate filters unrefrigerated; Ship liquid samples upright on ice	7 days to extraction, 40 days to analysis
			Chemically resistant borosilicate amber glass, 1-L, w/Teflon lined screw cap or crimp cap		
			Aluminum foil for sorbent module		

Notes:

[a] The analytical method listed or an equivalent method will be used.

6.0 CALIBRATION PROCEDURES AND FREQUENCY

Calibration is the process of determining the correctness of the assigned values of the physical standards or the scales of the measuring instruments. Instruments used for measurements must be calibrated frequently in order to minimize bias in the measurement. Reference methods listed in this QAPP that are to be used for testing and analysis give calibration specifications for instrumentation. These requirements are listed in the following sections.

6.1 Sampling Equipment

All sampling equipment is calibrated according to the criteria specified in the reference method being employed. Dry gas meters, orifices, nozzles, and pitot tubes are calibrated in accordance with these documents. The range of calibration is specified for all environmental measurements to encompass the range of probable experimental values. This approach ensures that all results are based on interpolative analyses rather than extrapolative analyses. Calibrations are designed to include, where practical, at least four measurement points evenly spaced over the range. This practice minimizes the probability that false assumptions of calibration linearity will be made. In addition, it is common practice to select, when practical, at least one calibration value that approximates the levels anticipated in the actual measurement.

Typically, calibration frequency is dictated by the need to demonstrate the stability of the calibration value over the course of the measurements. Calibrations are made both pre-test 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 according to the procedures outlined in this section.

New instruments or 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.

Calibrations are conducted in a manner and at a frequency that meets or exceeds U.S. EPA specifications. Calibration procedures outlined in the EPA Methods and those recommended within the *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, Stationary Source-Specific Methods (EPA-600/R-94/038c, September 1994*) will be followed. When these methods are inapplicable, methods such as those prescribed by the American Society

for Testing Materials (ASTM) will be used. Data obtained during calibrations are recorded on standardized forms, which are checked for completeness and accuracy by the QA Manager.

Data reduction and subsequent calculations are checked at least twice for accuracy. Copies of calibration forms are included in the test or project reports.

Emissions sampling equipment that requires calibration includes pitot tubes, pressure gauges, thermometers, dry gas meters, and barometers. Table I-6-1 gives calibration requirements for sampling equipment that will be used in the Trial Burn. The following sections elaborate on the calibration procedures followed for these items of equipment.

6.1.1 Pitot Tubes

All Type S pitot tubes are inspected in accordance with the geometry standards contained in EPA Method 2. If the pitot tube does not conform to the geometric specifications outlined in EPA Method 2, it will not be used for testing. Once the geometric specifications are confirmed, a baseline coefficient of 0.84 will be assigned to the pitot tube. In order to ensure that the baseline coefficient is valid, the pitot tube assembly will be configured to eliminate aerodynamic interference effects as described in EPA Method 2.

Each pitot tube is inspected visually upon return from the field. If a cursory inspection indicates damage or raises doubt that the pitot remains in accordance with the EPA geometry standards, the pitot tube is first calibrated, then repaired, and recalibrated.

6.1.2 Differential Pressure Gauges

Meter consoles used by the stack sampling team are equipped with 10-inch water column (in w.c.) inclined-vertical manometers. Fluid manometers do not require calibration other than leak-checks. Pitot tubes and manometers are leak-checked before and after each run in the field.

6.1.3 Digital Temperature Indicator

One digital temperature indicator is used to determine the flue gas, probe, oven, train, and dry gas meter temperatures. The digital temperature indicator is calibrated with the use of a signal generator, simulating temperature signals over a range of 32 to 600 °F. The calibration is acceptable if the agreement is within the value specified in Table I-6-1.

The thermocouple and digital temperature indicator combined system is checked at ambient temperature. The check is acceptable if the agreement with a NIST-traceable temperature measurement is within the value specified in Table I-6-1.

Table I-6-1
Sampling Equipment Calibration Requirements

Stack Gas Parameter	Quality Parameter	Method of Determination	Frequency	Criteria
Gas Flow	Pitot tube angle and dimensions	Measurements with a micrometer and an angle indicator	Pre-test	To specifications in EPA Method 2
	Stack gas digital temperature indicator	Calibrated with signal generator	Annually	Within 1.5% of reference temperature simulated
	Stack thermocouple/indicator	Checked against NIST traceable measurement at ambient temperature	Post-test	Within 2 °F
Isokinetic Sampling Trains	Dry gas meter	Calibrated against a reference wet test meter	Initially after purchase & semiannually	Y ± 0.02 from average ΔH@ ± 0.20 from average
		Calibrated at a single, intermediate orifice setting with vacuum at max from test	Post-test	Average value of calibration factor (Y) within 5% of pre-test
	Metering system	Leak check	Pre-test/post-test	Leak < 0.02 cfm
	Probe nozzle	Measurements with micrometer to nearest 0.001 inch	Pre-test	Maximum difference in high & low numbers within 0.004 inch
	Digital temperature indicators	Calibrated with signal generator	Annually	Within 1.5% of reference temperature simulated
	Thermocouple/indicators	Checked against NIST traceable measurement at ambient temperature	Post-test	Within 2 °F
	Analytical balance	Checked vs. standard weights	Day of use	Within 0.5 mg
	Top-loading balance	Checked vs. standard weights	Day of use	Within 0.5 g

Notes:
NIST National Institute of Standards and Technology
cfm Cubic foot per minute
mg Milligram
g Gram

6.1.4 Dry Gas Meter and Orifice

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

Each metering system receives full calibration at the time of purchase and semiannually. During the full calibration, the meter calibration factor shall not vary by more than the value specified in Table I-6-1. In addition to the initial and semiannual full calibrations, a post-test calibration check is performed after each field use. If during this post-test calibration, the calibration factor (Y) deviates by less than 5 the value specified in Table I-6-1, the test data is acceptable. If Y deviates by more than the value specified in Table I-6-1, the meter is recalibrated and the calibration factor (initial or recalibrated) that yields the lowest sample volume for the test run 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 the value specified in Table I-6-1. Standard practice is to recalibrate the dry gas meter semiannually and check the calibration factor after each field use.

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

6.1.5 Barometer

A reference barometer is used for all stack calculations. This barometer reading is corrected for elevation as necessary.

6.2 Analytical Instruments

Calibration of the analytical instruments is conducted in accordance to the procedures outlined in the EPA publication SW-846 entitled, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition* and other applicable reference methods. Table I-6-2 gives a summary of the calibration requirements for analytical equipment that will be used for analysis of samples generated during the Trial Burn.

Table I-6-2
Analytical Instrument Calibration Requirements

Analytical Parameter	Quality Parameter	Method of Determination	Frequency	Criteria
Particulate Matter (EPA Method 5)	Electronic balance calibration	Calibrated against NIST Class S weights	Post-test	Within 0.5 mg
HCl/Cl_2 (EPA Method 26A)	Ion Chromatograph: Calibration	Development of calibration curve with calibration standards	Before and after injection of the quality control check sample, reagent blanks, and field samples	Duplicate injections should agree within 5% of their mean
Metals (EPA Method 29)	Inductively Coupled Argon Plasma Spectrometer Calibration	Calibrate instrument according to the manufacturer's procedures using prepared standards	Once per hour	Reproduce standard concentrations within 10% (if this is not achieved, perform the complete calibration procedures)
PCDDs/PCDFs (EPA Method 23)	HRGC/HRMS calibration - initial calibration			
	Mass resolution	Tune the HRMS instrument to a resolving power of at least 10,000 at 10% percent of the peak height or 25,000 at 50% percent of the peak height. Assess the resolution at three exact m/z's representing the low-, mid-, and high-m/z range of the masses used to measure the target compound class.	Not specified	Verify that the exact mass is within 5 ppm of the required value
	Initial calibration	Initial analysis of 5 concentrations (shown in Table 23-11 of Method 23)	Prior to sample analysis; Repeated if Continuing Calibration Verification (CCV) requirements are not met	RRF RSD ≤ the values shown in Table 23-14 of Method 23; Signal to noise ratio ≥ 10; Ion abundance ratio (see Table 23-15 of Method 23)

Notes:
IS – Internal Standard PD - Percent difference RRF - Relative response factor RSD - Relative standard deviation

Table I-6-2
Analytical Instrument Calibration Requirements (continued)

Analytical Parameter	Quality Parameter	Method of Determination	Frequency	Criteria
PCDDs/PCDFs (EPA Method 23)	Continuing Calibration Verification (CCV)	Prepare CCV standards at mid-level of the calibration (C3 level from Table 23-11).	At least once every 12 hours during an analysis sequence	Continuing Calibration RRF compared to Initial Calibration RRF ≤ the values shown in Table 23-14 of Method 23 Signal to noise ratio ≥ 10; Ion abundance ratio (see Table 23-15 of Method 23)
	Lock-Mass Ions	Monitor the QC check ions specified in Table 23-4 of Method 23 to verify instrument stability during the analysis	Daily	The QC check ions may not vary > 25% from the average response.
Diphenylamine (SW-846 Method 8270)	Instrument performance check	Inject 50 ng of decafluorotriphenylphosphine (DFTPP)	Before initial calibration	Must meet mass intensity criteria specified in method
	Initial calibration (ICAL)	5 points minimum for response factor (RF) and linear regressions (LR), 6 points minimum for quadratic regression (QR) >90% of reported target analytes meet ICAL criteria	Prior to sample analysis	Calibration standard must meet criteria in Table 6 of SW-846 Method 8270.
	Initial calibration verification (ICV)	Prepared from different source of target analytes than ICAL standards	Prior to sample analysis	Calculated concentrations of target analytes are ±30% of true value
	Continuing Calibration Verification (CCV)	>80% of target analytes meet CCV criteria	Once at least every 12 hours	Targets are ≤20% difference or drift; IS responses are within 50% to 200% of mid-point of ICAL or average of ICAL ISs; and retention times for ISs have not shifted >30 seconds relative to ICAL

Notes:
IS – Internal Standard PD - Percent difference RRF - Relative response factor RSD - Relative standard deviation

7.0 ANALYTICAL PROCEDURES

Table I-4-1 provides a summary of all sampling and analytical procedures to be used during the project. All of the analytical methods listed are common procedures and do not require additional definition or description. Each analytical method was selected based on matrix applicability, target analytes, detection limits, sample quantitation limits, interferences, and other factors specific to the Trial Burn.

8.0 DATA REDUCTION, VALIDATION, AND REPORTING

Data reduction, validation, and reporting will follow standard conventions and guidelines to ensure that all data used is of sufficient quality. Technical review of the field and laboratory data will be performed by the appropriate personnel with a final review performed by the QA Manager.

8.1 Field Data Reduction

Extreme care will be exercised to ensure that hand recorded data is written accurately and legibly. Additionally, the use of prepared and conveniently formatted data recording forms is an important aid to verify that all necessary data items are recorded. Errors or discrepancies will be noted in the field project logbook. Calculation worksheets will be used in the field to check on isokinetic sampling conditions and stack flow gas rates. The analyst and the Trial Burn Coordinator will review the collected field laboratory data. A list of validation qualifiers will be included, as appropriate, in the Trial Burn Report and/or appendices with the field/analytical data packages. Any pertinent information that may materially affect the results of the test will also be noted in the Trial Burn Report.

Data reduction follows guidelines published in EPA Reference Methods, where applicable and in guidance documents where EPA Reference Methods are not available. Computer programs will be used to calculate all reported values.

8.2 Laboratory Data Reduction

The reduction of data generated at the laboratory bench will be the responsibility of the analyst producing the data. The data manipulation required to calculate sample concentrations will be performed according to the methodology described in the specific analytical method or Standard Operating Procedure (SOP). After all of the analyses have been completed, a preliminary report will be generated for review by the QA Manager or designee to verify that the analyses were performed and interpreted properly and that all QA/QC criteria were met. Samples and analyses not meeting all QA/QC criteria will be evaluated on a case-by-case basis and appropriate corrective action, possibly including rework, will be taken as necessary. After review by the QA Manager or designee, the raw data will be filed by the individual responsible for the analyses and archived.

The QA Manager or an appointee will also review the data for adherence to the project's quality control objectives. Additionally, the data will be reviewed for the presence of outliers. An outlier is an unusually large (or small) value in a set of observations. Among the many possible reasons for outliers are:

- Faulty instruments or component parts
- Inaccurate reading of a record, dialing error, etc.
- Errors in transcribing data
- Calculation errors
- Statistical variation resulting from inherent random error

All real-time measurement analytical data will be recorded on laboratory preprinted bench summary sheets unless computer generated summaries are produced.

Electronic spreadsheet calculation routines will be used where applicable and result printouts will be attached to the bench summary sheet. The reported data will be verified by the QA Manager for completeness.

8.3 Blank Correction Procedures

If a blank correction procedure exists for a particular stack sampling method, that method will be used if determined necessary. If a blank correction procedure does not exist or contamination appears only in field blank samples, the following blank correction procedure may be used. The blank correction procedures are presented in Section 2.5.1 of the handbook, *Hazardous Waste Incineration Measurement Guidance Manual, Volume III of the Hazardous Waste Incineration Guidance Series.*[2]

- Assemble data for each organic compound from all of the field and trip blanks.
- Determine whether the field blanks are statistically different from the trip blanks by using the paired t-test.
- If the field blanks are significantly higher than the trip blanks, use the field blank data only. If the blanks are not significantly different, use all of the blank values. Higher field blanks indicate background due to field exposure, which trip blanks do not measure.
- Calculate the average and standard deviation of the blanks.
- Determine whether each measured sample value is different from the blank value by using the following test for each sample:

  s = sample value (µg)
  b = blank average + 3 x standard deviation of blanks (µg)

[2] (EPA/625/6-89/021, June 1989)

Where: µg = microgram

If "s" is greater than "b," then the sample is different from the blanks.

If the measured sample value is different from the blank value, then the blank correction procedure is applied as follows:

Blank corrected emission value (µg) = measured sample value (µg) – average blank value (µg).

Where: µg = microgram

If the measured sample value is not different from the blank value, then the measured sample is used as an upper bound emission value and the emission rate is considered less than (<) or equal to (=) the measured value. This results in the reporting of emission concentration and mass emissions rate with a (<) sign. Consequently, removal efficiencies would be reported with a greater than (>) sign.

8.4 Data Validation

Data validation is the process of filtering data and accepting or rejecting it based on sound criteria. Project coordinators and QC personnel will use validation methods and criteria appropriate to the type of data and the purpose of the measurement. The data from field sampling activities and from laboratory analyses will be reviewed for completeness and comparability. Field sampling data will be validated by the Trial Burn Coordinator based on their judgment of the representativeness of the sample, the maintenance and cleanliness of sampling equipment and the adherence to an approved, written sample collection procedure. A cursory review of the completed data sheets would indicate missing data necessary for accomplishing the objectives of the test. The Trial Burn Coordinator will review the field data and the calculated results. The Trial Burn Coordinator and the laboratory QA Manager will perform the same function for analytical data.

Records of all data will be maintained, even those judged to be of "outlying" or suspicious value. The person(s) validating the data will have sufficient knowledge of the technical work to identify questionable values.

All laboratory data (100%) will be validated according to the criteria discussed in this QAPP. The results from the field, laboratory method blanks, replicate samples, and internal QC samples

will be used to further validate analytical results. Analytical results on field blanks and replicate field samples are valuable for validation of sample collection as well.

The following criteria will be used to evaluate the field sampling data:

- Use of approved test procedures
- Proper operation of process being tested
- Use of properly operating and calibrated equipment
- Leak checks conducted before and after tests
- Use of reagents that have conformed to QC specified criteria
- Use of National Institute of Standards and Technology (NIST) – traceable CEM calibration gases
- Proper chain-of-custody maintained for all sample trains – check to ensure proper sample gas volume collected

The criteria listed below will be used to evaluate the analytical data:

- Use of approved analytical procedures
- Use of properly operating and calibrated instrumentation
- Acceptable results from analyses of QC samples
- Precision and accuracy achieved should be comparable to that achieved in previous analytical programs and consistent with objectives stated in Sections 1.0 and 3.0 of this QAPP

8.5 Data Reporting and Test Report Contents

The concentrations and emission rates for the compounds of interest will be presented in the final report in the units set forth by the analysis method and/or guidance documents. Copies of this report will be filed with ESD and will remain on file for a minimum of five years following conclusion of the Trial Burn.

Copies of the test report will be submitted to all parties after the Trial Burn has been completed. Results reported will include, but will not be limited to, emission rates and/or concentrations of particulates and gaseous pollutants, the dilution factors, the method detection limits or estimated quantitation limits where appropriate, and any other type of data that is required. This report will also include a list of all personnel present during testing, summary of results, descriptions of test procedures used, a description of the source and its operation during testing, test location drawings, example calculations, raw field data, equipment calibrations, and QA/QC results. The

report will include information and supporting documentation needed to demonstrate that the data gathered during the Trial Burn is of sufficient quality to serve as the basis for demonstration of system compliance with the emission limits.

9.0 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

Internal quality control procedures are routine internal operations for assuring that the data output of a measurement system meets prescribed criteria for data quality. Quality control checks will be performed to ensure the collection of representative samples and the generation of valid analytical results for these samples. Section 3.0 specified the QA objectives; this section describes how these specifications will be met. These checks will be performed by project participants throughout the program, under the guidance of the participant's respective QC Coordinators.

Checks for the process data collection and sampling aspects of this program will include, but will not be limited to, the following:

- Use of standardized field data sheets to ensure accuracy and completeness, traceability, and comparability of the process information and samples collected
- Field checking of standardized forms by a second person to ensure accuracy and completeness
- Strict adherence to the sample traceability procedures outlined in Section 5.0 of this plan
- Submission of field blanks, as required by the method
- Leak checks of sample trains before and after sample collection, as required by the method

9.1 Sampling Equipment Operational QC Checks and Frequency

Calibration of the field sampling equipment will be performed prior to and at the conclusion of the field sampling effort. Copies of the calibration sheets will be available during testing for reference, and will be placed into the project file for the permanent testing record. Calibration will be performed as described in the EPA publication *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, Stationary Source-Specific Methods (EPA-600/R-94/038c, September 1994*), and in the procedures of the *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, Third Edition*. Section 8.0 presents the acceptance limits for calibrations.

Specific pretest QC checks for the sampling trains include:

- All sampling equipment will be maintained and calibrated according to the procedures described in EPA's Quality Assurance Handbook and the respective method.
- All filters will be visually inspected for irregularities and flaws, or pinhole leaks.

- The filters will be placed in the shipping containers and will remain in these containers at all times, except during sampling and weighing.
- All glassware will be cleaned according to the procedures described in the respective method.
- All glassware openings where contamination could occur will be covered and will remain covered until the sampling train is assembled.
- A leak check of the pitot lines will be conducted according to Method 2.
- All openings on the train where contamination could occur will be covered with Teflon film or aluminum foil until just prior to assembly or until sampling is about to begin.
- All containers to be used during the sampling and recovery efforts will be stored in clean places, free from uncontrolled dust and other sources of contamination.
- After placed in the filter holder, the filter will be visually inspected for tears.
- The sampling train will be visually inspected for proper assembly.
- A pre-test leak check will be performed, as required by the method.

During sampling:

- Prior to insertion of the train, the access ports will be cleaned to eliminate the chance of sampling deposited material.
- The filter and probe heating system temperatures will be checked to ensure that they are operating at the specified temperature.
- The pitot tube and probe will be checked to ensure that they are properly positioned.
- An isokinetic sampling rate of 90-110% will be maintained.
- A temperature around the filter of 120 ± 14 °C will be maintained.
- A gas temperature at the condenser/silica gel outlet will be maintained below 20 °C.
- Periodic checks will be made on the manometer level and zero during testing, as these may drift due to vibrations and temperature changes.
- Periodic checks will be made of the pH in the first sodium hydroxide impinger in the Method 5/26A train. The solution will be changed if it is below 10.
- Leak checks will be conducted before and after each port change, as required by the method.

After testing:

- A post-test leak check will be performed on the sampling train.
- A post-test leak check will be performed on the pitot lines.

- The sampling train, including the nozzle and pitot tubes, will be inspected for visual defects.

The following QC checks for the volumetric air flow rate determinations will be emphasized:

Flue Gas Velocity: Data required to determine the flue gas velocity will be collected using the methodology specified in EPA Method 2. Quality control procedures are as follows:

- Visually inspect the Type S pitot tube before and after sampling.
- Leak-check both legs of the pitot tube before and after sampling.
- Verify the location of the sampling traverse point before taking measurements.

Flue Gas Molecular Weight: Samples to be used for determination of flue gas molecular weight will be collected using the sampling technique specified in EPA Method 3A. Quality control will focus on the following procedures:

- A constant sampling rate will be used in withdrawing a sample.
- The sampling train will be purged prior to sample collection.
- The sampling port will be properly sealed to prevent air in-leakage.

Moisture Content: The moisture content of the gas stream will be determined using the technique specified in EPA Method 4. The following QC checks will be performed:

- The sampling train will be leak-checked before and after each run.
- Ice will be maintained in the ice bath throughout each run.

9.2 Sample Collection QC Checks and Frequency

Field blanks of reagents and collection media (deionized water, filters, impinger solutions, rinse solutions, etc.) will be placed in appropriately cleaned and sized sample containers in the field and handled in the same way as actual field samples to provide a QC check on sample handling.

For the test program, sample collection QC checks and frequency for blank samples to be collected are listed below:[3]

[3] NOTE: Not all blanks are to be analyzed.

- Field blanks will be generated and analyzed for appropriate trains.
- Laboratory blanks will be generated according to method protocol.
- Reagent blanks will be analyzed according to method protocol.

Laboratory method blanks will also be used with the gas sample methods that use absorption or adsorption media. Procedures for blank correction are discussed in Section 8.3.

9.3 Analytical Quality Control Checks

Laboratory analysis methods make use of a number of different types of QC checks to ensure the validity of the generated data. All QC activities are documented as part of the analysis data. Table I-9-1 summarizes the QC checks to be performed during each analysis as part of the test program. Some are detailed below.

9.3.1 Laboratory Quality Control Samples and Blanks

Method Blanks: Method blanks contain all of the reagents used in the preparation and analysis of samples and are processed through the entire analytical scheme to assess spurious contamination arising from reagents, glassware, and other materials used in the analysis.

Calibration Blank: The standard used for calibration that is void of all analytes. This standard is periodically used to check for carryover contamination.

Calibration Check or Verification Sample: These are working calibration standards or a standard prepared from the same stock solutions as the calibration standards that are periodically used to check that the original calibration is still valid.

Laboratory Control Sample (LCS): These samples are prepared or purchased from an independent source than that used for the calibration standards. An LCS is used to establish that an instrument or procedure is in control. An LCS is normally carried through the entire sample preparation and analysis procedure. For Method 23, the results of the Method Blank fulfill the function of the LCS. Therefore, no separate LCS is required for Method 23.

Matrix Spike: This sample is prepared by spiking one sample in a batch with a known amount of analyte(s). Then the spiked sample is carried through the entire analytical process. Recovery of the spiked analyte is a measure of accuracy. For Method 23, the isotopically labeled compounds

Table I-9-1
Quality Control Validity Checks

Analytical Parameter	Quality Parameter	Method of Determination	Frequency	Criteria
HCl/Cl_2 (EPA Method 26A)	Quality Control Sample	Duplicate injections of a QC sample	Between injections of the appropriate series of calibration standards	Values from duplicate injections should agree within 5% of their mean
	Reagent Blanks	Duplicate injections of reagent blanks	Between injections of the appropriate series of calibration standards	Values from duplicate injections should agree within 5% of their mean
PCDD/ PCDF (EPA Method 23)	Accuracy and precision	Initial Demonstration of Capability (IDC)	Prior to analyzing field samples, then quarterly; Repeated if changes are made to analytical parameters not previously validated during the IDC	See Section 9.3 of Method 23, Table 23-18 of Method 23
	Laboratory Method Blanks (LMB)	LMBs are prepared in the laboratory. Follow all sample preparation and analysis steps for field samples.	An LMB must be extracted with every batch of samples. Analyze an LMB at least once during each analytical sequence or every 12 hours, whichever period is shorter.	Native target compound concentrations must be ≤ 3x EDL of the method or 10x lower than the quantitation limit required by HWC MACT, whichever is higher; Performance specifications in Table 23-7 of Method 23 must also be met.
	Field Train Proof Blank Assessment	A field train proof blank is prepared and assembled in the same manner as the field samples. Follow all sample preparation and analysis steps for field samples, including data reporting.	Conduct at least one field train proof blank for each test series.	Native target compound concentrations must be ≤ 3x EDL of the method or 10x lower than the quantitation limit required by HWC MACT, whichever is higher; Performance specifications in Table 23-7 of Method 23 must also be met.
Diphenylamine (SW-846 Method 8270)	Method blank	Analysis of a method blank	With each analytical batch; at reagent change	Results should be less than ½ the lower limit of quantitation or ≤ 10 % of concentration in field samples
	Precision	Analysis of a matrix spike and matrix spike duplicate	With each analytical batch	LCL
	Accuracy	Analysis of a LCS	With each analytical batch	50 - 150% Recovery, or LCL
	Accuracy	Addition of surrogates	With each blank, field sample, and QC sample	Laboratory- specific surrogate control limits

Notes:
EDL Estimated Detection Limit
IDC Initial Demonstration of Capability
LCS Laboratory control sample
LCL Laboratory Control Limit
LMB Laboratory Method Blank

in the pre-extraction standard constitute a matrix spike of the resin, so no additional matrix spike will be conducted.

Duplicate: This sample is prepared by analyzing another portion of a sample in the same batch. Both portions are carried through the entire analytical process. Comparison of the results through calculation of relative percent difference is a measure of method precision. Often, duplicate spiked samples are analyzed to gauge precision and accuracy of measurable concentrations.

9.3.2 Laboratory Data Evaluation

The relative percent difference and the percent of recovery of each applicable QC check will be calculated as noted in Section 11.0. All values that fall outside the QC limits for the analytical method will be noted. The following guidelines will be used:

- All recovery data are evaluated to determine if the QC limits are appropriate and if a problem may exist even though the limits are being achieved (e.g., one compound that is consistently barely within the lower limit).
- All recovery data that are outside the established limits are evaluated. The evaluation will include an independent check of the calculation.
- Corrective action will be performed based on the failure to meet the applicable method performance criteria.

The following general QC procedures will be incorporated into the analytical effort:

- A secondary review of the analytical data and QC data will be conducted for completeness and acceptability.
- Analytical QC data will be tabulated using the appropriate charts and forms.

All hard copy raw data (i.e., chromatograms, computer printouts, etc.) and all hard copy forms generated during the analytical process will be maintained in the project file. The results of these quality control procedures will be included in the final report.

10.0 PERFORMANCE AND SYSTEM AUDITS

EPA guidance recommends that at least one internal audit be conducted by the QA Manager or designee. These audits include performance and system audits of field and laboratory activities. Performance and system audits are routine elements of all QA/QC Programs and are used as independent checks on the quality of data obtained from sampling and analysis activities. Either type of audit may show the need for corrective action or invalidate test project data.

10.1 System Audits

System audits are qualitative evaluations of all components of field and laboratory quality control measurement systems. This determines if the measurement systems are being used appropriately. The audits may be carried out before all systems are operational, during the program, or after the completion of the program. Such audits typically involve a comparison of the activities given in the QAPP with those actually scheduled or performed.

System audits are always conducted by test team leaders prior to the start of each stack sampling project. These audits entail the use of equipment checklists, previously completed by the Stack Sampling Coordinator, to assure the inclusion of all materials and equipment necessary for the sampling task.

The laboratory staff conducts system audits of the laboratory on a regular basis and reports to the laboratory QA Manager, as conditions require.

Relative to the emissions sampling associated with this project, an on-site qualitative inspection and review of each sampling system will be performed by the Stack Sampling Coordinator.

The system audit will include observation and recording of the following activities:

- Sample train assembly and leak checks
- Post-test leak checks and sample train disassembly
- Sample recovery, labeling, and storage for shipment

10.2 Performance Audits

A performance audit is a procedure to analyze "blind" samples, the content of which is known, simultaneously with the analysis of test samples. The purpose of a performance audit is to check bias in the measurement of compounds or parameters in the test sample, i.e., to check whether the laboratory is measuring the right compound or parameter with an acceptable degree of

accuracy. Performance audits check data quality at the time of the analysis and they are specific to the equipment and personnel involved with the test.

In addition to system audits, performance audits (if applicable) of the laboratory are conducted by providing independent samples for analysis. Audit materials typically include materials available from the EPA or materials specially prepared by the QA Manager. Any applicable audit requested by the regulatory agencies will be performed.

11.0 CALCULATION OF DATA QUALITY INDICATORS

This section describes the procedures and equations that will be used to determine the precision, accuracy, and completeness of measured parameters. Additionally, the determination of method detection limits is also discussed.

11.1 Precision

When sufficient data is available, precision is determined through the analysis of replicate or replicate spiked samples and is expressed as relative percent difference (RPD), range percent (RP), or relative standard deviation (RSD). If the number of data points is less than four, precision is expressed as relative percent difference or range percent:

$$RPD \text{ or } RP = 100 \times (X_1 - X_2) / X$$

Where: X_1 = highest value
X_2 = lowest value
X = arithmetic mean

The following equations are used when four or more measurements are made:

$$RSD = 100 \times (s / X)$$

Where: s = standard deviation
X = arithmetic mean

Standard deviation will be determined as follows:

$$s = [(\sum x_i^2 - (\sum (x_i)^2/n)) / (n-1)]^{1/2}$$

Where: x_i = i^{th} value of x (individual measurement)
n = number of measurements

11.2 Accuracy

Accuracy will be estimated from the analysis of matrix spiked samples and/or laboratory control samples, and will be expressed as a percent recovery or as relative error. The formulas to calculate the percent recovery and relative error are as follows:

$$\text{Percent recovery (\%R)} = 100 \times (\text{measured value} / \text{true value})$$

$$\%R = 100 \times [(\text{measured spike value} - \text{measured sample value}) / \text{spike value}]$$

$$\text{Relative error} = 100 \times (\text{measured value} - \text{true value}) / (\text{true value})$$

When the calculated percent recovery is used to correct the measured values for a batch of data, the following equation will be used:

$$\text{Corrected value} = 100 \times [\text{measured non-spiked value} / \text{percent recovery}]$$

11.3 Completeness

Completeness will be reported as the percentage of all measurements whose results are judged valid. The procedures to be used for validating data and for determining outliers are contained in Section 10.0 of this QAPP. The following formula will be used to estimate completeness:

$$C = 100 \times (V / T)$$

Where: C = percent completeness
V = number of measurements judged valid
T = total number of measurements

11.4 Method Detection Limit and Estimated Detection Limits

The method detection limit is verified periodically (e.g., annually) for analytical measurements by each laboratory using the statistical procedures given in 40 CFR 136, Appendix B. As mentioned in Section 3.3, no attempt will be made in this program to develop MDLs or reporting limits specific to this test program. The MDLs and reporting limits provided by the analytical laboratory will be noted in the analytical laboratory reports. The method detection limit (MDL) is defined as:

$$MDL = t_{(n-1,\ 1-\alpha = 0.99)} \times S$$

Where: S = standard deviation of the replicate analyses
$t_{(n-1,\ 1-\alpha = 0.99)}$ = student's t-value appropriate to a 99% confidence level and a standard deviation estimate with n-1 degrees of freedom

Estimated detection limits (EDLs) are calculated for each congener in each sample according to the formula (or an equivalent one) given in EPA Method 23. EDLs are used for Method 23 data instead of MDLs.

12.0 PREVENTATIVE MAINTENANCE

Well-maintained equipment is a very important factor in assuring the quality and completeness of measurement data. Measurements conducted in the field are more sensitive to the degree of equipment maintenance than measurements conducted within a laboratory setting because the former are often performed in an uncontrolled dynamic environment.

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 *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, Stationary Source-Specific Methods (EPA-600/R-94/038c, September 1994*).

12.1 Sampling Equipment Inspection and Maintenance

Each item of field test equipment that is purchased 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, equipment is cleaned, repaired, reconditioned and recalibrated as necessary. Each item of equipment is also inspected again before being transported to the field to detect any equipment problems that may originate during periods of storage. This minimizes lost time during the sampling project due to equipment failure. Adequate spare equipment should be available in the event of failure. All inspection and maintenance records for sampling equipment are recorded in an inspection logbook.

12.2 Laboratory Analytical Instrument Maintenance

The policy of each laboratory is to follow the manufacturer's recommended schedule for maintenance and/or to have service contracts for all of its major instruments. These contracts provide for routine preventive maintenance as well as for repair service. The terms for each contract vary. Additionally, the laboratory maintains an inventory of expendable parts and supplies to minimize downtime and to allow laboratory personnel to make minor repairs as necessary. All maintenance and repair activities are recorded in instrument specific logbooks maintained in the individual laboratories.

13.0 CORRECTIVE ACTION

Any samples not collected according to the proper methods will be considered for invalidation. Any equipment found to be out of calibration or not operating properly will be repaired or replaced before additional measurements are made.

If weaknesses or problems become apparent during system or performance audits, corrective action will be initiated immediately. Examples of corrective actions that may be taken are recalibration of instruments using freshly prepared calibration standards and replacement of reagents that give unacceptable blank values.

Should performance audits indicate that any methods are out of control, the QA Manager and Trial Burn Coordinator will review the audit data and determine the appropriate action to be taken. Independent calibration checks will be used, if necessary, to resolve problems with an analytical system.

In all cases where standard procedures cannot resolve the problem, the QA Manager and the Trial Burn Coordinator will determine the appropriate action. The Trial Burn Coordinator has daily contact and detailed familiarity with the procedures. The QA Manager offers a broader background and more detached viewpoint. This combination helps in formulating quick and reliable solutions to various problems. The Trial Burn Coordinator will be responsible for initiating the action and the QA Manager will be responsible for determining if this action has resolved the problem.

Corrective action during the field sampling portion of a program is most often a result of equipment failure or an operator oversight and may require repeating a run. When equipment is discovered to be defective (i.e., pre-sampling and post-sampling leak check) it is repaired or replaced and a correction factor is established as per the appropriate EPA method. If a correction factor is unacceptable, the run is repeated. Operator oversight is best avoided by having field crew members audit each other's work before and after a test. Every effort is made by the Stack Sampling Coordinator to ensure that all QC procedures are followed. Economically, it is preferred to repeat a run during a particular field trip rather than to conduct further testing at a later date.

Corrective action for analytical work would include recalibration of instruments, reanalysis of known QC samples, and, if necessary, reanalysis of actual field samples. If the problem is not solved in this manner, more formalized long-term corrective action may be necessary.

The need for this action may be identified by standard QC procedures, control charts, and/or performance or system audits. Any quality problem that cannot be solved by immediate corrective action falls into the long-term category. The corrective action process for long-term problems involves reporting the problem to the responsible party, who is part of the closed-loop action and follow-up plan. The essential steps in the closed-loop corrective action process are:

- Identify and define the problem.
- Assign responsibility for investigating the problem.
- Investigate and determine the cause of the problem.
- Determine a corrective action to eliminate the problem.
- Assign and accept responsibility for implementing the corrective action.
- Establish an effectiveness measure of the corrective action and implement it.
- Verify that the corrective action has eliminated the problem.

Documentation of the problem is important to the corrective action process. A Corrective Action Form containing information similar to the example shown in Figure I-13-1 is filled out. This form identifies the problem, possible causes of the problem, and the person responsible for action on the problem. The responsible person may be an analyst, a field team leader, or the QA Manager. If no person is identified as responsible for action, the QA Manager investigates the situation and determines who is responsible for action in the particular case.

The Corrective Action Form includes a description of the corrective action planned and the day it was taken, as well as space for follow-up dates. The QA Manager checks that the initial action has been taken, that the action appears effective, and, at an appropriate later date, that the problem has been fully solved. The QA Manager receives a copy of all Corrective Action Forms and enters them in the Corrective Action Log. This permanent record aids the QA Manager in follow-up activities and makes any quality problems clearly visible to management. The log may also prove valuable in identifying solutions to similar problems in separate corrective action cases.

Corrective Action Form No.:

Originator:_____ Date: _____
Person Responsible for Replying: _____
Contract: _____
Description of problem and when identified: _____
_____
_____
_____

State cause of problem, if known or suspected: _____
_____
_____

Sequence of Corrective Action: (If no responsible person is identified, notify QA Manager immediately. Submit all CA forms to QA Manager for initial approval of CA.)

State Date, Person and Action Planned: _____
_____
_____
_____
_____
_____

CA Initially Approved By: _____ Date: _____

Follow up Dates: _____

Final CA Approved By: _____ Date: _____

Information copies to: Responsible Party/Department QA Manager:

QA Manager: _____
Department Manager: _____

Figure I-13-1
Example Corrective Action Form

14.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Quality assurance reporting and documentation are important elements of final project reports. Final stack sampling project reports contain sections that describe QA/QC activities and criteria relevant to the measurements reported, provide results from the application of these activities, and address the impact of these results on the measurements reported. The QA procedures used in this test program generate sufficient documentation to indicate data quality. The individuals responsible for QA reports are those referred to in Section 2.0. QA results will be included in the final Trial Burn Report. At a minimum the following QA results will be addressed in the final report:

- Percent recovery of matrix and/or surrogate spikes
- Blank analysis results
- Sampling and analysis equipment calibration
- Cylinder gas audits and on-site equipment audits
- Spike composition verification and recovery checks
- Changes or deviations from the QAPP
- Discussion of whether QA objectives were met and the resulting impact on decision making
- Corrective actions taken that affect the project's data quality

Management reviews all evidence of the execution of the QA guidelines. In addition, all aspects of the project are discussed during regular project meetings, including the QA of each task.

Emissions testing and laboratory groups participate in independent audit checks. Subcontracted laboratories will report the QC data as an inclusion to their data summary package.

APPENDIX II

STACK DETECTION LIMIT AND FEEDRATE CALCULATIONS

POHC Detection Limit Calculations

Parameter	Units	Diphenylamine
Method Detection Limit	ng/dscf	375
Stack Gas Flowrate	dscfm	9,300
Minimum Detectable Emission Rate	lb/hr	4.61E-04
Removal Efficiency Required	%	99.99
Minimum Feedrate Required for Detection	lb/hr	4.61E+00
Minimum Feedrate Required for Detection [x 10]	lb/hr	4.61E+01
Target Feedrate a	lb/hr	46.0
Is the Target Feedrate Above the Minimum Feedrate Required for Detection?		YES
How Much Above the Minimum Feedrate Required for Detection?		10.0

Metals Stack Detection Limit Calculations

Parameter	Units	Chromium	Lead
Method Detection Limit	µg/sample	0.71	0.95
Sample Volume	dscm	1.25	1.25
Estimated In-Stack Detection Limit	µg/dscm	0.568	0.760
Stack Gas Flowrate	dscmm	2,835	2,835
Minimum Detectable Emission Rate	lb/hr	2.13E-04	2.85E-04
Removal Efficiency	%	99.99	99.99
Minimum Feedrate Required for Detection	lb/hr	2.13E+00	2.85E+00
Minimum Feedrate Required for Detection [x 2]	lb/hr	4.26E+00	5.70E+00
Target Feedrate	lb/hr	4.26	5.05
Is the Target Feedrate Above the Minimum Feedrate Required for Detection?		YES	YES
How Much Above the Minimum Feedrate Required for Detection?		2.0	1.8
Emissions Concentration Calculated Based on Expected Removal Efficiency [a]	µg/dscm @ 7% O_2 [a]	1	1
Emission Limit	µg/dscm @ 7% O_2	23	10
Emissions as Percentage of Emission Limit	%	4%	12%

Notes:

[a] Assuming an average oxygen content of 5.2%.

APPENDIX III

CONTINUOUS EMISSIONS MONITORING SYSTEM

PRECISION PARTNERS
INDUSTRIAL DEVELOPMENT GROUP

Continuous Emissions Monitoring System

Precision Partners has a partnership with CEMTEK Environmental, a technology leader in Continuous Emissions Monitoring Systems (CEMS), which after consulting, recommended and will provide a Fourier Transform Infrared Spectroscopy (FTIR) based Continuous Emissions Monitoring System. The Continuous Emissions Monitoring System was designed & engineered to meet the unique conditions encountered when monitoring emissions meeting RCRA 40 CFR Part 264 Subpart X, 40 CFR §63.1219(b)(5), and 40 CFR §63.1219(b)(5)(ii).

The CEMS FTIR technology package includes an analyzer to measure CO, & HCl, NH_3 (FTIR) and EPA compliant data acquisition software, all housed in an environmentally controlled shelter. O_2 will be measured using a zirconia oxide module in the FTIR analyzer, since O2 does not absorb light. This is a mechanical module integrated into the FTIR system. Gas is extracted into the FTIR analyzer, and after passing through it, the gas flows through the zirconia oxide module to provide a continuous O_2 reading in accordance with Performance Specification 4B. The system measures NH_3 and NH_3 slip using the FTIR analyzer, complemented by a triboelectric broken filter detector at the outlet of each filter housing. Together, these components provide dual leak detection capability.

The FTIR measurement technique incorporates several components, including a heated gas cell, electronics, a detector box, pressure measurement instrumentation, and a heated gas inlet. FTIR collects all infrared spectral data simultaneously by sending a broadband infrared light through an interferometer (modulator), which modulates all wavelengths at once. The modulated light passes through a gas cell where molecules in the sample absorb specific wavelengths. This signal is then demodulated using the Fourier Transform process, converting mirror position into a frequency response that directly correlates with the molecules present in the gas sample.

Data analysis begins with the demodulated signal, known as an interferogram, which is converted to a single-beam spectrum via the Fast Fourier Transform (FFT). To account for instrument response, a non-infrared absorbing gas is passed through the cell before sampling, and this baseline is subtracted from the sample signal. The logarithmic ratio of the sample beam to the background beam produces an absorbance spectrum over the infrared range, containing responses from all infrared-active compounds. The height of the absorbance peak is directly proportional to the compound's concentration.

The FTIR CEMS system will utilize a MKS Multigas 2030 FTIR, which is a highly sensitive instrument capable of detecting toxic gases at levels as low as 10–100 parts per billion (ppb). The system enables simultaneous analysis and display of required gases and uses permanent calibration spectrum which will be calibrated daily for O_2, and on an as required basis for CO, HCl, and NH_3. A patented, linearized detector response ensures consistent calibration across all instruments, while a heated sample line maintains temperature before gas enters the cell. Automatic temperature and pressure compensation ensures accuracy. Precision Partners and CEMTEK verify the CO and O_2 CEMS will be installed, calibrated, maintained, and continuously operated in compliance with Performance Specification 4B. The span level of the CO CEMS is 0-200 ppmv, dry basis (low-range span), 0-3,000 ppmv, dry basis (high-range span). The span level of the O2 CEMS is 0-25% oxygen.

The Multigas 2030 software offers robust quantitative analysis of all required compounds simultaneously, with automatic corrections for temperature and pressure variations. It can acquire and analyze samples in under one second, continuously acquiring spectra while computing gas concentrations. A residual spectrum feature identifies unaccounted spectral data, simplifying QA/QC verification and allowing saved spectra to be reprocessed at any time using the same or alternative calibration sets.

The system is specifically designed for process and environmental monitoring and can operate at spectral resolutions up to 0.5 cm^{-1}, even in hostile environments with vibration and temperature fluctuations. Its high-speed data processing produces low-noise infrared spectra. A single analyzer can measure all required components without requiring moisture removal prior to analysis, supporting hot/wet sampling methods. It is engineered for highly corrosive applications and excels at measuring water-soluble and reactive gases such as HCl and NH_3. Its rugged design and versatility make it well suited for the Hybrid Burn Chamber application.

Hot/Wet FTIR technology based CEMS is an ideal technology to monitor emissions and conditions of the Hybrid Burn Chamber. The Hot/Wet FTIR is not affected or corroded as all gases and components are heated above the dewpoint to maintain a safe analyzer environment. The ability of one Hot/Wet FTIR analyzer to measure multiple gases simultaneously provides a one analyzer solution, improves overall system integrity, requires less space and reductions in analyzer failures. The simple design of the system removes the requirement for chillers, filters, scrubbers, extra pumps, resulting in lower maintenance and less failure points.

RCRA Permit Application

Permit Number: 50424

EnviroSafe Demil, LLC

401 Demil Way

Hooks, Texas 75561-0019

December 3, 2024

Texas Commission on Environmental Quality
Attention: Waste Permits Division, MC 126
P.O. Box 13087
Austin, Texas 78711-3087

RE: RCRA PERMIT APPLICATION – ENVIROSAFE DEMIL, LLC IN HOOKS, TEXAS
INDUSTRIAL SOLID WASTE REGISTRATION NUMBER: 98470
PROPOSED HAZARDOUS WASTE PERMIT NUMBER: 50424

Texas Commission on Environmental Quality, Waste Permits Division:

EnviroSafe Demil, LLC (ESD) is resubmitting the attached Industrial and Hazardous Waste Permit Application for the facility in Hooks, Texas to the Texas Commission on Environmental Quality (TCEQ).

History
This application was originally submitted to TCEQ on May 24, 2024. TCEQ issued an Administrative Notice of Deficiency on June 5, 2024 and ESD submitted a response to the NOD on June 19, 2024. An email from Dawn Dollins (TCEQ) to TJ Ogden (ESD) on June 28, 2024 requested that additional information required by TCEQ rule 30 TAC 305.50(a)(7) be submitted in response to NOD #A13 within 15 days from June 27, 2024. ESD was granted a 60 day extension by Dawn Dollins (TCEQ) on July 12, 2024. The process of obtaining the required information to fully address NOD #A13 (certification of engineering plans and specifications by a Texas licensed P.E. as required by the Texas Engineering Practice Act) would have extended past the specified response time, so on September 16, 2024, ESD submitted a withdrawal request for the permit application. A letter from Charly Fritz (TCEQ) dated September 24, 2024 stated that ESD could resubmit the application within 90 days of withdrawal and apply the application fee of $3,666.00 to the new submittal. This submittal includes all of the original information submitted, plus the additional information requested in the June 5, 2024 Notice of Deficiency.

Content of Submittal
The following documents are enclosed in this mailing:

- TCEQ-20714, Waste Permits Division Correspondence Cover Sheet*
- TCEQ-20591, Plain Language Summary*
- TCEQ-20960, Public Involvement Plan Form for Permit and Registration Applications*
- Part A permit application*
- Part B permit application*
- An electronic mailing list of the List of Adjacent Landowners and the RCRA Part B Application Administrative and Technical Evaluation Checklist is included on compact disk (CD)

**The originally signed documents plus 1 paper copy is included. The 3rd copy is submitted on a thumb drive. Additionally, a full copy of the application will be submitted electronically via TCEQ's FTPS.*

The RCRA Part B Application Administrative and Technical Evaluation Checklist will also be submitted electronically via TCEQ's FTPS, in addition to being included on compact disk (CD).

Please contact me at 360-480-9320 or mwentz@envirosafedemil.com with any questions or comments.

Sincerely,

Michael Wentz
President, EnviroSafe Demil, LLC.
401 N Montague Street
Hooks, Texas 75561-0019

Texas Commission on Environmental Quality

Waste Permits Division Correspondence Cover Sheet

Date: December 3, 2024
Facility Name: EnviroSafe Demil, LLC (98470)
Permit or Registration No.: 50424 Permit No.
98470 Registration No.

Nature of Correspondence:
☒ Initial/New
☐ Response/Revision to TCEQ Tracking No.: _____ (from subject line of TCEQ letter regarding initial submission)

Affix this cover sheet to the front of your submission to the Waste Permits Division. Check appropriate box for type of correspondence. Contact WPD at (512) 239-2335 if you have questions regarding this form.

Table 1 - Municipal Solid Waste Correspondence

Applications	Reports and Notifications
☐ New Notice of Intent	☐ Alternative Daily Cover Report
☐ Notice of Intent Revision	☐ Closure Report
☐ New Permit (including Subchapter T)	☐ Compost Report
☐ New Registration (including Subchapter T)	☐ Groundwater Alternate Source Demonstration
☐ Major Amendment	☐ Groundwater Corrective Action
☐ Minor Amendment	☐ Groundwater Monitoring Report
☐ Limited Scope Major Amendment	☐ Groundwater Background Evaluation
☐ Notice Modification	☐ Landfill Gas Corrective Action
☐ Non-Notice Modification	☐ Landfill Gas Monitoring
☐ Transfer/Name Change Modification	☐ Liner Evaluation Report
☐ Temporary Authorization	☐ Soil Boring Plan
☐ Voluntary Revocation	☐ Special Waste Request
☐ Subchapter T Disturbance Non-Enclosed Structure	☐ Other:
☐ Other:	

Table 2 - Industrial & Hazardous Waste Correspondence

Applications	Reports and Responses
☒ New	☐ Annual/Biennial Site Activity Report
☐ Renewal	☐ CPT Plan/Result
☐ Post-Closure Order	☐ Closure Certification/Report
☐ Major Amendment	☐ Construction Certification/Report
☐ Minor Amendment	☐ CPT Plan/Result
☐ CCR Registration	☐ Extension Request
☐ CCR Registration Major Amendment	☐ Groundwater Monitoring Report
☐ CCR Registration Minor Amendment	☐ Interim Status Change
☐ Class 3 Modification	☐ Interim Status Closure Plan
☐ Class 2 Modification	☐ Soil Core Monitoring Report
☐ Class 1 ED Modification	☐ Treatability Study
☐ Class 1 Modification	☐ Trial Burn Plan/Result
☐ Endorsement	☐ Unsaturated Zone Monitoring Report
☐ Temporary Authorization	☐ Waste Minimization Report
☐ Voluntary Revocation	☐ Other:
☐ 335.6 Notification	
☐ Other:	

Texas Commission on Environmental Quality

Waste Permits Division Correspondence Cover Sheet

Date: April 21, 2026
Facility Name: EnviroSafe Demil, LLC
Permit or Registration No.: 50424

Nature of Correspondence:
☒ Initial/New
☒ Response/Revision to TCEQ Tracking No.: 30585390 (from subject line of TCEQ letter regarding initial submission)

Affix this cover sheet to the front of your submission to the Waste Permits Division. Check appropriate box for type of correspondence. Contact WPD at (512) 239-2335 if you have questions regarding this form.

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☐ Major Amendment	☐ Groundwater Corrective Action
☐ Minor Amendment	☐ Groundwater Monitoring Report
☐ Limited Scope Major Amendment	☐ Groundwater Background Evaluation
☐ Notice Modification	☐ Landfill Gas Corrective Action
☐ Non-Notice Modification	☐ Landfill Gas Monitoring
☐ Transfer/Name Change Modification	☐ Liner Evaluation Report
☐ Temporary Authorization	☐ Soil Boring Plan
☐ Voluntary Revocation	☐ Special Waste Request
☐ Subchapter T Disturbance Non-Enclosed Structure	☐ Other:
☐ Other:	

Table 2 - Industrial & Hazardous Waste Correspondence

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☐ Minor Amendment	☐ CPT Plan/Result
☐ CCR Registration	☐ Extension Request
☐ CCR Registration Major Amendment	☐ Groundwater Monitoring Report
☐ CCR Registration Minor Amendment	☐ Interim Status Change
☐ Class 3 Modification	☐ Interim Status Closure Plan
☐ Class 2 Modification	☐ Soil Core Monitoring Report
☐ Class 1 ED Modification	☐ Treatability Study
☐ Class 1 Modification	☐ Trial Burn Plan/Result
☐ Endorsement	☐ Unsaturated Zone Monitoring Report
☐ Temporary Authorization	☐ Waste Minimization Report
☐ Voluntary Revocation	☐ Other:
☐ 335.6 Notification	
☐ Other:	

Texas Commission on Environmental Quality

Plain Language Summary

Industrial and Hazardous Waste Permit Applications

Instructions: Complete this form and submit with any industrial hazardous waste, or industrial solid waste, permit application that is subject to 30 Texas Administrative Code §39.405(k) [applications for a Class 3 permit modification, permit amendment, permit renewals, and for a new permit]. Please be concise.

Application Information

Purpose of application: ☒New ☐Renewal ☐Modification/Amendment	
Date Submitted to TCEQ: May 24, 2024	
Customer Name: EnviroSafe Demil, LLC	
Facility Name: EnviroSafe Demil, LLC	
CN: 606060028	RN: 111572442
Permit Number: 50424	Solid Waste Registration Number: 98470
Facility Street Address: 401 Demil Way, Hooks, TX 75561	
Weblink to Street Address: https://earth.google.com/web/search/401+N+Montague+Street,+Hooks,+TX+75561/	

Facility Information *(check all that apply)*

What is the primary type of business?	☐Chemical manufacturing ☐ Oil refinery ☒ Treatment, storage or disposal facility plant ☐Other If other, enter description:
What does the facility produce?	☐Chemicals ☐Fuels / lubricants ☒No products ☐Other If other, enter description:

Waste Management Information *(check all that apply)*

What types of wastes are managed?	☐Nonhazardous industrial ☒Hazardous ☒Other If other, enter description: energetic materials
Where does the waste come from?	☒Off-site source energetic materials ☒On-site source Processing unit and air pollution control system (APCS) waste
How is the waste managed?	☒Storage ☒Process / Treatment energetic materials ☐Disposal ☒Other If other, enter description: Processing unit and APCS waste shipped off-site
What type of units manage the waste?	☒Active ☐Post-Closure Type and count: Storage Magazines - 3; Hybrid Burn Chamber (HBC) - 1; Preparation building (Rocket Motor Ops Building) - 1
What happens to waste managed at the facility?	☒Transported off-site Processing unit and APCS waste ☐Disposed on-site ☒Other If other, enter description: Energetic material processed in processing unit

Pollution Control Methods *(check all that apply)*	
How will the facility prevent spills, leaks, and releases?	☒Routine inspections ☐Engineered liner systems ☒Spill containment ☒Proper waste handling ☒Operations in enclosed buildings ☐Groundwater monitoring ☐Other If other, enter description:
How will the facility clean up spills, leaks, and releases?	☒Spill clean-up supplies ☒Decontamination equipment ☐Other If other, enter description:
How will the facility prevent / minimize air emissions?	☒Air monitoring / control systems ☒Filters / scrubbers ☒Routine inspections ☒Proper waste handling ☒Operations in enclosed buildings ☐Other If other, enter description:

Description of Update *(for Class 3 Modifications and Amendments only)*

List and explain any changes this modification or amendment would make to the two sections above—Waste Management Information and Pollution Control Methods.

Clear Form

Texas Commission on Environmental Quality

Public Involvement Plan Form for Permit and Registration Applications

The Public Involvement Plan is intended to provide applicants and the agency with information about how public outreach will be accomplished for certain types of applications in certain geographical areas of the state. It is intended to apply to new activities; major changes at existing plants, facilities, and processes; and to activities which are likely to have significant interest from the public. This preliminary screening is designed to identify applications that will benefit from an initial assessment of the need for enhanced public outreach.

All applicable sections of this form should be completed and submitted with the permit or registration application. For instructions on how to complete this form, see TCEQ-20960-inst.

Section 1. Preliminary Screening

☒ New Permit or Registration Application
☐ New Activity – modification, registration, amendment, facility, etc. (see instructions)

If neither of the above boxes are checked, a Public Involvement Plan is not necessary. Completion of the remaining sections not required.

Section 2. Secondary Screening

☒ Requires public notice,
☐ Considered to have significant public interest, **and**
☐ Located within any of the following geographical locations:

- Austin
- Dallas
- Fort Worth
- Houston
- San Antonio
- West Texas
- Texas Panhandle
- Along the Texas/Mexico Border
- Other geographical locations should be decided on a case-by-case basis

If all of the above boxes are not checked, a Public Involvement Plan is not necessary. Stop after Section 2.

☒ Public Involvement Plan not applicable to this application. Provide **brief** explanation.
EnviroSafe Demil, LLC is located in northeastern Texas; Bowie County; City of Hooks, Texas. The geographical locations shown above are not near the facility.

Section 3. Application Information

Not Applicable per Section 2

Type of Application (check all that apply):

Air ☐ Initial ☐ Federal ☐ Amendment ☐ Standard Permit ☐ Title V

Waste ☐ Municipal Solid Waste ☐ Industrial and Hazardous Waste
☐ Radioactive Materials Licensing ☐ Underground Injection Controls

Water Quality

☐ Texas Pollutant Discharge Elimination System (TPDES)

- ☐ Texas Land Application Permit (TLAP)
- ☐ State Only Concentrated Animal Feeding Operation (CAFO)
- ☐ Water Treatment Plant Residuals Disposal Permit
  - ☐ Class B Biosolids Land Application Permit
  - ☐ Domestic Septage Land Application Registration

Water Rights New Permit

- ☐ New Appropriation of Water
- ☐ New or existing reservoir

Amendment to an Existing Water Right

- ☐ Add a New Appropriation of Water
- ☐ Add a New or Existing Reservoir
- ☐ Major Amendment that could affect other water rights or the environment

Section 4. Plain Language Summary

Not Applicable per Section 2

Provide a brief description of planned activities.

Section 5. Community and Demographic Information

Not Applicable per Section 2

Community information can be found using EPA's EJ Screen, U.S. Census Bureau information, or generally available demographic tools.

Information gathered in this section can assist with the determination of whether alternative language notice is necessary. Please provide the following information.

_____

(City)

_____

(County)

(Census Tract)

Please indicate which of these three is the level used for gathering the following information.
☐ City
☐ County
☐ Census Tract

(a) Percent of people over 25 years of age who at least graduated from high school

(b) Per capita income for population near the specified location

(c) Percent of minority population and percent of population by race within the specified location

(d) Percent of Linguistically Isolated Households by language within the specified location

(e) Languages commonly spoken in area by percentage

(f) Community and/or Stakeholder Groups

(g) Historic public interest or involvement

Section 6. Planned Public Outreach Activities

Not Applicable per Section 2

(a) Is this application subject to the public participation requirements of Title 30 Texas Administrative Code (30 TAC) Chapter 39?

☐ Yes ☐ No

(b) If yes, do you intend at this time to provide public outreach other than what is required by rule?

☐ Yes ☐ No

If Yes, please describe.

If you answered "yes" that this application is subject to 30 TAC Chapter 39, answering the remaining questions in Section 6 is not required.

(c) Will you provide notice of this application in alternative languages?

☐ Yes ☐ No

Please refer to Section 5. If more than 5% of the population potentially affected by your application is Limited English Proficient, then you are required to provide notice in the alternative language.

If yes, how will you provide notice in alternative languages?

☐ Publish in alternative language newspaper

☐ Posted on Commissioner's Integrated Database Website

☐ Mailed by TCEQ's Office of the Chief Clerk

☐ Other (specify)

(d) Is there an opportunity for some type of public meeting, including after notice?

☐ Yes ☐ No

(e) If a public meeting is held, will a translator be provided if requested?

☐ Yes ☐ No

(f) Hard copies of the application will be available at the following (check all that apply):

☐ TCEQ Regional Office

☐ TCEQ Central Office

☐ Public Place (specify)

Section 7. Voluntary Submittal

Not Applicable per Section 2

For applicants voluntarily providing this Public Involvement Plan, who are not subject to formal public participation requirements.

Will you provide notice of this application, including notice in alternative languages?

☐ Yes ☐ No

What types of notice will be provided?

☐ Publish in alternative language newspaper

☐ Posted on Commissioner's Integrated Database Website

☐ Mailed by TCEQ's Office of the Chief Clerk

☐ Other (specify)

Texas Commission on Environmental Quality
Instructions and Procedural Information
for Filing a Permit Application for a
Hazardous Waste Storage, Processing, or Disposal Facility

Part A

[**Form Availability**: This form, as well as other Industrial and Hazardous Waste documents, is available on the Internet World Wide Web, Industrial and Hazardous Waste home page at address https://www.tceq.texas.gov/permitting/waste_permits/ihw_permits]

General Instructions

1. A person (individual, corporation or other legal entity) who stores, processes or disposes of hazardous waste (except where such storage and/or processing is excluded from permit requirements in accordance with 30 Texas Administrative Code (TAC) Section 335.2) must obtain a permit pursuant to the Texas Health and Safety Code. In applying to the Texas Commission on Environmental Quality, hereafter referred to as the Commission, the applicant shall follow the procedures outlined below, on the application and in the Rules of the Commission.

2. The application (one original plus three (3) complete copies[1]) should be mailed to:

   Texas Commission on Environmental Quality
   Attention: Waste Permits Division, MC126
   P. O. Box 13087
   Austin, Texas 78711-3087

3. Signature on Application [30 TAC 305.44]. The application shall be signed by the owner and operator or by a duly authorized agent, employee, officer, or representative of the owner or operator and shall be verified before a notary public. When another person signs on behalf of the owner and operator, this person's title or relationship to the owner or operator should be shown. In all cases, the person signing the form should be authorized to do so by the owner or operator (the Commission may require a person signing on behalf of an owner or operator to provide proof of authorization). An application submitted for a corporation must be signed by (or the signatory must be authorized by) a responsible corporate officer such as a president, secretary, treasurer, vice-president, or designated manager; or for a partnership or sole proprietorship, by a general partner or the proprietor, respectively. In the case of a municipal, state, federal, or other public facility, the application shall be signed by either a principal executive

[1] The third copy may optionally consist of paper copies of all plans and maps and a computer diskette of the remaining document. The document should be formatted in Word processing software up to and including version 6.1 or a 100% compatible format. Files may be compressed using PKZIP Ver. 2 or a 100% compatible program.

officer or ranking elected official.

4. An application will not be processed until all information required to properly evaluate the application has been obtained. When an application is severely lacking in detail and/or the applicant fails to submit additionally requested information in a timely manner, the application will not be considered to be "filed in accordance with the rules and regulations of the Commission."

   Please submit any application revisions with a revised date and page numbers at the bottom of the page(s).

5. Fees and Costs

   a. The fee for filing an application is discussed in Section XII of Part B, form number TCEQ-0376.

   b. The applicant for a permit is required to bear the cost of publication of notice of the application in a newspaper as prescribed by 30 TAC Section 39.405(f).

6. A person may not commence operation of a hazardous waste management facility until the Commission has issued a permit to authorize the storage, processing, or disposal of hazardous waste, except with the approval of the Commission.

7. Designation of Material as Confidential

   The designation of material as confidential is frequently carried to excess. The Commission has a responsibility to provide a copy of each application to other review agencies and to interested persons upon request and to safeguard confidential material from becoming public knowledge. Thus, the Commission requests that the applicant (1) be prudent in the designation of material as confidential and (2) submit such material only when it might be essential to the staff in their development of a recommendation.

   The Commission suggests that the applicant NOT submit confidential information as part of the permit application. However, if this cannot be avoided, the confidential information should be described in non-confidential terms throughout the application, and submitted as a document or binder, and conspicuously marked "CONFIDENTIAL."

   Reasons of confidentiality include the concept of trade secrecy and other related legal concepts which give a business the right to preserve confidentiality of business information to obtain or retain advantages from its right in the information. This includes authorizations under 18 U.S.C. 1905 and special rules cited in 40 CFR Chapter I, Part 2, Subpart B.

   Section 361.037 of the Texas Health and Safety Code does not allow an applicant for an industrial and hazardous waste permit to claim as confidential any record pertaining to the characteristics of the industrial solid waste.

   The applicant may elect to withdraw any confidential material submitted with the application. However, the permit cannot be issued, amended, or modified if the application is incomplete.

Part II

Procedural Information

After the submittal of Parts A and B of the application, the TCEQ will provide public notice of receipt of the application. The Executive Director's staff will review the application for completeness of information submitted. During the review, the applicant may be contacted for clarification or additional information. When all pertinent information is present, the application or a summary of its contents will be forwarded for review by other state agencies and local governmental entities interested in water quality control and solid waste management. After technical evaluation, opportunity for public hearing will be afforded.

Note that for facilities which had "commenced on-site storage, processing, or disposal of hazardous waste" [see 30 TAC Section 335.43(b)] on or before the date such waste is identified or listed as hazardous by EPA, the Texas Health and Safety Code provides in Section 361.082(f) that these facilities may continue to manage hazardous waste until such time as the Commission approves or denies the application, provided that the applicant has filed the permit application in accordance with the rules and regulations of the Commission.

The Commission may act upon an application for a permit, permit amendment, permit modification, or renewal of a permit without the necessity of holding a public hearing:

1. (a) When notice of the application has been mailed to persons possibly affected by the proposed permit; and

   (b) When notice has been published at least once in a newspaper regularly published or circulated within each county where the proposed facility is located; and

   (c) Within forty-five (45) days following publication of the Commission's notice, a Commissioner, the Executive Director or an affected person has not requested a public hearing; or

2. For a Class 1 or a Class 2 permit modification or a minor amendment to a permit. The Commission may, in certain cases, hold a public hearing for a Class 2 permit modification or a minor amendment.

A public hearing may be scheduled on an application for a RCRA hazardous waste permit when requested by a Commissioner, the Executive Director, or an affected person within forty-five (45) days following the newspaper publication.

Requirements of Giving Notice of the Application:

1. By the Applicant: Every applicant for a permit, permit amendment, permit modification, or permit renewal shall publish notice (see note below) of the application at least once in a newspaper regularly published or circulated within each county where the proposed facility is located. Where a public hearing has been requested, notice will be mailed to the applicant in ample time for publication, which shall be not less than thirty (30) days prior to the date set for the hearing. Except in the case of a notice of a permit modification request, the Commission will mail the appropriate notice and instructions for publication to the applicant.

   NOTE: Additional publication and direct mail notice to affected persons will result if a public hearing is requested following newspaper publication of the notice of application. The cost of providing this additionally required publication and service of notice to affected persons will be assumed by the applicant.

2. By the Texas Commission on Environmental Quality: The Commission will mail notice of

the application (except for permit modifications) to affected persons and certain governmental entities. The notice will be mailed at the same time instructions for newspaper publications are mailed to the applicant.

3. Bilingual Notice Instructions:

   For certain permit applications, public notice in an alternate language is required. If an elementary school or middle school nearest to the facility offers a bilingual program, notice may be required to be published in an alternative language. The Texas Education Code, upon which the TCEQ alternative language notice requirements are based, requires a bilingual education program for an entire school district should the requisite alternative language speaking student population exist. However, there may not be any bilingual-speaking students at a particular school within a district which is required to offer the bilingual education program. For this reason, the requirement to publish notice in an alternative language is triggered if the nearest elementary or middle school, as part of a larger school district, is required to make a bilingual education program available to qualifying students and either the school has students enrolled at such a program on-site, or has students who attend such a program at another location to satisfy the school's obligation to provide such a program.

   If it is determined that a bilingual notice is required, the applicant is responsible for ensuring that the publication in the alternate language is complete and accurate in that language. Electronic versions of the Spanish template examples are available from the TCEQ to help the applicant complete the publication in the alternative language.

Bilingual Notice Application Form:

Bilingual notice confirmation for this application:

1. Is the school district of the elementary or middle school nearest to the facility required by the Texas Education Code to have a bilingual program?

   ☐YES ☒ NO **Tracy Cook, Assistant Superintendent of Hooks Independent School District, verified that they are not required to have a bilingual program by TEA and they do not have a bilingual program.**

   (**If NO**, alternative language notice publication not required)

2. **If YES** to question 1, are students enrolled in a bilingual education program at either the elementary school or the middle school nearest to the facility?

   ☐ YES ☐ NO

   (**If YES** to questions 1 and 2, alternative language publication is required; **If NO** to question 2, then consider the next question)

3. **If YES** to question 1, are there students enrolled at either the elementary school or the middle school nearest to the facility who attend a bilingual education program at another location?

   ☐ YES ☐ NO

   (**If Yes** to questions 1 and 3, alternative language publication is required; **If NO** to question 3, then consider the next question)

4. **If YES** to question 1, would either the elementary school or the middle school nearest to the facility be required to provide a bilingual education program but for the fact that it

secured a waiver from this requirement, as available under 19 TAC 89.1205(g)?

☐ YES ☐ NO

(**If Yes** to questions 1 and 4, alternative language publication is required; **If NO** to question 4, alternative language notice publication not required)

If a bilingual education program(s) is provided by either the elementary school or the middle school nearest to the facility, which language(s) is required by the bilingual program? **N/A, See question #1.**

Consideration of the Permit Application by the Commission:

The applicant will be notified by the Commission when the application is set for final consideration. If the Commission issues the permit, the applicant will be mailed a copy of the permit by the TCEQ Office of the Chief Clerk within one (1) month following Commission approval. (NOTE: Only one copy is mailed to the applicant and that copy will be sent to the official mailing address of the applicant as shown on the permit application form.)

Table of Contents

Texas Commission on Environmental Quality Instructions and Procedural Information for Filing a Permit Application for a Hazardous Waste Storage, Processing, or Disposal Facility i

Part A i
General Instructions i
Part II iii
Procedural Information iii
Bilingual Notice Application Form: iv

Texas Commission on Environmental Quality Permit Application for a Hazardous Waste Storage/Processing/Disposal Facility Part A - Facility Background Information 1
I. General Information 1

A. Facility Name 1
B. Facility Contact 1
C. Operator 2
D. Owner 2
E. Type of Application Submittal 43
F. Registration and Permit Information 54
G. Give a brief description of the nature of your business. 65
H. TCEQ Core Data Form 65

Signature Page 76
II. Facility Background Information 87

A. Location of Facility for which the application is submitted 87
B. Legal Description of Facility 87
C. SIC Codes 87

III. Wastes and Waste Management 109

A. Waste Generation and Management Activities 109
B. Waste Management Units Summary 109
C. Location of Waste Management Units 1110
D. Flow Diagram/Description 1211

IV. Index Of Attachments 1312
Table III-1 – Hazardous Wastes and Management Activities 1413
Table III-2 – Hazardous Waste Management Unit Checklist 1514

Texas Commission on Environmental Quality
Permit Application for a Hazardous Waste Storage/Processing/Disposal Facility
Part A - Facility Background Information

I. General Information

A. Facility Name: **EnviroSafe Demil, LLC**

(Individual, Corporation, or Other Legal Entity Name)

TCEQ Solid Waste Registration No: **98470** EPA I.D. No.: **TXR000086289**

Street Address (If Available): **401 ~~N Montague Street~~Demil Way**

City: **Hooks**, State: **TX** Zip Code: **75561**

County: **Bowie**

Telephone Number: **(206) 999-8684** Charter Number: **805003546**

If the application is submitted on behalf of a corporation, please identify the Charter Number as recorded with the Office of the Secretary of State for Texas.

B. Facility Contact

1. List those persons or firms who will act as primary contact for the applicant during the processing of the permit application. Also indicate the capacity in which each person may represent the applicant (engineering, legal, etc.). The person listed first will be the primary recipient of correspondence regarding this application. Include the complete mailing addresses and phone numbers.

Contact – Primary, Legal
TJ Ogden
CEO & Founder, EnviroSafe Demil, LLC
401 ~~N Montague Street~~Demil Way
Hooks, TX 75561
Phone: 206-999-8684
Email: [redacted]

Contact – Engineering
Michael Wentz
President, EnviroSafe Demil, LLC
401 ~~N Montague Street~~Demil Way
Hooks, TX 75561
Phone: 360-480-9320
Email: [redacted]

2. If the application is submitted by a corporation or by a person residing out of state, the applicant must register an Agent in Service or Agent of Service with the Texas Secretary of State's office and provide a complete mailing address for the agent. The agent must be a Texas resident.

Agent In Service
Michael Wentz
President, EnviroSafe Demil, LLC
401 ~~N Montague Street~~Demil Way
Hooks, TX 75561
Phone: 360-480-9320
Email: [redacted]

C. Operator[1]: Identify the entity who will conduct facility operations.

Operator Name**:** **EnviroSafe Demil, LLC**

Address: **401 ~~N Montague Street~~Demil Way**

City: **Hooks**, State: **TX** Zip Code: **75561**

Telephone Number: **(206) 999-8684** Charter Number: **805003546**

D. Owner

1. Indicate the ownership status of the facility:

   a. Private **X**

      (1) **X** Corporation
      (2) _____Partnership
      (3) _____Proprietorship
      (4) _____Non-profit organization

   b. Public _____

      (1) _____Federal
      (2) _____Military
      (3) _____State
      (4) _____Regional
      (5) _____County
      (6) _____Municipal
      (7) _____Other (specify)

2. Does the operator own the facility units and facility property?

   ☐ Yes ☒ No

   The operator, EnviroSafe Demil, LLC (ESD), owns the facility's processing units and the main portion of the facility

[1] The operator has the duty to submit an application if the facility is owned by one person and operated by another [30 TAC 305.43(b)]. The permit will specify the operator and the owner who is listed on this application [Section 361.087 Texas Health and Safety Code].

(purchased from~~. ESD is currently in the middle of closing on the purchase of the main portion of the facility from~~ the TexAmericas Center~~). and expects that the purchase will be complete by the time the RCRA permit is issued.~~ ESD is leasing the ~~adjacent~~ proximate storage areas from the TexAmericas Center.

Below is a summary of the owner/operator status:

- **Main Facility – owned by ESD; operated by ESD**
- **Above Ground Magazine – owned by TAC East Holdings; operated by ESD**
- **Earth Covered Magazines - owned by TAC East Holdings; operated by ESD**
- **Roadways – owned by TexAmerica's Center; ESD has the right-of-way to use these roads**

If you checked "no",

a. Submit as "Attachment A" a copy of the lease for use of or the option to buy said facility units and/or facility property, as appropriate; and

***Attachment A – Lease Information* is included.**

b. Identify the facility units' owner(s) and/or facility property owner(s). Please note that the owner(s) is/are required to sign the application on page 5.

~~Facility Unit's~~Main Facility Owner Name:
~~—~~**EnviroSafe Demil, LLC**
Address: **401 ~~N Montague Street~~Demil Way**
City: **Hooks**, State: **TX** Zip Code: **75561**
Telephone Number: **(206) 999-8684**

~~Facility Property~~Above Ground Magazine and Earth Covered Magazine Owner Name*****:
~~—~~**TAC East Holdings Co. No 1**
Address: **107 Chapel Lane**
City: **New Boston**, State: **TX** Zip Code: **75570**
****See information under Item D.2 above.***

Roadways Owner Name*****:
TexAmerica's Center
Address: **107 Chapel Lane**
City: **New Boston**, State: **TX** Zip Code: **75570**
****See information under Item D.2 above.***

E. Type of Application Submittal:
Initial __**X**__ or Revision _____

F. Registration and Permit Information

Indicate (by listing the permit number(s) in the right-hand column below) all existing or pending State and/or Federal permits or construction approvals which pertain to pollution control or industrial solid waste management activities conducted by your plant or at your location. Complete each blank by entering the *permit number*, or the *date of application*, or *"none"*.

	Relevant Program and/or Law	Permit No.	Agency*
1.	Texas Solid Waste Disposal Act		
2.	Wastewater disposal under the Texas Water Code		
3.	Underground injection under the Texas Water Code		
4.	Texas Clean Air Act	**170884**	**TCEQ**
5.	Texas Uranium Surface Mining & Reclamation Act		
6.	Texas Surface Coal Mining & Reclamation Act		
7.	Hazardous Waste Management program under the Resource Conservation and Recovery Act		
8.	UIC program under the Safe Drinking Water Act		
9.	TPDES program under the Clean Water Act		
10.	PSD program under the Clean Air Act		
11.	Nonattainment program under the Clean Air Act		
12.	National Emission Standards for Hazardous Pollutants (NESHAP) Pre-construction approval under the Clean Air Act		
13.	Ocean dumping permits under the Marine Protection Research and Sanctuaries Act		

14. Dredge or fill permits under section 404 of the Clean Water Act	_____	_____
15. Other relevant environmental permits	_____	_____

*Use the following acronyms for each agency as shown below:

TCEQ	= Texas Commission on Environmental Quality
TRC	= Texas Railroad Commission
TDH	= Texas Department of Health
TDA	= Texas Department of Agriculture
EPA	= U.S. Environmental Protection Agency
CORPS	= U.S. Army Corps of Engineers

G. Give a brief description of the nature of your business.

Envirosafe Demil, LLC safely and cleanly processes energetic materials. The Hybrid Burn Chamber (HBC) provides a modern and environmentally responsible alternative to open burning.

H. TCEQ Core Data Form

The TCEQ requires that a Core Data Form (Form 10400) be submitted on all incoming applications. For more information regarding the Core Data Form, call (512) 239-1575 or go to the TCEQ website at http://www.tceq.texas.gov/permitting/central_registry/guidance.html.

The Core Data Form (Form 10400) is included following this form.

Signature Page

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Operator Signature: _____ Date: _____

Name and Official Title (type or print): _____

Operator Signature: _____ Date: _____

Name and Official Title (type or print): _____

Operator Signature: _____ Date: _____

Name and Official Title (type or print): _____

Owner Signature: _____ Date: _____

Name and Official Title (type or print): _____

To be completed by the operator if the application is signed by an authorized representative for the operator

I, _____ hereby designate _____
(operator) (authorized representative)
as my representative and hereby authorize said representative to sign any application, submit additional information as may be requested by the Commission; and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my authorized representative support of the application, and for compliance with the terms and conditions of any permit which might be issued based upon this application.

_____
Printed or Typed Name of Operator or Principal Executive Officer

_____
Signature

(Note: Application Must Bear Signature & Seal of Notary Public)

Subscribed and sworn to before me by the said _____on this

_____ day of _____, _____.

My commission expires of the _____ day of _____, _____

_____
Notary Public in and for _____ County, Texas

II. Facility Background Information

A. Location of Facility for which the application is submitted

1. Give a description of the location of the facility site with respect to known or easily identifiable landmarks.

The facility is located in Hooks, Texas (Bowie County), north of ~~Pine~~ Cypress Street, south of Oak Street, east of N Montague Street (renamed to Demil Way), and west of Freedom Way. Hooks, Texas is east of New Boston, Texas and west of Texarkana, Texas.

2. Detail the access routes from the nearest U.S. or State Highway to the facility.

The facility is located south of US-82 (just south of I-30) in Hooks, Texas and can be accessed by driving westward from Texarkana, Texas on US-82, turning left (south) onto Bowie Parkway, turning right (west) onto Oak Street, and turning left (south) onto N Montague Street (renamed Demil Way). The facility can also be accessed by driving eastward from New Boston, Texas on US-82, turning right (south) on Cass Street, left (east) on Oak Street, and right (south) on N Montague Street (renamed Demil Way). Other routes are possible, including access via Interstate 30 (I-30), but these are the most direct routes.

3. Enter the geographical coordinates of the facility:

Latitude: 33°26'56.0"N

Longitude: 94°15'21.9"W

4. Is the facility located on Indian lands?

☐ Yes ☒ No

B. Legal Description of Facility

Submit as "Attachment B" a legal description(s) of the tract or tracts of land upon which the waste management operations referred to in this permit application occur or will occur. Although a legal description is required, a metes and bounds description is not necessary for urban sites with appropriate "lot" description(s). A survey plat or facility plan drawing which shows the specific points referenced in the survey should also be included in Attachment B.

***Attachment B – Legal Description of the Facility* is included.**

C. SIC Codes

List, in descending order of significance, the four-digit standard industrial classification (SIC) codes that best describe your facility in terms of the principal products or services you produce or provide. Also, specify each classification in words. These classifications may differ from the SIC codes describing the operation generating the hazardous wastes.

4-digit SIC Code	Description
4953	Refuse Systems

4-digit SIC Code	Description

SIC code numbers are descriptions that may be found in the Standard Industrial Classification Manual prepared by the Executive Officer of the President, Office of Management and Budget, which is available from the Government Printing Office, Washington, D.C. Use the current edition of the manual.

III. Wastes and Waste Management

A. Waste Generation and Management Activities

Is any hazardous waste [see Title 40, Code of Federal Regulations (CFR), Part 261] presently or proposed to be generated or received at your facility?

☒ Yes ☐ No

If no, skip to question Number 2 below.

If yes, answer the following question.

1. Are you presently registered with TCEQ as a solid waste generator?

   ☒ Yes ☐ No ☐ Pending

   If no, contact the Industrial and Hazardous Waste Division of TCEQ in Austin, Texas to obtain registration information. Also, continue with the application form (go to Number 2 below).

   If yes, go to Section I of your TCEQ Notice of Registration, determine which of your wastes are hazardous, and list these wastes (and mixtures) in Table III-1 (see Number 2 below).

2. Complete Table III-1, Hazardous Wastes and Management Activities, below, listing all hazardous wastes, all mixtures containing any hazardous wastes, and hazardous debris which were, are presently, or are proposed to be handled at your facility in interim status or permitted units. See 40 CFR 261 and 268.2, attaching additional copies as necessary.

   Guidelines for the Classification & Coding of Industrial Wastes and Hazardous Wastes, TCEQ publication RG-22, contains guidance on how to properly classify and code industrial waste and hazardous waste in accordance with 30 TAC 335.501-335.515 (Subchapter R).

   If you are not registered with TCEQ, enter "NA" for TCEQ Waste Code Number.

   For the EPA Hazardous Waste Numbers, see 40 CFR 261.20-33. For annual quantity, provide the amount in units of pounds (as generated and/or received) for each waste and/or waste mixture.

   Table III-1 has been completed and is included below.

B. Waste Management Units Summary

1. For each waste and waste mixture listed in Table III-1 that is stored, processed, and/or disposed on-site (except where such storage and/or processing is excluded from permit requirements in accordance with Texas Administrative Code (TAC) Section 335), complete Table III-2, Hazardous Waste Management Unit Checklist, and enter the name of each hazardous waste management unit (Note: Please make copies of Table III-2 if necessary).

   Give the design capacity of each hazardous waste management unit in any of the units of measure shown. In the case of inactive or closed units for which design details are unavailable, an estimate of the design capacity is sufficient.

   Please provide a description for each waste management unit described in your own words on the line provided for "Waste Management Unit."

   Table III-2 has been completed and is included below.

2. Has the applicant at any time conducted the on-site disposal of industrial solid waste now identified or listed as hazardous waste?

   ☐ Yes ☒ No

   If yes, complete Table III-2 indicating the hazardous waste management units which were once utilized at your plant site but are no longer in service (i.e., inactive or closed facility units).

   If no, and if no hazardous waste is presently or proposed to be stored [for longer than 90 days (see 30 TAC Section 335.53)], processed, or disposed of at your facility, then you need not file this permit application. Otherwise proceed with the application form.

3. Provide an estimate of the total weight (lbs) of hazardous waste material that has been disposed of and/or stored within your site boundaries and not removed to another site.

   No hazardous waste material has been disposed of on-site, nor has it been stored on-site and not removed to another site.

C. Location of Waste Management Units

1. Submit as "Attachment C" a drawn-to-scale topographic map (or other map if a topographic map is unavailable) extending one mile beyond the facility boundaries, depicting the following:

   a. The approximate boundaries of the facility (described in Section II.B) and within these boundaries, the location and boundaries of the areas occupied by each active, inactive, and proposed hazardous waste management unit (see Table III-2). Each depicted area should be labeled to identify the unit(s), unit status (i.e., active, inactive, or proposed), and areal size in acres.

      ***Attachment C – Topographic Maps* includes the requested information. Table III-2 includes the unit status.**

   b. The overall facility and all surface intake and discharge structures;

      Not Applicable

   c. All on-site injection wells where liquids are injected underground;

      Not Applicable

   d. All known monitor wells and boreholes within the property boundaries of the facility; and

      Not Applicable

   e. All wells, springs, other surface water bodies, and drinking water wells listed in public records or otherwise known to the applicant within the map area and the purpose for which each water well is used (e.g., domestic, livestock, agricultural, industrial, etc.).

      Not Applicable

2. Submit as "Attachment D" photographs which clearly delineate all hazardous waste management storage, processing, and disposal units, as well as sites of future storage, processing and disposal units.

***Attachment D – Photographs* is included.**

D. Flow Diagram/Description

Show as "Attachment E" process flow diagrams and step-by-step word descriptions of the process flow, depicting the handling, collection, storage, processing, and/or disposal of each of the hazardous wastes previously listed in this application.

The flow diagrams or descriptions should include the following information:

1. Originating point of each waste and waste classification code;

2. Means of conveyance utilized in every step of the process flow;

3. Name and function of each facility component through which the waste passes;

4. The ultimate disposition of all wastes (if off-site, specify "off-site") and waste residues.

***Attachment E– Process Description and Process Flow Diagram* is included.**

IV. Index Of Attachments

List and index below all attachments to this application and indicate if included or not included:

Item	Attachments	Attachment	Included	Not Included
I.D.2.a	Lease/Option to buy	A	Yes	
II.B	Site legal description	B	Yes	
III.C.1	Facility boundaries and adjacent waters map	C	Yes	
III.C.2	Photographs	D	Yes	
III.D	Process flow diagram/description	E	Yes, Additional information is also provided in *Appendix V - Engineering Reports* and in *Appendix XIII – Confidential Material*	

Table III-1 – Hazardous Wastes and Management Activities

Verbal Description of Waste	TCEQ Waste for Code and Classification Code	EPA Hazardous Waste Number	Storage[1] of Wastes Received from Off-Site	Processing[2] of Wastes Received from Off-Site	Disposal of Wastes Received from Off-Site	Storage[1] of Wastes Generated On-Site	Processing2[2] of Wastes Generated On-Site	Disposal of Wastes Generated On-Site	Annual Quantity Generated and/or Received
Materials Shipped to ESD for Processing									
Military and industrial energetics, ammunition, munitions and munition components, and energetically combustible materials from off-site sources	315H	D001, D003, D004, D005, D006, D007, D008, D009, D010, D011, D030	Above Ground Magazine (AGM) or Earth Covered Magazines (ECMs)	Rocket Motor Ops Building and Hybrid Burn Chamber (HBC)	None	None	None	None	16,500,000 lbs NEW received
Materials Prepared On-Site for Processing									
Prepared military and industrial energetics, ammunition, munitions and munition components, and energetically combustible materials from off-site sources	315H	D001, D003, D004, D005, D006, D007, D008, D009, D010, D011, D030	None	None	None	Prepared materials are sent directly to the HBC for processing	HBC	None	16,500,000 lbs NEW prepared

[1] "Storage" means the holding of solid waste for a temporary period, at the end of which the waste is processed, disposed of, or stored elsewhere.

[2] "Processing" means the extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of solid waste for reuse or disposal, including the treatment or neutralization of hazardous waste, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material from the waste or so as to render such waste non-hazardous or less hazardous; safer for transport, store or dispose of; or amenable for recovery, amenable for storage, or reduced in volume. The "transfer" of solid waste for reuse or disposal as used above, does not include the actions of a transporter in conveying or transporting solid waste by truck, ship, pipeline, or other means. Unless the Executive Director determines that regulation of such activity is necessary to protect human health or the environment, the definition of "processing" does not include activities relating to those materials exempted by the Resource Conservation and Recovery Act, 42 U.S.C. 6901 et seq., as amended.

Table III-2 – Hazardous Waste Management Unit Checklist

Waste Management Unit	TCEQ N.O.R. Unit #	Status [1]	Design Capacity [2,a,b]	Number of Years Utilized	Date in Service
Rocket Motor Ops Building	100	Proposed	80 lbs HD 1.1 NEW 1,500 lbs HD 1.2.2 NEW 10,000 lbs HD 1.3 NEW 10,000 lbs ~~Unlimited~~ HD 1.4 NEW 33,333 lbs Total Weight	Not yet in service	Not yet in service
Hybrid Burn Chamber (HBC)	101	Proposed	~~80 lbs HD 1.1 NEW~~ ~~1,500 lbs HD 1.2.2 NEW~~ ~~10,000 lbs HD 1.3 NEW~~ ~~Unlimited HD 1.4 NEW~~250 lbs HD 1.3 NEW per batch 250 lbs HD 1.4 NEW per batch 833 lbs Total Weight per batch	Not yet in service	Not yet in service
Above Ground Magazine (AGM)	300	Proposed	100,000 lbs HD 1.3 NEW 100,000 lbs ~~Unlimited~~ HD 1.4 NEW 333,333 lbs Total Weight	Not yet in service	Not yet in service
Earth Covered Magazine (ECM) (V-13-1)	301	Proposed	300,000 lbs HD 1.3 NEW 300,000 lbs ~~Unlimited~~ HD 1.4 NEW 1,000,000 lbs Total Weight	Not yet in service	Not yet in service
Earth Covered Magazine (ECM) (V-13-2)	302	Proposed	200,000 lbs HD 1.1 NEW 150,000 lbs HD 1.2.1 NEW 200,000 lbs HD 1.2.2 NEW 200,000 lbs HD 1.3 NEW 200,000 lbs ~~Unlimited~~ HD 1.4 NEW	Not yet in service	Not yet in service

[1] Indicate only one of the following: Active, Inactive, Closed, or Proposed
[2] Cubic yards, gallons, pounds, gallons/minute, pounds/hour, BTUs/hour, etc.

[a] NEW stands for Net Explosive Weight.
[b] Most of these figures are the NEW values that have been approved in relation to ESD's contract with the U.S. Army.
~~[c] These ECMs are reserved for future use. At the time of this application, there is no planned storage of RCRA waste in these ECMs. If they are added in the future, ESD will revise the Closure Plan and Closure Cost Estimate.~~

Waste Management Unit	TCEQ N.O.R. Unit #	Status [1]	Design Capacity [2,a,b]	Number of Years Utilized	Date in Service
			666,667 lbs Total Weight		
~~Earth Covered Magazine (ECM) (V-13-3)~~	~~Reserved for future use~~ [e]	~~Proposed (reserved for future use)~~	~~TBD (reserved for future use)~~	~~Not yet in service (reserved for future use)~~	~~Not yet in service (reserved for future use)~~
~~Earth Covered Magazine (ECM) (V-13-4)~~	~~Reserved for future use~~ [e]	~~Proposed (reserved for future use)~~	~~TBD (reserved for future use)~~	~~Not yet in service (reserved for future use)~~	~~Not yet in service (reserved for future use)~~

TCEQ Use Only

TCEQ Core Data Form

For detailed instructions on completing this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission (*If other is checked please describe in space provided.*)

☒ New Permit, Registration or Authorization (*Core Data Form should be submitted with the program application.*)

☐ Renewal *(Core Data Form should be submitted with the renewal form)*

☐ Other

u

2. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	**3. Regulated Entity Reference Number** *(if issued)*
CN 606060028		**RN 111572442**

SECTION II: Customer Information

4. General Customer Information	**5. Effective Date for Customer Information Updates** (mm/dd/yyyy)	9/26/2022

☐ New Customer ☒ Update to Customer Information ☐ Change in Regulated Entity Ownership

☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).

6. Customer Legal Name *(If an individual, print last name first: eg: Doe, John)* — *If new Customer, enter previous Customer below:*

EnviroSafe Demil, LLC

7. TX SOS/CPA Filing Number	**8. TX State Tax ID** (11 digits)	**9. Federal Tax ID** (9 digits)	**10. DUNS Number** *(if applicable)*
805003546	32089250859	352318751	

11. Type of Customer:

☐ Corporation ☐ Individual Partnership: ☐ General ☒ Limited

Government: ☐ City ☐ County ☐ Federal ☐ Local ☐ State ☐ Other ☐ Sole Proprietorship ☒ Other: LLC

12. Number of Employees

☒ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher

13. Independently Owned and Operated?

☒ **Yes** ☐ **No**

14. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check one of the following*

☐ Owner ☐ Operator ☒ Owner & Operator

☐ Occupational Licensee ☐ Responsible Party ☐ VCP/BSA Applicant ☐ Other:

15. Mailing Address:	EnviroSafe Demil, LLC							
	401 N Montague Street							
	City	Hooks	**State**	TX	**ZIP**	75561	**ZIP + 4**	

16. Country Mailing Information *(if outside USA)*	**17. E-Mail Address** *(if applicable)*
	[redacted]

18. Telephone Number	**19. Extension or Code**	**20. Fax Number** *(if applicable)*

(206) 999-8684		( ) -

SECTION III: Regulated Entity Information

21. General Regulated Entity Information *(If 'New Regulated Entity" is selected, a new permit application is also required.)*

☐ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated, in order to meet TCEQ Core Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name *(Enter name of the site where the regulated action is taking place.)*

EnviroSafe Demil, LLC

23. Street Address of the Regulated Entity: ***(No PO Boxes)***	EnviroSafe Demil, LLC							
	401 N Montague Street							
	City	Hooks	**State**	TX	**ZIP**	75561	**ZIP + 4**	
24. County	Bowie							

If no Street Address is provided, fields 25-28 are required.

25. Description to Physical Location:					
26. Nearest City			**State**		**Nearest ZIP Code**
New Boston			TX		75570

Latitude/Longitude are required and may be added/updated to meet TCEQ Core Data Standards. (Geocoding of the Physical Address may be used to supply coordinates where none have been provided or to gain accuracy).

27. Latitude (N) In Decimal:			**28. Longitude (W) In Decimal:**		
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
33	27	20	94	16	42

29. Primary SIC Code (4 digits)	**30. Secondary SIC Code** (4 digits)	**31. Primary NAICS Code** (5 or 6 digits)	**32. Secondary NAICS Code** (5 or 6 digits)
4953		332993 To thermally neutralize explosives and energetic materials	562211

33. What is the Primary Business of this entity? *(Do not repeat the SIC or NAICS description.)*

To thermally neutralize explosives and energetic materials

34. Mailing Address:	**EnviroSafe Demil, LLC**							
	401 N Montague Street							
	City	**Hooks**	**State**	**TX**	**ZIP**	**75561**	**ZIP + 4**	
35. E-Mail Address:	**tjogden@envirosafedemil.com**							

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(206) 999-8684		( ) -

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☐ Edwards Aquifer	☐ Emissions Inventory Air	☒ Industrial Hazardous Waste
☐ Municipal Solid Waste	☐ New Source Review Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS
☐ Sludge	☐ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
☐ Voluntary Cleanup	☐ Wastewater	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

SECTION IV: Preparer Information

40. Name:	TJ Ogden		41. Title:	CEO & Founder
42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address	
(206) 999-8684		( ) -	[redacted]	

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	EnviroSafe Demil, LLC	Job Title:	President	
Name *(In Print)*:	Michael Wentz		Phone:	(430) 200- 2296
Signature:	[signature]		Date:	12/3/2024

Part A Application Form

Attachment A

Lease Information

EnviroSafe Demil, LLC (ESD) has ~~leased~~ purchased the entire F-line of the former Lone Star Army Ammunition Plant (LSAAP) which includes ~~. Two separate leases are in place for the F-line, one for~~ the north portion of the F-line (45 acres) and ~~one for~~the south portion of the F-line (130 acres). ~~ESD is currently in the middle of closing the purchase of both of these sections under lease and expects that the purchase will be complete by the time the RCRA permit is issued.~~

ESD has one above ground magazine (AGM) under lease. ESD has line V-13 under a lease agreement. ESD is currently leasing 2 earth covered magazines (ECMs) on line V-13, but the lease has the option to expand into 2 additional ECMs that are also on line V-13.

The purchase documentation and lease information for the facility is included in this attachment. The table below indicates the location of each lease agreement.

Area	Attachment	Information Included
F-line (45 acres) F-line (130 acres)	Attachment A.1/ ~~Attachment~~ A.2	Deed of Trust
Above Ground Magazine (AGM)	Attachment A.3	Industrial Lease
Earth Covered Magazines (ECMs)	Attachment A.4	Industrial Lease

ATTACHMENT A.1/A.2

DEED OF TRUST

F-LINE (45 ACRES)

F-LINE (130 ACRES)

PREPARED IN THE OFFICE OF:
JORDAN LAW FIRM, L.L.P.
#4 Woodmont Crossing
Texarkana, Texas 75503

NOTICE OF CONFIDENTIALITY RIGHTS:
IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OF THE FOLLOWING INFORMATION FROM THIS INSTRUMENT BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS:
YOUR SOCIAL SECURITY NUMBER OR
YOUR DRIVER'S LICENSE NUMBER.

DEED OF TRUST
(TEXAS)

2435062

THE STATE OF TEXAS

KNOW ALL MEN BY THESE PRESENTS:

COUNTY OF BOWIE

That F LINE HOLDINGS, LLC, hereinafter called Grantors, for the purpose of securing the indebtedness hereinafter described, and in consideration of the sum of TEN DOLLARS ($10.00) to us in hand paid by the Trustee hereinafter named, the receipt of which is hereby acknowledged, and for the further consideration of the uses, purposes and trusts hereinafter set forth, has granted, sold and conveyed, and by these presents does grant, sell and convey unto Raymond W. Jordan, Trustee, of Bowie County, Texas, and his substitutes or successors, all of the following described property situated in Bowie County, Texas, to-wit:

All that certain lot, tract or parcel of land lying and situated in the William H. Fore Headright Survey, Abstract 214, Bowie County, Texas, being a part of that certain tract of land described as 318.555 acres in the deed from TexAmericas Center to TAC East Holding Company No. 1, dated April 25, 2017, recorded in Document No. 2017-4829 of the Real Property Records of Bowie County, Texas, and being more particularly described by metes and bounds as follows:

BEGINNING at a 1/2 inch steel rod found for a corner, capped MTG 101011-00, the Southwest corner of the said 318.555 acre tract, the Southeast corner of Montague Street, an ingress and egress easement recorded in the said Document No. 2017-4829, lying in the North line of that certain tract of land described as Tract 10 – Proposed 5th

Street Parcel w/ 81.718 acres in the deed from United States of America to Red River Redevelopment Authority, now known as TexAmericas Center, dated September 1, 2010, recorded in Volume 5898, Page 1 of the Real property Records in Bowie County, Texas;

THENCE North 45 degrees 10 minutes 16 seconds West a distance of 71.19 feet along the West line of the said 318.555 acre tract and the East line of the said Montague Street to a 1/2 inch steel rod found for a corner, capped MTG 101011-00 (control monument), at an angle point;

THENCE North 00 degrees 33 minutes 19 seconds West a distance of 3814.64 feet along the West line of the said 318.555 acre tract and the East line of the said Montague Street to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, said corner bears North 00 degrees 33 minutes 19 seconds West a distance of 1185.33 feet to 1/2 inch steel rod found for a corner, capped MTG 101011-00 (control monument), at an angle point;

THENCE North 89 degrees 38 minutes 24 seconds East a distance of 148.98 feet across the said 318.555 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, the Northwest corner of that certain tract of land described as 45.000 acres in the deed from TAC East Holdings Company No. 1 to F Line Holdings, LLC, dated September 14, 2023, recorded in Document No. 2023-00008948 of the Real Property Records of Bowie County, Texas;

THENCE South 00 degrees 55 minutes 04 seconds East a distance of 1650.37 feet along the West line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, the Southwest corner of the said 45.000 acre tract;

THENCE North 89 degrees 19 minutes 34 seconds East a distance of 1209.94 feet along the South line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, the Southeast corner of the said 45.000 acre tract;

THENCE North 00 degrees 23 minutes 40 seconds West a distance of 1643.72 feet along the East line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, the Northeast corner of the said 45.000 acre tract;

THENCE North 89 degrees 38 minutes 14 seconds East a distance of 345.66 feet across the said 318.555 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00;

THENCE South 00 degrees 21 minutes 51 seconds East a distance of 366.14 feet across the said 318.555 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00;

THENCE North 89 degrees 38 minutes 32 seconds East a distance of 380.02 feet across the said 318.555 acre tract to a 1/2 inch steel rod set for a corner, capped MTG ENG;

THENCE South 00 degrees 50 minutes 08 seconds East a distance of 2134.21 feet across the said 318.555 acre tract to a 1/2 inch steel rod set for a corner, capped MTG ENG;

THENCE South 89 degrees 23 minutes 15 seconds West a distance of 244.93 feet across the said 318.555 acre tract to a 1/2 inch steel rod set for a corner, capped MTG ENG;

THENCE South 00 degrees 03 minutes 41 seconds West a distance of 1381.52 feet across and through the said 318.555 acre tract to a 1/2 inch steel rod set for a corner, capped MTG ENG, lying in the South line of the said 318.555 acre tract, the North line of the said 81.718 acre tract, and a circular curve to the right;

THENCE in a Northwesterly direction along the arc of the said circular curve a distance of 101.83 feet, with a delta angle of 00 degrees 23 minutes 27 seconds, a radius of 14925.00 feet, a chord bearing of North 89 degrees 58 minutes 55 seconds West, and a chord distance of 101.83 feet to a 1/2 inch steel rod set for a corner, capped MTG ENG, at the end of the said circular curve;

THENCE North 89 degrees 47 minutes 11 seconds West, tangent to the said circular curve, a distance of 1697.38 feet along the South line of the said 318.555 acre tract and the North line of the said 81.718 acre tract to the point of beginning and containing 130.000 acres of land, at the time of this survey.

Permitted encumbrances:

All exceptions, covenants, conditions, easements, restrictions and reservations other than liens, affecting the property, and currently recorded in the Real Property Records of Bowie County, Texas.

HAVE AND TO HOLD the above described property, together with the rights, privileges and appurtenances thereto belonging unto the said Trustee, and to his substitutes or successors forever. And Grantors do hereby bind themselves, their heirs, executors, administrators and assigns to warrant and forever defend the said premises unto the said Trustee, his substitutes or successors and assigns forever, against the claim, or claims, of all persons claiming or to claim the same or any part thereof.

This conveyance, however, is made in TRUST to secure payment of one promissory note of even date herewith in the principal sum of EIGHT HUNDRED SIX THOUSAND AND NO/100

DOLLARS ($806,000.00) executed by Grantors, payable to the order of TAC EAST HOLDINGS COMPANY NO. 1 at 107 Chapel Lane, New Boston, Bowie County, Texas 75570, as therein stipulated, bearing interest as therein set forth and providing for acceleration of maturity and for attorney's fees, with a maturity date of the 1st day of November, 2025.

This Deed of Trust shall secure, in addition to the Note, all funds advanced by Beneficiary to or for the benefit of Grantors, as contemplated by any covenant or provision herein contained or for any other purpose, and all other indebtedness, of whatever kind or character, owing or which may hereafter become owing by Grantors (or by any of them) to Beneficiary, whether such indebtedness is evidenced by note, open account, overdraft, endorsement, surety agreement, guaranty or otherwise, it being contemplated that Grantors may hereafter become indebted to Beneficiary in further sum or sums. All indebtedness secured hereby shall be payable at 107 Chapel Lane, New Boston, Bowie County, Texas; and, unless otherwise provided in the instrument evidencing such indebtedness, shall bear interest at the same rate per annum as the Note bears, from the date of accrual of such indebtedness until paid. If the Note or any other indebtedness secured hereby shall be collected by legal proceedings, whether through a probate or bankruptcy court or otherwise, or shall be placed in the hands of an attorney for collection after maturity, whether matured by the expiration of time or by any option given to the Beneficiary to mature same, Grantors agree to pay Beneficiary's attorney's and collection fees in the amount as set forth in the Note, and such fees shall be a part of the indebtedness secured hereby. This Deed of Trust shall also secure all renewals, extensions and modifications of any of the indebtedness secured hereby, which said indebtedness or Deed of Trust securing same shall be renewed, extended or modified without notice to any prior grantor, which such renewal, extension or modification shall not relieve any prior grantor of any personal liability under said indebtedness or Deed of Trust securing same. Finally, this Deed of Trust shall secure, in addition to such indebtedness, the performance of all obligations of Grantors, their heirs, successors, assigns or assumptors (or any of them), to Beneficiary relating in any manner to such indebtedness or any part thereof.

Should Grantors do and perform all of the covenants and agreements herein contained, and make prompt payment of all indebtedness as the same shall become due and payable, then this conveyance shall become null and void and of no further force and effect, and shall be released at the expense of Grantors, by the holder thereof, hereinafter called Beneficiary (whether one or more).

Grantors covenant and agree as follows:

That they are lawfully seized of said property, and have the right to convey the same; that said property is free from all liens and encumbrances except as herein provided.

No hazardous or toxic substance, the manufacture, use, storage or disposition of which is subject to any Federal, State or local law or regulations will be manufactured, used or stored, or disposed of, on or about the real property herein described except in accordance with all laws and that Grantors, their heirs and assigns, will indemnify and hold the holder of the Note secured by this Deed of Trust harmless from all liability and legal fees, , and all other expenses resulting from any

violation of this covenant, but excluding any special, punitive, exemplary and consequential damates other than to the extent such special, punitive, exemplary or consequential damages are asserted against the holder of the Note by a third party.

To protect the title and possession of said property and to pay when due all taxes and assessments now existing or hereafter levied or assessed upon said property, or the interest therein created by this Deed of Trust, and to preserve and maintain the lien hereby created as a first and prior lien on said property including any improvements hereafter made a part of the realty.

Notwithstanding the foregoing and anything else herein to the contrary, upon Grantor obtaining financing from Capital Bank, N.A., or another lender, to facilitate the acquisition and instillation of the rocket motor project ("RMP Financing"), the this lien hereby created shall automatically be subordinate to such RMP Financing and become a second lien on the property, without the requirement of any additional action or recording of any other document,

To provide Beneficiary written proof of payment when due of all insurance premiums and tax statements due and owing on the property herein described.

To keep the improvements on said property in good repair and condition and not to permit or commit any waste thereof; to keep said buildings occupied so as not to impair the insurance carried thereon.

To insure and keep insured all improvements now or hereafter created upon said property against loss or damage by fire and windstorm, and any other hazard or hazards as may be reasonably required from time to time by Beneficiary during the term of the indebtedness hereby secured, to the extent of the original amount of the indebtedness hereby secured, or to the extent of the full insurable value of said improvements, whichever is lesser, in such form and with such Insurance Company or Companies as may be approved by Beneficiary, and to deliver to Beneficiary the policies of such insurance having attached to said policies such mortgage indemnity clause as Beneficiary shall direct; to deliver renewals of such policies to Beneficiary at least ten (10) days before any such insurance policies shall expire; any proceeds which Beneficiary may receive under any such policy, or policies, may be applied by Beneficiary, at its option, to reduce the indebtedness hereby secured, whether then matured or to mature in the future, and in such manner as Beneficiary may elect, or Beneficiary may permit Grantors to use said proceeds to repair or replace all improvements damaged or destroyed and covered by said policy.

That in the event Grantors shall fail to keep the improvements on the property hereby conveyed in good repair and condition after thirty (30) days' written notice from Beneficiary, or to pay promptly when due all taxes and assessments, as aforesaid, or to preserve the prior lien of this Deed of Trust on said property (excluding the automatic subordination in connection with the RMP Financing as set forth above), or to keep the buildings and improvements insured, as aforesaid, or to deliver the policy, or policies, of insurance or the renewal thereof to Beneficiary, as aforesaid, then Beneficiary may, at its option, but without being required to do so, make such repairs, pay such

taxes and assessments, purchase any tax title thereon, remove any prior liens, and prosecute or defend any suits in relation to the preservation of the prior lien of this Deed of Trust on said property, or insure and keep insured the improvements thereon in an amount not to exceed that above stipulated; that any sums which may be so paid out by Beneficiary and all sums paid for insurance premiums, as aforesaid, including the costs, expenses and Attorney's fees paid in any suit affecting said property when necessary to protect the lien hereof shall bear interest from the dates of such payments at the rate stated in said note and shall be paid by Grantors to Beneficiary upon demand, at the same place at which said note is payable, or, at Beneficiary's option, same shall be deemed a part of the debt hereby secured and recoverable as such in all respects.

That in the event Beneficiary, in its sole discretion determines that an appraisal, supplemental appraisal or re-appraisal of the real property described herein and the improvements located thereon is necessary, required by regulatory authorities, or desirable during the term of the note described herein, or during any extended or renewal term, Beneficiary may acquire such appraisal, supplemental appraisal or re-appraisal from such entities as Beneficiary desires and Grantors shall pay for the expense of the same within ten (10) days of receipt of notice from Beneficiary of the cost. If Grantors fail to pay said expense within the ten days, said expense shall be deemed to be a part of the debt hereby secured, bear interest from the date paid at the rate stated in the note and shall be recoverable as such in all respects.

Grantors further covenant and agree with Beneficiary that Beneficiary at its option may declare the entire unmatured portion of all indebtedness secured hereby (whether such indebtedness then be evidenced by the original note or notes evidencing the same or by any instrument(s) given in renewal or extension thereof), together with all interest accrued on all such indebtedness, to be immediately due and payable (which acceleration of maturity may be accomplished without notice to any one), and thereupon the same shall forthwith become immediately due and payable in any one of the following events:

A. If any voluntary or involuntary petition be filed to subject Grantors or either of them (or any party obligated as maker, endorser, surety, or guarantor for the payment of the Primary Indebtedness) to any bankruptcy, debt-adjustment, receivership or other insolvency proceedings;

B. If default be made in the performance by Grantors or either of them of any term, provision, covenant, or agreement herein contained to be kept and performed by Grantors and such default is not cured within thirty (30) days of written notice from Beneficiary;

C. If default be made in the payment of any part of the principal or interest of any indebtedness secured hereby within five (5) days of written notice of such failure of payment from Beneficiary according to the terms of the original instrument evidencing such indebtedness or of any instrument at any time hereafter evidencing such indebtedness;

D. If Grantors or either of them, being a partnership or a corporation, shall be dissolved or reorganized in any manner;

E. Intentionally omitted;

F. If at any time it shall appear that any financial statement or any other representation made to obtain the loan designated above as Primary Indebtedness is materially incorrect; or

G. If at any time it shall appear that Grantors' title to the hereinabove described property or any portion thereof is subject to any prior lien, title or interest not mentioned in this Deed of Trust as a prior encumbrance except for the RMP Financing and except for any lien caused by or through Beneficiary;

H. If at any time Grantors shall sell or convey, contract to sell or convey the above described real property without the express written consent of Beneficiary, such action by Grantors shall be deemed a Default under the terms of this Deed of Trust and all sums then remaining due, owing and unpaid hereunder shall be accelerated and matured and subject to foreclosure as provided for herein.

It is particularly understood that the foregoing acceleration provisions shall be applicable not only to the maturities recited in the original note(s) evidencing the indebtedness hereby secured but also to any substituted maturities created by extension, modification or renewal; and that Beneficiary's failure to declare an acceleration of maturities when a ground therefor exists, even though such forbearance may be repeated from time to time, shall not constitute a waiver of Beneficiary's right to accelerate maturities upon a recurrence of the same ground therefor; and that the act of Grantors in remedying any condition resulting from Grantors' default shall not bar Beneficiary from declaring an acceleration of maturities by reason of such default.

In the event of such default it shall thereupon, or at any time thereafter, be the duty of the Trustee, or his successor or substitute as hereinafter provided, at the request of Beneficiary (which request is hereby conclusively presumed), to enforce this trust; and after advertising the time, place and terms of the sale of the above described and conveyed property, then subject to the lien hereof, for at least twenty-one (21) days preceding the date of sale by posting written or printed notice thereof at the Courthouse door of the County where said real property is situated, which notice may be posted by the Trustee acting, or by any person acting for him, and the Beneficiary (the holder of the indebtedness secured hereby) has, at least twenty-one (21) days preceding the date of sale, served written or printed notice of the proposed sale by certified mail on each debtor obligated to pay the indebtedness secured by this Deed of Trust according to the records of Beneficiary, by the deposit of such notice, enclosed in a postpaid wrapper, properly addressed to such debtor at debtor's most recent address as shown by the records of Beneficiary, in a post office or official depository

under the care and custody of the United States Postal Service, the Trustee shall sell the above described property, then subject to the lien hereof, at public auction in accordance with such notice at the Courthouse door of said county where such real property is situated (provided where said real property is situated in more than one county, the notice to be posted as herein provided shall be posted at the Courthouse door of each of such counties where said real property is situated, and said above described and conveyed property may be sold at the Courthouse door of any one of such counties, and the notices so posted shall designate the county where the property will be sold), on the first Tuesday in any month between the hours of ten o'clock a.m. and four o'clock p.m. to the highest bidder for cash, selling all of the property as an entirety or in such parcels as the Trustee acting may elect, and make due conveyance to the Purchaser or Purchasers, with general warranty binding Grantors, their heirs and assigns; and out of the money arising from such sale, the Trustee acting shall pay first, all the expenses of advertising the sale and making the conveyance, including a reasonable commission to himself, which commission shall be due and owing in addition to the Attorney's fees provided for in said note, and then to Beneficiary the full amount of principal, interest, Attorney's fees and other charges due and unpaid on said note and all other indebtedness secured hereby, rendering the balance of the sales price, if any, to Grantors, their heirs or assigns, and the recitals in the conveyance to the Purchaser or Purchasers shall be full and conclusive evidence of the truth of the matters therein stated, and all prerequisites to said sale shall be presumed to have been performed, and such sale and conveyance shall be conclusive against Grantors, their heirs and assigns.

It is agreed that in the event a foreclosure hereunder should be commenced by the Trustee, or his substitute or successor, Beneficiary may at any time before the sale of said property direct the said Trustee to abandon the sale, and may then institute suit for the collection of said note, and for the foreclosure of this Deed of Trust lien; it is further agreed that if Beneficiary should institute a suit for the collection thereof, and for a foreclosure of this Deed of Trust lien, that he may at any time before the entry of a final judgment in said suit dismiss the same, and require the Trustee, his substitute or successor to sell the property in accordance with the provisions of this Deed of Trust.

Beneficiary shall have the right to purchase at any sale of the property, being the highest bidder and to have the amount for which such property is sold credited on the debt then owing.

Beneficiary in any event is hereby authorized to appoint a substitute trustee, or a successor trustee, to act instead of the Trustee named herein without other formality than the designation in writing of a substitute or successor trustee; and the authority hereby conferred shall extend to the appointment of other successor and substitute trustees successively until the indebtedness hereby secured has been paid in full, or until said property is sold hereunder, and each substitute and successor trustee shall succeed to all of the rights and powers of the original Trustee named herein.

In the event any sale is made of the above described property, or any portion thereof, under the terms of this Deed of Trust, Grantors, their heirs and assigns, shall forthwith upon the making of such sale surrender and deliver possession of the property so sold to the Purchaser at such sale, and in the event of their failure to do so they shall thereupon from and after the making of such sale be

and continue as tenants at will of such Purchaser, and in the event of their failure to surrender possession of said property upon demand, the Purchaser, his heirs or assigns, shall be entitled to institute and maintain an action for forcible detainer of said property in the Justice of the Peace Court in the Justice Precinct in which such property, or any part thereof, is situated.

It is agreed that, except for a lien created in connection with the RMP Financing, the lien hereby created shall take precedence over and be a prior lien to any other lien of any character whether vendor's, materialmen's or mechanic's lien hereafter created on the above described property, and in the event the proceeds of the indebtedness secured hereby as set forth herein are used to pay off and satisfy any liens heretofore existing on said property, then Beneficiary is, and shall be, subrogated to all of the rights, liens and remedies of the holders of the indebtedness to so paid.

It is further agreed that if Grantors, their heirs or assigns, while the owner of the hereinabove described property, should commit an act of bankruptcy, or authorize the filing of a voluntary petition in bankruptcy, or should an act of bankruptcy be committed and involuntary proceedings instituted or threatened, or should the property hereinabove described be taken over by a Receiver for Grantors, their heirs or assigns, the note hereinabove described shall, at the option of Beneficiary, immediately become due and payable, and the acting Trustee may then proceed to sell the same under the provisions of this Deed of Trust.

As further security for the payment of the hereinabove described indebtedness, Grantors hereafter transfer, assign and convey unto Beneficiary all rents issuing or to hereafter issue from said real property, together with all revenues, profits, royalties, bonuses, delay rentals or other income derived from any oil, gas and/or mineral lease or any other lease executed by Grantors, and in the event of any default in the payment of said note hereunder, after applicable notice and grace periods, Beneficiary, its agent or representative, is hereby authorized, at its option, to collect rent, revenues, profits, royalties, bonuses, delay rentals or other income derived from any oil, gas and/or mineral lease or any other lease executed by Grantors, to be applied, less the reasonable costs and expenses of collection thereof, to the payment of said indebtedness, whether then matured or to mature in the future, and in such manner as Beneficiary may elect. Upon the cure of any default, Beneficiary shall not longer be entitled to collect such rent, revenues, profits, royalties, bonuses, delay rentals or other income derived from any oil, gas and/or mineral lease or any other lease executed by Grantors, and such right shall revert to Grantors. The collection of said rents, revenues, profits, royalties, bonuses, delay rentals or other income derived from any oil, gas and/or mineral lease or any other lease executed by Grantors, by Beneficiary shall not constitute a waiver of its right to accelerate the maturity of said indebtedness nor of its right to proceed with the enforcement of this Deed of Trust.

It is agreed that an extension, or modification, may be made of the time of payment of all, or any part, of the indebtedness secured hereby, and that any part of the above described real property may be released from this lien without altering or affecting the priority of the lien created by this Deed of Trust in favor of any junior encumbrancer, mortgagee or purchaser, or any person acquiring

an interest in the property hereby conveyed, or any part thereof; it being the intention of the parties hereto to preserve this lien on the property herein described and all improvements thereon, and that may be hereafter constructed thereon, first and superior to any liens that may be placed thereon, or that may be fixed, given or imposed by law thereon after the execution of this instrument notwithstanding any such extension or modification of the time of payment, or the release of any portion of said property from this lien.

In the event any portion of the indebtedness hereinabove described cannot be lawfully secured by this Deed of Trust lien on said real property, it is agreed that the first payments made on said indebtedness shall be applied to the discharge of that portion of said indebtedness.

Beneficiary shall be entitled to receive any and all sums which may become payable to Grantors for the condemnation of the hereinabove described real property, or any part thereof, for public or quasi-public use, or by virtue of private sale in lieu thereof, and any sums which may be awarded or become payable to Grantors for damages caused by public works or construction on or near the said property. All such sums are hereby assigned to Beneficiary, who may, after deducting therefrom all expenses actually incurred, including attorney's fees, release same to Grantors or apply the same to the reduction of the indebtedness hereby secured, whether then matured or to mature in the future, or on any money obligation hereunder, as and in such manner as Beneficiary may elect. Beneficiary shall not be, in any event or circumstances, liable or responsible for failure to collect, or exercise diligence in the collection of, any such sums.

Nothing herein or in said note contained shall ever entitle beneficiary, upon the arising of any contingency whatsoever, to receive or collect interest in excess of the highest rate allowed by the applicable laws on the principal indebtedness hereby secured or on any money obligation hereunder and in no event shall Grantors be obligated to pay interest thereon in excess of such rate.

If this Deed of Trust is executed by only one person or by a corporation the plural reference to Grantors shall be held to include the singular and all of the covenants and agreements herein undertaken to be performed by and the rights conferred upon the respective Grantors named herein, shall be binding upon and inure to the benefit of not only said parties respectively but also their respective heirs, executors, administrators, grantees, successors and assigns.

The debt evidenced by the note is in part payment of the purchase price of the property; the debt is secured by this deed of trust and by a vendor's lien on the property, which is expressly retained in a deed of even date given by TAC EAST HOLDINGS COMPANY NO. 1 to F LINE HOLDINGS, LLC. This deed of trust does not waive the vendor's lien, and the two liens and rights created by this instrument shall be cumulative. Beneficiary may elect to foreclose under either of the liens without waiving the other or may foreclose under both. The deed is incorporated into this deed of trust.

THIS WRITTEN LOAN AGREEMENT REPRESENTS THE FINAL AGREEMENT BETWEEN THE PARTIES AND MAY NOT BE CONTRADICTED BY EVIDENCE OF PRIOR, CONTEMPORANEOUS, OR SUBSEQUENT ORAL AGREEMENTS OF THE PARTIES.

THERE ARE NO UNWRITTEN ORAL AGREEMENTS BETWEEN THE PARTIES.

EXECUTED this 26th day of February, 2025.

F LINE HOLDINGS, LLC

By: _____
Thomas J. Ogden
Manager

Trustees Address:	Beneficiary's Address:	Grantor's Address
Raymond W. Jordan	TAC EAST HOLDINGS COMPANY NO. 1	F LINE HOLDINGS, LLC
Jordan Law Firm, L.L.P.	107 Chapel Lane	401 N Montague Street
4 Woodmont Crossing	New Boston, Texas 75570	Hooks, TX 75561
Texarkana, Texas 75503		

ACKNOWLEDGMENT

STATE OF Texas §
§
COUNTY OF Bowie §

This instrument was acknowledged before me on the 26 day of February 2025, by Thomas J. Ogden, Manager of F Line Holdings LLC, a Texas Limited Liability Company, on behalf of said limited liability company.

MELODY L JOHNSON NOTARY PUBLIC STATE OF TEXAS ID# 11498659-3 EXP. 11-06-2026

_____
Notary Public, State of _____

ATTACHMENT A.3

LEASE INFORMATION

ABOVE GROUND MAGAZINE (AGM)

INDUSTRIAL LEASE
TexAmericas Center - East

LEASE SUMMARY

Lessor: TexAmericas Center
107 Chapel Lane
New Boston, Texas 75570

Lessee: **EnviroSafe Demil**
12763 Lovelock Hwy.
Fallon, Nevada 89406, USA

Guarantor: _____
_____
_____

Premises Leased Address: #10 Beech
Hooks, TX 75561

Primary Term: Six (6) years; From July 1, 2023, to June 30, 2029.

Option Terms: Four (4) option(s) of One (1) year each

Base Rent: $1,437.00 per month during year one from July 1,2023 through June 30, 2024
$1,480.63 per month during year two from July 1,2024 through June 30, 2025
$1,525.04 per month during year three from July 1,2025 through June 30, 2026
$1,570.80 per month during year four from July 1,2026 through June 30, 2027
$1,617.92 per month during year five from July 1,2027 through June 30, 2028
$1,666.46 per month during year six from July 1,2028 through June 30, 2029

Option Rent: $1,716.45 per month during year one from July 1, 2029 through June 30, 2030
$1,767.95 per month during year two from July 1, 2030 through June 30, 2031
$1,820.95 per month during year three from July 1, 2031 through June 30, 2032
$1,875.62 per month during year four from July 1, 2032 through June 30, 2033

Security Deposit: $1,500.00

Ad Valorem Tax/PILOT Deposit: $ 2,250.00

Table of Contents

ARTICLE 1 . TERM

§ 1.01 Term of Lease

§ 1.02 Option to Extend Term

§ 1.03 Holdover

ARTICLE 2 . RENT/SECURITY and AD VALOREM TAX DEPOSITS

§ 2.01 Base Rent

§ 2.02 Taxes and Assessments as Additional Rent

§ 2.03. Late Charges

§ 2.04. Security-Ad Valorem Tax/PILOT Deposit; Deposit Processing Fee

ARTICLE 3 . USE OF PREMISES

§ 3.01 Tenant's Warranty Regarding Use

§ 3.02 Compliance With Laws

§ 3.03 Rights of Inspection

§ 3.04 Environmental Reporting Requirements

§ 3.05 Condition of Premises

§ 3.06 Delivery of Premises at End of Term

§ 3.07 Blast Arcs

§ 3.08 Information to Be Provided to Landlord

ARTICLE 4 . REPAIRS AND MAINTENANCE

§ 4.01 Repairs and Maintenance by Tenant

§ 4.02 Tenant's Failure to Repair or Maintain

§ 4.03 Allocation of Environmental Cleanup Costs

ARTICLE 5 . UTILITIES AND GARBAGE REMOVAL

§ 5.01 Utility Charges

§ 5.02 Meters and Pretreatment Requirements

§ 5.03 Garbage Removal

ARTICLE 6 . ALTERATIONS, ADDITIONS, AND IMPROVEMENTS

§ 6.01 Consent of Landlord

§ 6.02 Property of Landlord

§ 6.03 Alterations Required by Accessibility Laws

ARTICLE 7 . TRADE FIXTURES AND SIGNS

§ 7.01 Trade Fixtures

§ 7.02 Signs

ARTICLE 8 . MECHANIC'S LIEN

ARTICLE 9 . INSURANCE AND INDEMNITY

§ 9.01 Tenant's Property Insurance

§ 9.02 Landlord's Property Insurance

§ 9.03 Tenant's Liability Insurance

§ 9.04 Remedy for Failure to Provide Insurance

§ 9.05 Tenant's Environmental Indemnity

§ 9.06 Hold-Harmless Clause

§ 9.07 Release of Claims/Subrogation

§ 9.08 Pollution Legal Liability Insurance

ARTICLE 10 . DAMAGE OR DESTRUCTION

§ 10.01 Notice to Landlord

§ 10.02 Total Destruction

§ 10.03 Partial Destruction

ARTICLE 11 . CONDEMNATION

§ 11.01 Total Condemnation

§ 11.02 Partial Condemnation

§ 11.03 Condemnation Award

ARTICLE 12 . DEFAULT

§ 12.01 Tenant's Default

§ 12.02 Landlord's Lien

§ 12.03 Landlord's Default

§ 12.04 Cumulative Remedies

§ 12.05 Waiver of Breach

§ 12.06 Indemnities in Event of Termination

§ 12.07 Limitation of Landlord's Liability

ARTICLE 13 . INSPECTION BY LANDLORD

ARTICLE 14 . ASSIGNMENT AND SUBLEASE

§ 14.01 Assignment and Subletting by Tenant

§ 14.02 Assignment by Landlord

ARTICLE 15 . MISCELLANEOUS

§ 15.01 Notices and Addresses

§ 15.02 Parties Bound

§ 15.03 Texas Law to Apply

§ 15.04 Legal Construction

§ 15.05 Prior Agreements Superseded

§ 15.06 Amendment

§ 15.07 Rights and Remedies Cumulative

§ 15.08 Attorney's Fees and Costs

§ 15.09 Force Majeure

§ 15.10 Time of Essence

§ 15.11 Alternate Dispute Resolution

§ 15.12 Limitation of Warranties

§ 15.13 Abandoned Property

§ 15.14 Municipal and Emergency Services

§ 15.15 Army Imposed Restrictions

§ 15.16 Reservation of Rights

§ 15.17 Common Area Charges

§ 15.18 License for Access to Premises

§ 15.19 Advertising and Promotions Rights

§ 15.20 Annual Report

§ 15.21 Guarantee

§ 15.22 Governmental Immunity

§ 15.23 Option to Purchase Intentionally Deleted

ARTICLE 16. LESSEE AFFIRMATIONS

Execution

Exhibit "A" – Premises Description
Exhibit "B" – Option to Purchase – Intentionally Deleted

LEASE

This Lease is entered into between TexAmericas Center ("Landlord"), a political subdivision of the State of Texas, and EnviroSafe Demil, LLC ("Tenant"), a Nevada Limited liability Company.

In consideration of the mutual covenants and agreements of this lease, and other good and valuable consideration, Landlord demises and leases to Tenant, and Tenant leases from Landlord, the premises situated at 10 Beech Street, in Hooks, Bowie County, Texas, described on Exhibit A attached to this lease, and made a part of this lease for all purposes (collectively referred to as "the premises" or "the leased premises" in this lease).

Landlord reserves the right to harvest any and/or all timber located upon the leased premises together with the right of ingress and egress to and from the leased premises for said harvesting by Landlord and/or its contractors.

ARTICLE 1 . TERM

§ 1.01. **Term of Lease**. The term of this lease is Six (6) years, beginning on July 1, 2023, and ending on June 30, 2029, unless terminated sooner as provided in this lease.

§ 1.02. **Option to Extend Term.** Tenant may extend the term of this lease beyond the expiration date provided in § 1.01 on the following conditions:

a. Tenant may, if it is not in default either on the date required for the notice or on the date such extension commences, extend the lease term for Four (4) additional periods of One(1) year(s) each. The extended term will begin on the day following the expiration date of the lease term specified in § 1.01, or on the day following the expiration date of the immediately preceding extended term, as applicable. If, at the date the original term or any extended term expires, Tenant is in default beyond any grace period provided in this lease in performing any of the terms of this lease, the remaining option or options are void. All of the terms and covenants of this lease apply to all extended lease terms except for the rent which shall be as set forth in paragraph 2.01.

b. Tenant may exercise each option to extend this lease by giving Landlord notice of its intention to do so not later than six (6) months before the then current lease term expires, in the case of the initial option to extend, or the extended lease term, in the case of successive options to extend. Notice of an intention to exercise an option under this lease must, to be effective, be sent by mail or fax to Landlord at the address provided in § 15.01 and must be postmarked no later than the latest date provided in this section for Tenant's exercising the option.

§ 1.03. **Holdover.** If Tenant holds over and continues in possession of the premises after the lease term (or any extension) expires, other than as provided in § 1.02, Tenant will be considered to be occupying the premises on a month-to-month tenancy, subject to all the terms of this lease. Landlord may terminate the tenancy upon ten (10) days written notice to Tenant.

ARTICLE 2 . RENT/SECURITY DEPOSIT AND AD VALOREM TAX/PILOT DEPOSITS

§ 2.01. **Fixed Rent.**

a. Tenant will pay Landlord $ 1,437.00 per month on or before the first day of each month as a fixed rent for the next month. Rent for any fractional month at the beginning or end of the lease term will be prorated on a per-day basis.

b. Tenant will pay this fixed rent to Landlord at Landlord's office, located at 107 Chapel Lane, New Boston, Texas 75570, or at such other location or locations that Landlord may from time to time designate by written notice to Tenant.

c. The fixed rent will increase for each extended lease term, so that the fixed rent during the first extended term will be $ 1,480.63; the fixed rent during the second extended term will be $1,525.04; the fixed rent during the third extended term will be $1,570.80; the fixed rent during the fourth extended term will be $1,617.92; and the fixed rent during the fifth extended term will be $1,666.46.

§ 2.02. **Taxes and Assessments as Additional Rent.**

a. In addition to the fixed rent specified in § 2.01, Tenant will pay in full all real-property taxes, special assessments, and governmental charges of any kind imposed on the premises or leasehold interest in the Premises commencing on the first day of the lease term and continuing through the end of the calendar year in which the term ends, including any special assessments imposed on or against the premises for constructing or improving public works. This additional rent is payable directly to the entity imposing the tax, assessment, or charge at least 30 days before the date payment is due. Tenant will provide Landlord with a receipt or other evidence of payment for each tax, assessment, or charge paid as soon as a receipt or other evidence is available to Tenant, but not later than the date payment is due.

b. Tenant may, at its own expense, contest any tax or assessment for which it is responsible under subparagraph a. Except as provided in subparagraph c, Tenant need not pay the tax, assessment, or charge while the contest is pending. Except as provided in subparagraph c, Tenant may prevent Landlord from paying any tax, assessment, or charge that Tenant is contesting under this subparagraph, pending resolution of the contest, by depositing with Landlord the full amount of the tax or assessment, plus the amount of any penalty that might be imposed for failing to make timely payment and one year of interest at the rate imposed by the entity levying the tax or assessment. When the contest is resolved, Tenant may use the money deposited with Landlord to pay any tax or assessment, plus any penalty or interest, due under the final resolution and keep any balance of the deposit. If the deposit is insufficient to pay these amounts, Tenant must immediately pay the balance due to the entity imposing the tax, assessment, or charge.

c. Notwithstanding subparagraph b, Landlord may pay, or require Tenant to pay, any tax, assessment, or charge for which Tenant is responsible under subparagraph a, pending resolution of Tenant's contest of the tax, assessment, or charge, if payment is demanded by a holder of a mortgage on the premises or if failing to pay will subject all or part of the premises to forfeiture or loss.

d. Tenant Payment in Lieu of Taxes (PILOT). If Tenant's leasehold interest in the Premises is or hereafter becomes exempt from real property taxes, Tenant shall pay to Landlord annually a payment in lieu of taxes (PILOT) in an amount as agreed by Landlord and Tenant; provided, however, that said PILOT shall not exceed the amount that Tenant would be required to pay in real property taxes if the leasehold interest were not exempt. If Landlord and Tenant are not able to agree upon the amount of the PILOT within ninety (90) days after the leasehold interest becomes exempt from taxes, the amount of the PILOT shall be an amount equal to ninety percent (90%) of what the real property taxes would be if the leasehold interest were not exempt. Landlord and Tenant shall document the agreement regarding the PILOT as an amendment to this Lease Agreement. The agreement may be for a single year, or multiple years, and may, or may not, provide for an adjustment of the PILOT periodically. If at any time the PILOT agreement of the parties lapses, expires or is terminated pursuant to its terms, and the leasehold interest is exempt from real property taxes, Tenant shall pay to Landlord annually a PILOT in an amount equal to ninety percent (90%) of what the real property taxes would be if the leasehold interest were not exempt. PILOT payments shall be payable to Landlord on or before January 31 of each year.

§2.03. **Late Charges.** Tenant shall pay a late charge of five percent (5%) of any rent not received by Landlord by the tenth day of the month in which said rent is due.

§2.04. **Security and Ad Valorem Tax/PILOT Deposits; Deposit Processing Fee**

A. Security Deposit. Upon execution of this Lease, Tenant shall deposit the sum of $1,500.00 with Landlord as a deposit. Said deposit shall not accrue interest. Landlord may use the deposit to pay arrears of rent, to repair any damage or injury to the Premises, or to pay any expense or liability incurred by Landlord as a result of any default by Tenant under this Lease including but not limited to payment of ad valorem taxes upon the premises or the leasehold interest in the premises. If Landlord uses the deposit, or any portion thereof as authorized above, Tenant shall restore the deposit to its original amount within ten (10) days after notice from Landlord. Failure to restore the deposit to its original amount within the required time shall constitute a default under the Lease. Subject to the right to withhold to pay ad valorem taxes as provided in 2.04.B, within 30 days after Tenant surrenders the Premises, or completion of repairs or replacement of damaged or destroyed property, whichever is later, Landlord shall return to Tenant any remaining portion of the deposit less the Processing Fee provided in Subsection C. below, after any lawful deductions, provided Tenant has given to Landlord an address specifically for that purpose. IT IS SPECIFICALLY PROVIDED, HOWEVER, THAT TENANT SHALL NOT BE ENTITLED TO ANY PORTION OF THE SECURITY DEPOSIT AS A REFUND UNLESS TENANT GIVES LANDLORD SIXTY (60) DAYS NOTICE OF SURRENDERING THE PREMISES.

B. Ad Valorem Tax/PILOT Deposit. Upon execution of this Lease Tenant shall deposit the sum of $2,250.00 with Landlord as an Ad Valorem Tax/PILOT Deposit. Said deposit shall not accrue interest. Landlord may upon expiration or termination of this Lease use the deposit to pay the taxes actually due, or hold for payment of, estimated ad valorem taxes due or to become due upon the leased premises and for which Tenant is responsible under the Terms of this Lease. Provided Tenant pays all ad valorem taxes for which Tenant is responsible under this Lease, the deposit shall be refunded to Tenant at the address Tenant has given to Landlord for this specific purpose. If taxes have not been assessed and levied for the year in which this Lease expires or is terminated, Landlord may hold the deposit until said taxes have been determined; and, if Tenant does not pay said taxes at least 30 days before delinquency, Landlord may apply the deposit to the taxes due. Nothing in this

subsection shall relieve Tenant of its obligation to pay ad valorem taxes upon the leased premises prior to delinquency as provided elsewhere in this Lease. In the event the Premises are exempt from real property taxes, the Ad Valorem/PILOT Deposit may be applied to any deficiency or default in payment of the PILOT as provided for in Section 2.02.d of this Lease.

C. Processing Fee. Landlord shall be, and is hereby entitled and authorized to withhold and pay to Landlord a Processing Fee of $100.00 from the refund by Landlord of the Security and/or Ad Valorem Tax Deposits for the purpose of defraying Landlord's lease administration expense, including but not limited to review of documents, tracking payment of the taxes, utilities and miscellaneous fees, coordination processing, and payment of security and Ad Valorem Tax deposits refunds and related expenses.

ARTICLE 3 . USE OF PREMISES

§ 3.01. **Tenant's Warranty Regarding Use.** Tenant represents and warrants to Landlord that Tenant intends to use the premises for Warehousing and Storage , and that Tenant's use of the property is restricted to those purposes specified in this section unless Tenant obtains Landlord's prior written consent to any change in use. Before the lease term begins, Tenant must give Landlord an affidavit of an officer of Tenant, referred to as the "Officer's Affidavit," setting forth a detailed description of the operations that Tenant will conduct on the premises and stating any applicable permit numbers. The Officer's Affidavit must be organized and prepared in a narrative form, including a description and quantification of all hazardous materials to be generated, manufactured, refined, transported, treated, stored, handled, or disposed of on the premises. After the lease term begins, Tenant must notify Landlord as to any changes in Tenant's operation or use or generation of hazardous materials by way of a supplemental Officer's Affidavit. Tenant must also supplement and update the Officer's Affidavit on each anniversary of the commencement of the lease term. Tenant may not begin or alter any operations on the property before (a) obtaining all required operating and discharge permits or approvals, including but not limited to air pollution control permits and pollution discharge elimination system permits, from all governmental or public authorities having jurisdiction over the Tenant's operations or the property, and (b) providing copies of such permits and approvals to the Landlord.

§ 3.02. **Compliance With Laws.**

a. Tenant may not use, or permit using, the premises in any manner that results in waste of premises or constitutes a nuisance or for any illegal purpose. Tenant, at its own expense, will comply, and will cause its officers, employees, agents, and invitees to comply, with all applicable laws, ordinances, and governmental rules and regulations concerning the use of the premises, including Hazardous Materials Laws, fire and safety regulations and explosives regulations, including but not limited to Title 27, Chapter 11, Subchapter C, Part 555 of the Code of Federal Regulations regarding commerce in explosives.

b. Tenant, at its sole cost, must comply with all Hazardous Materials Laws in connection with Tenant's use of the premises.

c. "Hazardous Materials" means any substance, material, or waste that is or becomes regulated by any local governmental agency, the State of Texas, or the federal government, including, but not limited to, any material or substance that is upon commencement of the

term or at any time during the term, (1) designated as a "hazardous substance" pursuant to Section 311 of the Clean Water Act, 33 U.S.C. § 1251 et seq., or listed pursuant to Section 307 of the Clean Water Act, 33 U.S.C. § 1317, (2) defined as a "hazardous substance" pursuant to Section 101 of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9601 et seq., (3) defined as a "hazardous waste" pursuant to Section 1004 of the Resource Conservation and Recovery Act, 42 U.S.C. § 6901 et seq., (4) petroleum, (5) asbestos, and (6) polychlorinated biphenyls.

d. "Hazardous Materials Laws" means any federal, state, or local statute, ordinance, order, rule, or regulation of any type relating to the storage, handling, use, or disposal of any Hazardous Materials, the contamination of the environment, or any removal of such contamination, including, without limitation, those statutes referred to in subparagraph c.

e. Tenant shall coordinate with Landlord and the U.S. Army regarding environmental issues related to the leased premises as provided in Section 15.15.

f. Tenant shall obtain any and all permits and/or licenses required to conduct its business on the Premises and provide a copy of same to Landlord.

g. Tenant shall provide a monthly report to Landlord of all materials manufactured and/or stored in the Premises which constitute hazardous materials, explosives, petrochemicals, alcohols and any other materials which constitute a danger due to their fire, explosive or environmental hazard.

h. Tenant shall clearly indicate on the outside of each igloo/warehouse the type of materials manufac6tured or stored therein.

i. Tenant shall furnish, install, and maintain during the term such safety devices, such as fire suppression systems, spark arresters, lightning rods and static electricity suppressors, as are required or are customarily installed in facilities manufacturing or storing explosives, hazardous materials, petrochemicals, alcohols and other materials constituting a danger due to explosives or fire.

j. Tenant shall construct a secure perimeter fence around the Leased Premises sufficient to deter persons not affiliated with Tenant from gaining access to storage facilities in which explosives, hazardous materials, petrochemicals, alcohols and other materials constituting a danger due to explosions or fire are kept or stored.

k. Tenant shall not store any hazardous materials, explosives, explosive constituents, petro chemicals, alcohols, or any other materials which constitute a danger due to their fire, explosive or environmental hazard on the Premises other than inside the igloo bunkers secured by a locked door.

§ 3.03. **Rights of Inspection.** Tenant must permit Landlord and Landlord's agents, servants, and employees, including but not limited to legal counsel and environmental consultants and engineers, access to the premises upon at least 24 hours' prior written notice for the purpose of conducting environmental inspections and sampling during regular business hours, and during other hours either by agreement of the parties or in the event of an environmental emergency. Tenant may not restrict access to any part of the premises, and Tenant may not impose any conditions to access. If Landlord's environmental inspection includes sampling and testing of the premises, Landlord must use its best efforts to avoid

interfering with Tenant's use of the premises, and on completion of sampling and testing must repair and restore the affected areas of the premises as made necessary by any sampling and testing.

§ 3.04. **Environmental Reporting Requirements.**

a. Tenant must promptly supply Landlord with copies of all notices, reports, correspondence, and submissions made by Tenant to the Texas Commission on Environmental Quality, the United States Environmental Protection Agency, the United States Occupational Safety and Health Administration, or any other local, state, or federal authority that requires submission of any information concerning environmental matters or hazardous materials pursuant to hazardous materials laws. Tenant shall provide to Landlord copies of all permits and/or licenses issued to Tenant for operation of its business on the leased premises and all modifications, amendments and other changes within 30 days after issuance of same.

b. Tenant must promptly notify Landlord in advance of any scheduled meeting between Tenant and any of the agencies specified in subparagraph a. In the case of regulatory inspections for which the Tenant has not received advance notice, Tenant shall notify Landlord within 48 hours of the visit and the corrective actions, if any, required by the Agency.

c. Tenant must promptly notify Landlord as to any liens threatened or attached against the premises pursuant to any environmental law. If an environmental lien is filed against the premises, Tenant must, within 30 days from the date on which the lien is placed against the premises, and at any rate before the date on which any governmental authority begins proceedings to sell the premises pursuant to a lien, either: (1) pay the claim and remove the lien from the premises; or (2) furnish either (a) a bond satisfactory to the Landlord in the amount of the claim on which the lien is based, or (b) other security satisfactory to the Landlord in an amount sufficient to discharge the claim on which the lien is based.

§ 3.05. **Condition of Premises.** Tenant accepts the Premises in their present condition "AS IS" and acknowledges that the Premises are, or will be repaired by Tenant to be, suitable for Tenant's intended use.

§ 3.06. **Delivery of Premises at End of Term.** Tenant shall remove all personal property, Tenant owned equipment and stored items from the leased premises at the end of the term or extended term of this Lease. The leased premises shall be returned to Landlord in clean, empty and good condition reasonable wear and tear excepted. Under no circumstances shall stored items be left on or in the premises.

§ 3.07. **Blast Arcs.** Except as provided in this Section 3.07, Tenant shall not use the leased premises for any purpose or in a way that allows or requires that blast safety arcs (or inhabited building restrictions) as required by applicable regulatory authorities to extend outside the leased premises or encroach upon or overlap on or across the adjoining roadways known as Oak Street, Cyprus Street and Lamar Street, or extend outside the Leased Premises other than across the street known as Titus Street, which lies West of the Leased Premises. Blast arcs can extend beyond the Leased Premises and interlock (overlap) with the leased premises of another tenant upon written confirmation of permission of both tenants and approval of Landlord. Tenant agrees to allow an interlock (overlap) of Blast Arcs and/or inhabited building restrictions upon the Leased Premises by an adjoining or

nearby third party tenant of Landlord, provided said overlap is permitted by applicable regulations. Every agreement for overlap of Blast Arcs or inhabited building restrictions must be in writing and signed by each tenant whose leased premises are within the overlap.

Except as provided in this Section 3.07, Tenant shall not use the Leased Premises for any purpose or in a way that allows or requires that Blast Safety Arcs (or inhabited building restrictions) as required by applicable regulatory authorities extend outside the Leased Premises or encroach upon or overlap on or across the adjoining roadways known as Oak Street, Cypress Street and Lamar Street or extend outside the Leased Premises other than across the street known as Ellis Street which lies between Tracts One and Two of the Leased Premises. Blast Arcs can extend beyond the Leased Premises and interlock (overlap) with the Leased Premises of another Tenant upon written confirmation of permission of both Tenants and approval of Landlord. Tenant agrees to allow an interlock (overlap) of Blast Arcs and/or inhabited building restrictions upon the Leased Premises by an adjoining or nearby third party Tenant of Landlord provided said overlap is permitted by applicable regulations. Every agreement for overlap of Blast Arcs or inhabited building restrictions must be in writing and signed by each Tenant whose Leased Premises are within the overlap area. The overlap may not include an area in which either Tenant has an occupied building or an useable building which a Tenant desires to place in use at a later date. The agreement of the parties must include a plat or aerial photograph depicting the leased areas of the Tenants and the Blast Arc or inhabited building restriction overlap area.

§ 3.08. **Information to Be Provided to Landlord.** On or before the tenth day of each month during the Lease Term, Tenant shall provide to Landlord a report indicting the type and quantity of each explosive material stored in or one of the leased premises (including individual bunkers/igloos) as of the first day of said month.

ARTICLE 4 . REPAIRS AND MAINTENANCE

§ 4.01. **Repairs and Maintenance by Tenant.** Tenant will except as provided in paragraph 4.04, throughout the lease term and any extensions of it, at its own expense and risk, maintain the premises and all improvements on them in good order and condition, including but not limited to making all repairs and replacements necessary to keep the premises and improvements in that condition. All maintenance, repairs, and replacements required by this section must be performed promptly when required.

§ 4.02. **Tenant's Failure to Repair or Maintain.** If Tenant fails to perform its obligation to repair, replace, or maintain, as set forth in § 4.01, within a reasonable time after notice from Landlord of the need for the repair, replacement, or maintenance, Landlord may enter the premises and make the repairs or replacements, or perform the maintenance, or have the repairs or replacements made or maintenance performed, at its own expense. On Landlord's notice to Tenant of the performance and cost of any maintenance, repairs, or replacements under this section, Tenant must immediately reimburse Landlord for any reasonable costs incurred by Landlord under this section, together with interest on the sum at the highest legal rate from the date of the notice until the date paid by Tenant to Landlord.

§ 4.03. **Allocation of Environmental Cleanup Costs.** Tenant is responsible only for the

payment of that portion of any cleanup costs necessary for compliance with Hazardous Materials Laws that arise as a result of Tenant's discharge of hazardous materials on the premises during the Tenant's occupancy of the premises and/or as a result of Tenant's violation of any restrictive covenants relating to the Premises which are of Record in Bowie County, Texas, including but not limited to those set forth in Section 15.15 of this Lease.

§ 4.04. **Repairs and Maintenance by Landlord.** Landlord shall repair, replace and maintain only the (a) roof and (b) the foundation.

ARTICLE 5 . UTILITIES AND GARBAGE REMOVAL

§ 5.01. **Utility Charges.** Tenant will pay all utility and connection charges for water, sewer, electricity, heat, gas, cable, fiber optic and telephone service used in and about the premises during the lease term. Tenant will pay the charges directly to the utility company or governmental agency furnishing the service before the charges are delinquent.

§ 5.02. **Meters and Pretreatment Requirements.** Tenant shall pay for the cost for individual meters for utility services and installation of them if individual meters to the Premises are not in place at the time of execution of this Lease. Tenant agrees to pretreat at its cost any waste streams which require pretreatment as determined by the respective utility provider prior to discharge of such waste into the sanitary sewer system.

§ 5.03. **Garbage Removal.** Tenant will pay for all garbage removal from the premises during the lease term.

ARTICLE 6 . ALTERATIONS, ADDITIONS, AND IMPROVEMENTS

§ 6.01. **Consent of Landlord.** Tenant may not make any alterations, additions, or improvements to the premises without Landlord's prior written consent. Landlord may not unreasonably withhold consent for nonstructural alterations, additions, or improvements.

§ 6.02. **Property of Landlord.** All alterations, additions, or improvements made by Tenant will become Landlord's property when the lease terminates. However, Landlord may, when the lease terminates, remove any alterations, additions, and improvements made by Tenant and any other property it placed in the premises, and charge Tenant the cost of removal plus interest which amount shall be paid within 50 days of Landlord's notice to Tenant of the amount due.

§ 6.03. **Alterations Required by Accessibility Laws.** If any alterations, additions, or improvements to the premises are mandated by legal requirements related to accessibility by persons with disabilities ("accessibility alterations"), Tenant is responsible for making them. This allocation of responsibility for compliance with such legal requirements is a material inducement for the parties to enter this lease.

ARTICLE 7 . TRADE FIXTURES AND SIGNS

§ 7.01. **Trade Fixtures.** Tenant may, at all times, erect or install shelves, bins, machinery, equipment, or other trade fixtures, in, on, or about the premises, if Tenant complies with all applicable governmental laws, ordinances, and regulations regarding the fixtures. Tenant may remove all trade fixtures when this lease terminates, if Tenant is not in default under the lease and the fixtures can be removed without structural damage to the building. Tenant

must repair any damage to the premises caused by removing trade fixtures, and all the repairs must be completed before the lease terminates. Any trade fixtures not removed by Tenant when this lease terminates are considered abandoned by Tenant and will automatically become Landlord's property. If any trade fixture installed by Tenant is abandoned when the lease terminates, Tenant must pay Landlord any reasonable expense actually incurred by Landlord to remove the fixture from the premises, which amount shall be paid within 15 days of Landlord's notice to Tenant of the amount due.

§ 7.02. **Signs.** Tenant may erect signs on any portion of the premises, including but not limited to the exterior walls, subject to applicable laws, ordinances, and regulations, and after approval of the proposed signage by Landlord. Tenant must remove all signs when this lease terminates and repair any damage resulting from erecting or removing the signs.

ARTICLE 8 . MECHANIC'S LIEN

Tenant will not permit any mechanic's lien to be placed on the premises or improvements on the premises. Tenant will promptly pay any mechanic's lien that is filed on the premises or on improvements located on the premises. If default in payment of the lien continues for 20 days after Landlord's written notice to Tenant, Landlord may, at its option, pay the lien or any portion of it without inquiring into its validity. Any amounts Landlord pays to remove a mechanic's lien caused by Tenant to be filed against the premises or improvements on them, including expenses and interest, are due from Tenant to Landlord and must be repaid to Landlord immediately on rendition of notice, together with interest at eighteen (18) percent annually until repaid.

ARTICLE 9 . INSURANCE AND INDEMNITY

§ 9.01. **Tenant's Property Insurance.** Tenant must, at its own expense during the lease term, maintain insurance on Tenant's personal property, furniture, fixtures and equipment in such amounts as Tenant deems necessary.

§ 9.02. **Landlord's Property Insurance.** Landlord shall, at its expense, keep all buildings on the Premises insured against loss or damage in an amount determined by Landlord in its sole discretion. Tenant will have no claim to any proceeds of Landlord's insurance policies.

§ 9.03. **Tenant's Liability Insurance.** Tenant, at its own expense, must provide and maintain in force during the lease term (a) a policy of commercial liability insurance with a single limit each occurrence of not less than $1,000,000.00 and general aggregate of not less than $2,000,000.00, and (b) a policy of Worker's Compensation Insurance as required by applicable law. This insurance is to be carried by one or more insurance companies authorized or admitted to transact business in Texas. The liability policy must cover Landlord as well as Tenant, for any liability for property damage or personal injury arising from Tenant's occupying or Landlord's owning the premises.

§ 9.04. **Remedy for Failure to Provide Insurance.** Tenant must furnish Landlord with certificates of all insurance required by this article. If Tenant does not provide the certificates when Landlord delivers possession to Tenant and within ten days prior to any renewal date, or if Tenant allows any insurance required under this article to lapse, Landlord may, at its option, take out and pay the premiums on the necessary insurance to comply with Tenant's obligations under this article. Landlord is entitled to reimbursement from Tenant for all amounts spent to procure and maintain the insurance, with interest at the

rate of eighteen (18) percent annually from the date Tenant receives Landlord's notice of payment until reimbursement.

§ 9.05. **Tenant's Environmental Indemnity.** Tenant agrees to indemnify, defend, and hold harmless Landlord from and against all claims, liabilities, losses, damages, remediation expenses, fines and penalties, and costs, foreseen or unforeseen, including without limitation counsel, engineering, and other professional or expert fees, that Landlord may incur by reason of Tenant's action or inaction with regard to Tenant's obligations under Articles 3 and 4 and Section 15.15 of this lease. This section survives the expiration or earlier termination of this lease.

§ 9.06. **Hold-Harmless Clause** Tenant will indemnify and hold Landlord harmless against any claims, demands, damages, costs, and expenses, including reasonable attorney's fees for defending claims and demands, arising from the conduct or management of Tenant's business on the premises or its use of them; from any breach by Tenant of any conditions of this lease; or from any act of negligence of Tenant, its agents, contractors, employees, subtenants, concessionaires, or licensees in or about the premises. If any action or proceeding is brought against Landlord by reason of any such claim, Tenant, on notice from Landlord, will defend the action or proceeding by counsel acceptable to Landlord.

§ 9.07. **Release of Claims/Subrogation.** Landlord and Tenant release each other from any claim, by subrogation or otherwise, for any damage to the Premises, the building, or personal property within the building, regardless of cause, including negligence of Landlord or Tenant, however, the release applies only to the extent it is permitted by law, the damage is covered by insurance proceeds, and the release does not adversely affect any insurance coverage. Landlord and Tenant will notify their insurance companies of the release set forth herein and will have the insurance policies, endorsed, if necessary, to prevent invalidation of the insurance coverage.

§ 9.08. **Pollution Legal Liability Insurance.** Tenant shall carry and provide during the term of this Lease Pollution Legal Liability insurance providing the following coverages:

a. On-site cleanup of new conditions arising after the commencement of this Lease triggered by first-party discovery or third-party claim

b. Third-party claims for on-site bodily injury, property damage or cleanup costs arising from new conditions arising after the commencement of this Lease;

c. Pollution conditions resulting from transported cargo (third-party carrier or owned vehicle) while on TAC properties or adjacent entrances or exits;

d. Coverage for punitive damages, fines and penalties, if insurable in this jurisdiction

The policy shall provide coverages of not less than $1,000,000.00 per loss and not less than $2,000,000.00 in the aggregate.

The deductible on the policy shall not be greater than $25,000.00 per occurrence.

ARTICLE 10 . DAMAGE OR DESTRUCTION OF PREMISES

§ 10.01. **Notice to Landlord.** If the premises, or any structures or improvements on them, are damaged or destroyed by fire, tornado, or other casualty, Tenant must immediately give Landlord written notice of the damage or destruction, including a general description of the damage and, as far as known to Tenant, the cause of the damage.

§ 10.02. **Total Destruction.** If the building on the premises is totally destroyed by fire, tornado, or other casualty by other than the negligence, gross negligence, or intentional tort of Tenant or any person in or about the premises with Tenant's express or implied consent, or if it is so damaged that rebuilding or repairs cannot reasonably be completed within ninety (90) working days at a cost not to exceed the insurance recovery proceeds, this lease will terminate, and rent will be abated for the unexpired portion of this lease, effective as of the date of written notification as provided in § 10.01.

§ 10.03. **Partial Destruction.** If the building or other improvements on the premises are partially damaged by fire, tornado, or other casualty by other than the negligence, gross negligence, or intentional tort of Tenant or any person in or about the premises with Tenant's express or implied consent, but not to such an extent that rebuilding or repairs cannot reasonably be completed within ninety (90) working days and at a cost not to exceed the insurance recovery proceeds, this lease will not terminate except as follows:

a. If the premises are partially destroyed before the final twelve (12) months of the lease term, Landlord must, at its sole cost and risk, up to but not exceeding the amount of available insurance proceeds, proceed immediately to rebuild or repair the damaged buildings and improvements to substantially the condition they were in before the damage. If the damage renders the premises untenantable in whole or in part, the rent payable during the period in which they are untenantable will be adjusted equitably. If Landlord fails to complete the rebuilding or repairs within one-hundred twenty (120) working days from the date of Tenant's written notification to Landlord of the damage, Tenant may terminate this lease by written notification to Landlord. On the notification, all rights and obligations under this lease will cease.

b. If the premises are partially destroyed during the final twelve (12) months of the lease term, Landlord need not rebuild or repair them. If Landlord elects not to rebuild or repair and the damage rendered the premises untenantable in whole or in part, Tenant may terminate the lease or continue it with the rent for the remainder of the lease period adjusted equitably.

ARTICLE 11 . CONDEMNATION

§ 11.01. **Total Condemnation.** If, during the lease term or any extension or renewal of it, all of the premises are taken for any public or quasi-public use under any governmental law, ordinance, or regulation, or by right of eminent domain, or are sold to the condemning authority under threat of condemnation, this lease will terminate, and the rent will be abated during the unexpired portion of this lease, effective as of the date the condemning authority takes the premises.

§ 11.02. **Partial Condemnation.** If less than all, but more than twenty-five percent (25%), of the premises is taken for any public or quasi-public use under any governmental law, ordinance, or regulation, or by right of eminent domain, or is sold to the condemning

authority under threat of condemnation, Tenant may terminate the lease by giving Landlord written notice within 30 days after the entity exercising the power of condemnation takes possession of the condemned portion. In addition, if twenty-five percent (25%) of the parking area, or all of the signage, of the premises is taken for any public or quasi-public use under any governmental law, ordinance, or regulation or by right of eminent domain, or is sold to the condemning authority under threat of condemnation, Tenant may terminate the lease by giving Landlord written notice within 30 days after the entity exercising the power of condemnation takes possession of the condemned portion.

If the premises are partially condemned and Tenant fails to exercise the option to terminate the lease under this section, or if less than twenty five percent (25%) of the premises is condemned, this lease will not terminate, but Tenant may, at its sole expense, restore and reconstruct the building and other improvements situated on the premises to make them reasonably tenantable and suitable for the uses for which the premises are leased. The fixed rent payable under § 2.01 of this lease will be adjusted equitably during the unexpired portion of this lease.

§ 11.03. **Condemnation Award.** Landlord is entitled to receive and retain the entire award in any condemnation proceedings, except for any portion attributable to trade fixtures, which Tenant is entitled to receive and retain. The termination of this lease will not affect the right to this award.

ARTICLE 12 . DEFAULT

§ 12.01. **Tenant's Default.** If Tenant allows the rent to be in arrears more than fifteen (15) days after its due date, or remains in default under any other condition of this lease for 30 days after written notice from Landlord, Landlord may, at its option, without notice to Tenant, terminate this lease, or, in the alternative, Landlord may reenter and take possession of the premises and remove all persons and property without being considered guilty of any manner of trespass and may (but is not required to) relet the premises (or any part of them) for all or any part of the remainder of the lease term, to a party satisfactory to Landlord and at the monthly rental as Landlord can secure with reasonable diligence. If Landlord cannot relet after reasonable efforts to do so or if the monthly rental is less than the rental Tenant was obligated to pay under this lease (or any renewal of it) plus the expense of reletting, then Tenant must pay Landlord the amount of the deficiency.

§ 12.02. **Landlord's Lien.** If Tenant defaults in paying rent or any other sum due from Tenant to Landlord under this lease, Landlord has a lien on all fixtures, chattels, or other property of any description belonging to Tenant that are placed in, or become a part of, the premises as security for rent due and to become due for the remainder of the current lease term and any other sum Tenant owes Landlord. This lien is not in lieu of, nor in any way affects, the statutory landlord's lien but is in addition to that lien, and Tenant grants Landlord a security interest in all of Tenant's property placed in or on the premises for purposes of this contractual lien. This does not prevent Tenant's selling any merchandise in the ordinary course of business free of such Landlord's lien. If Landlord exercises the option to terminate the leasehold, reenter, and relet the premises as provided in the preceding paragraph and gives Tenant reasonable notice of the intent to take possession and an opportunity for a hearing on the matter, Landlord may take possession of all of Tenant's property on the premises and sell it at public or private sale after giving Tenant reasonable notice of the time and place of any public sale or of the time after which any private sale is to be made, for cash or on credit, for the prices and terms that Landlord considers best,

with or without having the property present at the sale. The proceeds of the sale will be applied first to the necessary and proper expense of removing, storing, and selling the property, then to the payment of any rent due or to become due under this lease; any balance will paid to Tenant. Tenant further grants Landlord a security interest in Tenant's personal property now or subsequently placed in or on the Premises. This Lease is a Security Agreement under the Texas Business and Commerce Code. Landlord may file a Financing Statement to perfect its Security Interest.

§ 12.03. **Landlord's Default.** If Landlord defaults in performing any term or covenant that Landlord must perform under this agreement, Tenant may, after not fewer than thirty (30) days' notice to Landlord, remedy the default by any necessary action and, in connection with the remedy, may pay expenses and employ counsel. Landlord must, on demand, pay Tenant all sums expended, or obligations incurred, by Tenant in connection with remedying Landlord's default. It is agreed, however, that if Landlord commences action within 30 days after receipt of notice to remedy any default and diligently pursue such action to conclusion, Tenant's rights under this section shall not apply.

§ 12.04. **Cumulative Remedies.** All Landlord's and Tenant's rights and remedies under this Article are cumulative, and none will exclude any other right or remedy provided by law or any other provision of this lease. All the consistent rights and remedies may be exercised and enforced concurrently and whenever occasion for their exercise arises.

§ 12.05. **Waiver of Breach.** All Landlord's or Tenant's waiving a breach of this lease by the other party does not constitute a continuing waiver or a waiver of any subsequent breach.

§ 12.06. **Indemnities in Event of Termination.** In the event that this Lease Agreement is terminated by either party as provided in this Agreement, and upon expiration of the Term, or extended term of this Lease Agreement, the Tenant's obligations to indemnify and hold harmless Landlord shall not terminate or expire and shall survive such termination and/or expiration and shall be fully binding upon Tenant.

§ 12.07. **Limitation of Landlord's Liability.** Notwithstanding anything to the contrary contained herein, no personal or individual liability of any kind or character whatsoever shall now or at any time hereafter attach to Landlord or its property other than leased premises for the payment of any amount payable under this Lease. The exclusive remedy of Tenant for the failure of Landlord to perform any of its obligations under this Lease shall be to proceed against the interest of Landlord in and to the leased premises.

ARTICLE 13 . INSPECTION BY LANDLORD

Tenant will permit Landlord and its agents, representatives, and employees to enter the premises upon at least 24 hours' prior written notice at all reasonable times for the purpose of inspection or any other purpose necessary to protect Landlord's interest in the premises or to perform Landlord's duties under this lease, or to show the Premises to prospective purchasers or future tenants.

ARTICLE 14 . ASSIGNMENT AND SUBLEASE

§ 14.01. **Assignment and Subletting by Tenant.**

a. Tenant may not sublet, assign, encumber, or otherwise transfer this lease, or any right or interest in it or in the premises or the improvements on them, without Landlord's written consent. If Tenant sublets, assigns, encumbers, or otherwise transfers its rights or interests in this lease or in the premises or the improvements on them without Landlord's written consent, Landlord may, at its option, declare this lease terminated. If Landlord consents in writing to an assignment, sublease, or other transfer of all or any of Tenant's rights under this lease, the assignee or subtenant must assume all of Tenant's obligations under this lease, and Tenant will remain liable for every obligation under the lease. Landlord may not arbitrarily or unreasonably withhold consent under this section.

b. As a condition precedent to the Tenant's right to sublease the property or to assign this lease, the Tenant must, at the Tenant's own expense, fulfill all of the Tenant's environmental obligations under Article 3 of this lease. If this condition is not satisfied, the Landlord has the right to withhold consent to any proposed sublease or assignment.

§ 14.02. **Assignment by Landlord.** Landlord may assign or transfer any of its interests under this lease. On transfer, and on the transferee's assumption of its obligations, Landlord is relieved of its obligations under the lease.

ARTICLE 15 . MISCELLANEOUS

§ 15.01. **Notices and Addresses.** All notices required under this lease may be given by the following methods:

a. By certified mail, return receipt requested, addressed to the proper party, at the following addresses:

Landlord: TexAmericas Center
107 Chapel Lane
New Boston, Texas 75570
Attn: Executive Director

Guarantor: N/A
N/A
N/A

Tenant: **EnviroSafe Demil**
12763 Lovelock Hwy.
Fallon, Nevada 89406, USA

b. By fax transmission, to the proper party, at the following fax numbers:

Landlord: 903-223-8742 Attn: Executive Director

Notices are effective when received. Either party may change the address or fax number to which notices are to be sent by sending written notice of the new address or number to the other party in accordance with the provisions of this section.

§ 15.02. **Parties Bound.** This agreement binds, and inures to the benefit of, the parties to

the lease and their respective heirs, executors, administrators, legal representatives, successors, and assigns when this agreement permits.

§ 15.03. **Texas Law to Apply.** This agreement is to be construed under Texas law, and all obligations of the parties created by this lease are performable in Bowie County, Texas.

§ 15.04. **Legal Construction.** If one or more of the provisions contained in this agreement are for any reason held by a court of competent jurisdiction to be invalid, illegal, or unenforceable in any respect, the invalidity, illegality, or unenforceability will not affect any other provision of the agreement, which will be construed as if it had not included the invalid, illegal, or unenforceable provision.

§ 15.05. **Prior Agreements Superseded.** This agreement constitutes the parties' sole agreement and supersedes any prior understandings or written or oral agreements between the parties with respect to the subject matter.

§ 15.06. **Amendment.** No amendment, modification, or alteration of this agreement is binding unless in writing, dated subsequent to the date of this agreement, and duly executed by the parties.

§ 15.07. **Rights and Remedies Cumulative.** The rights and remedies provided by this lease are cumulative, and either party's using any right or remedy will not preclude or waive its right to use any other remedy. These rights and remedies are in addition to any other rights the parties may have by law, statute, ordinance, or otherwise.

§ 15.08. **Attorney's Fees and Costs.** If, as a result of either party's breaching this agreement, the other party employs an attorney to enforce its rights under this lease, then the breaching or defaulting party will pay the other party the reasonable attorney's fees and costs incurred to enforce the lease.

§ 15.09. **Force Majeure.** Neither Landlord nor Tenant is required to perform any term or covenant in this lease so long as performance is delayed or prevented by *force majeure,* which includes acts of God, strikes, lockouts, material or labor restrictions by any governmental authority, civil riot, floods, and any other cause not reasonably within Landlord's or Tenant's control and that Landlord or Tenant cannot, by exercising due diligence and paying money, prevent or overcome, in whole or part.

§ 15.10. **Time of Essence.** Time is of the essence of this agreement.

§ 15.11. **Alternate Dispute Resolution.** Landlord and Tenant shall submit in good faith to mediation any and all disputes before filing suit. Each party shall pay its own counsel fees in such mediations and shall each pay one-half of the mediator's charges. The parties shall mutually agree upon the mediator, and upon failure to agree within 30 days of a request by either party to mediation, shall request the County Judge of Bowie County to select a mediator whose selection shall be binding on the parties. All mediations shall take place in Bowie County, Texas.

§ 15.12. **LIMITATION OF WARRANTIES.** THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER KIND ARISING OUT OF THIS LEASE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THOSE, IF ANY, EXPRESSLY STATED IN THIS LEASE.

§ 15.13. **Abandoned Property.** Landlord may retain, destroy or dispose of any property left on the Premises at the end of the Term without liability to Tenant for loss or damage.

§ 15.14. **Municipal and Emergency Services.** Tenant shall pay for all municipal services (Police, Hazardous Spill Response, Emergency Medical Response and Fire Protection) used by Tenant, its employees, guests, invitees, and any and all persons while upon the Premises. Said services may be furnished by local law enforcement agencies and by the U.S. Department of the Army as provided in that certain Municipal Services Agreement between Red River Army Depot and Red River Redevelopment Authority dated the 4th day of February, 1998, as it may be amended from time to time. Tenant shall pay to, or reimburse, Landlord for all municipal services furnished to Tenant or to persons on the Premises within ten (10) days after receipt of an invoice for said services from Landlord. Tenant shall be entitled to receive and shall handle all documentation for reimbursement by insurance companies or other third-party benefit plan providers.

§ 15.15. **Army Imposed Restrictions.**

a. Notwithstanding any other provision of this Lease, this Lease Agreement is made subject to, and Tenant agrees to be bound by those certain exceptions, limitations, covenants, conditions and reservations set forth in the Deed Without Warranty conveying the Premises from the United States of America, acting by and through the Secretary of the Army to Red River Redevelopment Authority dated September 1, 2010, and recorded in Volume 5898, Page 1 of the Real Property Records, Bowie County, Texas, to the extent said provisions apply to the Premises. A copy of the Deed Without Warranty is available at the offices of Landlord.

b. Lessee specifically acknowledges that the Deed Without Warranty contains the following language regarding Post Transfer Discovery of Contamination:

> "A. If an actual or threatened release of a hazardous substance or petroleum product is discovered by the GRANTEE, its successors or assigns on the Property after the date of conveyance, GRANTEE, its successors or assigns, shall be responsible for the investigation and/or remediation of such release or newly discovered substance unless GRANTEE is able to demonstrate that such release or such newly discovered substance was due to GRANTOR's activities, use, or ownership of the Property. If the GRANTEE, its successors or assigns believe the discovered hazardous substance is due to GRANTOR's activities, use or ownership of the Property, GRANTEE will immediately secure the site and notify the GRANTOR of the existence of the hazardous substances, and GRANTEE will not further disturb such hazardous substances without the written permission of the GRANTOR.
>
> B. GRANTEE, its successors and assigns, as consideration for the conveyance of the Property, agree to release GRANTOR from any liability or responsibility for any claims arising solely out of the release of any hazardous substance or petroleum product on the Property occurring after the date of the

delivery and acceptance of this Deed, where such substance or product was placed on the Property by the GRANTEE, or its successors, assigns, employees, invitees, agents or contractors, after the conveyance. This paragraph shall not affect the GRANTOR's responsibilities to conduct response actions or corrective actions that are required by applicable laws, rules and regulations, or the GRANTOR's indemnification obligations under applicable laws."

c. Lessee agrees to comply with the provisions of this subsection and will be responsible for all claims, damages, remediation expenses, fines and penalties related to violation of Hazardous Materials Laws, as defined in Section 3.02, and/or violation or breach of the restrictions and covenants set forth in this Section 15 after the commencement date of this Lease, including but not limited to such claims, damages, remediation expenses, fines and penalties related to the release, disturbance, spreading, extension, expansion or exacerbation of a release or substance by Lessee or those on the Premises with the consent or for the benefit of Lessee.

§ 15.16. **Reservation of Rights.** Landlord reserves the right to include the Premises including the easement locations, if any, together with other adjoining property owned by Landlord in a subdivision plat and subject the property described in said platted subdivision to utility easements and common restrictive covenants; provided, however, that said restrictive covenants and easements shall not interfere unreasonably with Tenant's use and related uses. It shall not be necessary or required that Tenant join in the execution of any such plat dedication or declaration of restrictive covenants and easements.

§ 15.17. **Common Area Charges.** Tenant acknowledges and agrees that it shall be responsible for and pay its proportionate share of the "TexAmericas Center-East common area charges" based upon the square footage of the Premises as a percentage of the total area of the TexAmericas Center-East development area (excluding the "common areas"). The "common areas" are those areas of TexAmericas Center-East used by and/or for the benefit of all property owners or tenants within TexAmericas Center-East, including but not limited to parks, recreational facilities, walkways, roadways and public parking areas. "Common area charges" are those property taxes, user charges, payments in lieu of taxes, maintenance, improvement, and betterment charges, and other local, county, TexAmericas Center, or other governmental assessments on or against the Commerce Park common areas. The common area charges, other than taxes, shall not exceed ten cents ($0.10) per $100.00 valuation of the Premises based upon the fair market value thereof as determined by the Bowie Central Appraisal District for the year in which the assessment is made. Landlord shall notify Tenant of the amount of the assessment, and Tenant shall pay said assessment within thirty (30) days.

§ 15.18. **License for Access to Premises.** Landlord grants Tenant a license to use the roadways of Landlord for access to and from the Premises, said roadways being identified as follows (select only one by placing an X in the applicable option):

_____ All roadways including paved and unpaved roads;
_____ Only the paved roadways; or
__X__ The following specific streets:

Houston	Cass Street	Cherry Street
Montague Street	Oak Street	Beech Street
Cypress Street	Alder Circle	Huckleberry Street

This is a non-exclusive license to use said roadways which shall terminate upon the termination of this lease.

§ 15.19. **Advertising and Promotions Rights**. Tenant, by entering into this Lease Agreement, authorizes Landlord to use in its advertising and promotion of TexAmericas Center and its properties the fact that Tenant has leased property from Landlord including but not limited to photographs of the leased premises, Tenant signage, and vehicles, and Tenant employees; inclusion of Tenant's name and any "doing business as" names in Landlord's client/customer listings; and quotations of Tenant and Tenant's representatives. This authorized use includes all forms of media including but not limited to print, radio and other audio media, television and other video media, internet and other telecommunications media, and social media such as Facebook, Twitter, LinkedIn and others. This section constitutes a license from Tenant to Landlord to use for the limited purposes set forth herein any and all trademarks, trade names and related intellectual property generally available and visible to the general public.

§ 15.20. **Annual Reports.** Tenant agrees to annually, on or about, June 30 of each year during the Term and all extensions of the Term, and at such other times as Landlord may request, to provide to Landlord a report setting forth the following information for the prior calendar year:

1. Maximum number of Full Time Equivalent jobs;
2. Minimum number of Full Time Equivalent jobs;
3. Total Payroll for jobs on the Premises;
4. An employee census by position (no names);
5. Number of employees making above the average wage for Bowie County as determined by the Texas Workforce Commission;
6. Average wage for all employees;
7. Such other information as Landlord may reasonably request to support its redevelopment efforts, including but not limited to information required by authorities issuing grants for which Landlord may apply.

§ 15.21. **Guarantee.** Guarantor agrees to guarantee payment and performance by Tenant of its obligations under this Lease. Guarantor agrees to pay and perform the obligations of Tenant within 15 days of receipt of notice from Landlord of failure of Tenant to pay or perform under the Lease. This is an unconditional guaranty of payment and performance, not of collection, and it is an agreement of guaranty, not of suretyship. Guarantor waives all requirements of law, if any, that any collection efforts be made against Tenant or that any action be commenced against Tenant before resorting to this guaranty. Guarantor acknowledges but that for Guarantor providing this guaranty, Landlord would not have entered into this Lease with Tenant.

§ 15.22 **Governmental Immunity.** By execution of this Agreement, TexAmericas Center does not waive its governmental immunity except to the extent it is contractually liable for

damages for failure to perform its responsibilities under this Agreement. This limited waiver of governmental immunity shall not extend to, or for the benefit of, any third parties.

§ 15.23. **Option to Purchase.** Provided Tenant is not in default under the terms of this Lease, Tenant shall have an option to purchase the leased premises and adjoining property upon the terms stated in the Option to Purchase attached hereto as Exhibit B.

ARTICLE 16. LESSEE AFFIRMATIONS

1. **FALSE STATEMENTS.** Lessee represents and warrants that all statements and information prepared and submitted in response to the solicitation are current, complete, true and accurate. Signing the solicitation with a false statement is a material breach of this Purchase Order and shall void the submitted response or any resulting Purchase Orders, and may result in removal of the Lessee from the Centralized Master Bidder List.

2. (Intentionally Deleted)

3. (Intentionally Deleted)

4. (Intentionally Deleted)

5. (Intentionally Deleted)

6. (Intentionally Deleted)

7. **PROHIBITION AGAINST BOYCOTTING ISRAEL.** Pursuant to Section 2271.002 of the Texas Government Code, Lessee certifies that either (i) it meets an exemption criteria under Section 2271.002; or (ii) it does not boycott Israel and will not boycott Israel during the term of the contract resulting from this solicitation. Lessee shall state any facts that make it exempt from the boycott certification in its Response.

8. **PROHIBITION AGAINST CONTRACTING WITH COMPANIES ENGAGED IN BUSINESS WITH IRAN, SUDAN, OR FOREIGN TERRORIST ORGANIZATIONS.** In accordance with Section 2252.152 of the Texas Government Code, TFC is prohibited from entering into a governmental contract (as defined in Texas Government Code Section 2252.151(3)) with a company that is identified on a list prepared and maintained under Texas Government Code Section 806.051, 807,051, or 2252.153. If Lessee is on the above referenced list the Contract will be considered void or voidable and TFC will not be responsible to pay Lessee for any work performed.

9. **EXCLUDED PARTIES.** Lessee certifies that it is not listed in the prohibited vendors list authorized by Executive Order No. 13224, "Blocking Property and Prohibiting Transactions with Persons Who Commit, Threaten to Commit, or Support Terrorism", published by the United States Department of the Treasury, Office of Foreign Assets Control.

10. **SUSPENSION AND DEBARMENT.** Lessee certifies that it and its principals are not suspended or debarred from doing business with the state or federal government as listed on the State of Texas Debarred Vendor List maintained by the Texas Comptroller of Public

Accounts and the System for Award Management (SAM) maintained by the General Services Administration.

11. **PROHIBITION AGAINST ENERGY COMPANY BOYCOTTS.** Pursuant to Texas Government Code Chapter 2274, Lessee certifies that either (1) it meets an exemption criteria under said Chapter; or (2) it does not boycott energy companies and will not boycott energy companies during the term of this contract.

12. **PROHIBITION AGAINST DISCRIMINATION AGAINST FIREARM ENTITIES OR FIREARM TRADE ASSOCIATIONS.** Pursuant to Texas Government Code Chapter 2274, Lessee certifies that (1) it meets an exemption criteria under said Chapter, or (2) it does not have a practice, policy, guidance or directive that discriminates against a firearm entity or firearm trade association, and will not discriminate during the term of this Contract against a firearm entity or firearm trade association.

13. **PROHIBITION AGAINST CONTRACTING WITH CERTAIN FOREIGN ENTITIES RELATING TO CRITICAL INFRASTRUCTURE.** Pursuant to the provision of Chapter 113 of the Texas Business and Commerce Code, Lessee certifies that (1) this contract does not relate to critical infrastructure, or if it does relate to critical infrastructure, (2) it is not a company owned by or the majority stock or other ownership interest of the Company is held or controlled by (a) individuals who are citizens of China, Iran, North Korea, Russia or other countries designated by the Governor of Texas, or (b) a company or other entity including a governmental entity that is owned or controlled by citizens of or is directly controlled by the government of China, Iran, North Korea, Russia, or other country designated by the Governor of the State of Texas.

The undersigned Landlord and Tenant execute this agreement on the ___day of _____, 2022.

LANDLORD
TEXAMERICAS CENTER

By: _____

Name: Scott Norton
Title: Executive Director, CEO

TENANT
EnviroSafe Demil, LLC

By: _____

Name: Thomas Ogden
Title: CEO

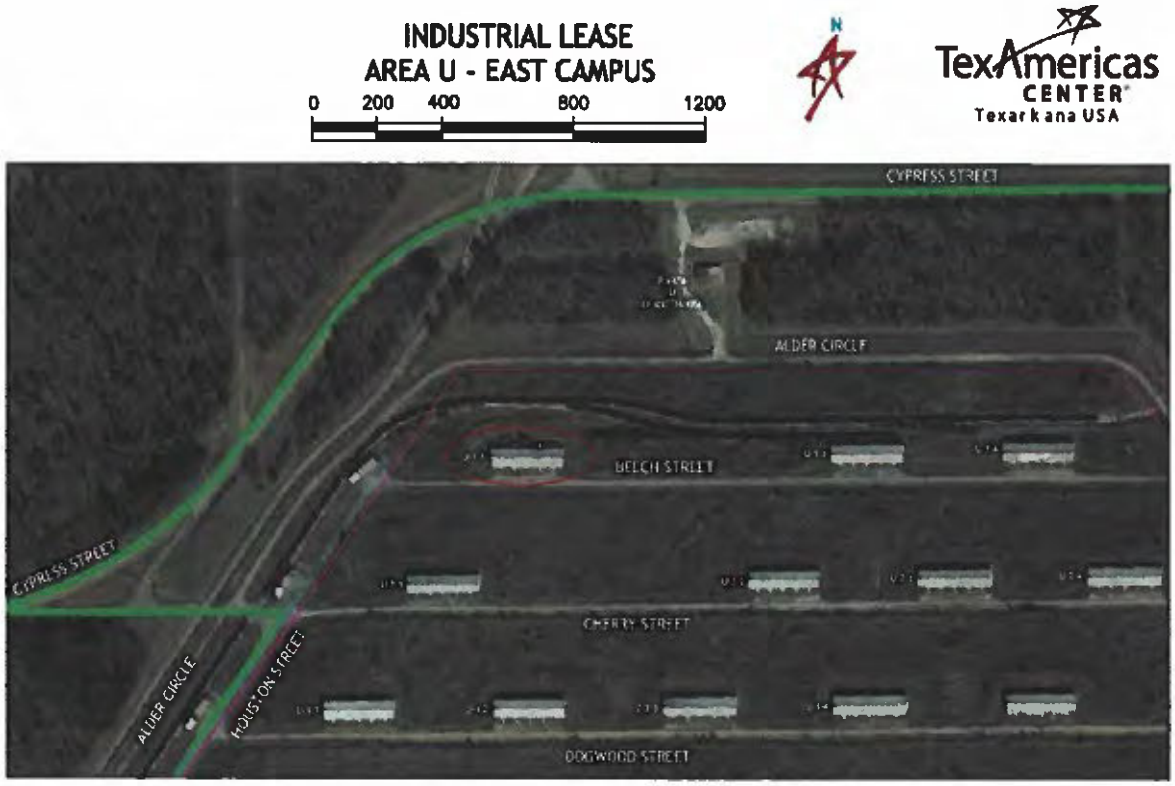
GUARANTOR

By: N/A

Name: N/A
Title: N/A

EXHIBIT "A"

PREMISES DESCRIPTION



The Premises are a portion of the Property conveyed by the United States of America to Red River Redevelopment Authority by that certain Deed Without Warranty dated September 1, 2010, recorded in Volume 5898, Page 1 of the Real Proper

ATTACHMENT A.4

LEASE INFORMATION

EARTH COVERED MAGAZINES (ECMs)

INDUSTRIAL LEASE

TAC East Holdings Company No. 1
A Texas Non-Profit Organization

LEASE SUMMARY

Landlord: TAC EAST HOLDINGS COMPANY NO. 1
107 Chapel Lane
New Boston, Texas 75570

Tenant: EnviroSafe Demil
12763 Lovelock Hwy.
Fallon, Nevada 89406, USA

Guarantor: N/A
N/A
N/A

Premises Leased Address: Two Igloo/Bunkers/Magazines at 1,648 sf each located at # 10 Nacogdoches Street and # 20 Nacogdoches Street in Area V, in Hooks, Texas, together with the safety arc areas as depicted upon Exhibit "A" attached hereto. This lease agreement is to include the option to expand into up to two (2) additional bunkers on the same row, identified on Exhibit A as #30, and #40 Nacogdoches. The monthly rent for the extended term of this Lease shall be $985.58 per month increasing annually by 3%.

Primary Term: Six (6) years; From the First (1st) day of October 2022 to the Thirtieth (30th) day of September 2028.

Option Terms: Four (4) option(s) of One (1) year each, extending to September 30, 2032

Base Rent: Year One $985.58 per month from October 1, 2022, to September 30, 2023, for the lease of two (2) bunkers.

Year Two $1,015.15 per month from October 1, 2023, to September 30, 2024, for the lease of two (2) bunkers.

Year Three $1,045.60 per month from October 1, 2024, to September 30, 2025, for the lease of two (2) bunkers.

Year Four $1,076.97 per month from October 1, 2025, to September 30, 2026, for the lease of two (2) bunkers.

Year Five $1,109.28 per month from October 1, 2026, to September 30, 2027, for the lease of two (2) bunkers.

Year Six $1,142.56 per month from October 1, 2027, to September 30, 2028, for the lease of two (2) bunkers.

Option Rent:

Option Year 1 $1,176.84 per month from October 1, 2028, to September 30, 2029, for the lease of two (2) bunkers.

Option Year 2 $1,212.14 per month from October 1, 2029, to September 30, 2030, for the lease of two (2) bunkers.

Option Year 3 $1,248.51 per month from October 1, 2030, to September 30, 2031, for the lease of two (2) bunkers.

Option Year 4 $1,285.96 per month from October 1, 2031, to September 30, 2032, for the lease of two (2) bunkers.

Security Deposit: $1,500.00

Ad Valorem Tax /PILOT Deposit: $2,000.00

Table of Contents

GRANT OF LEASE

1. Lease of Premises
2. Reservation of Timber Rights
3. Reservation of Right to Lease Areas outside Igloos

ARTICLE 1 . TERM

§ 1.01 Term of Lease

§ 1.02 Option to Extend Term

§ 1.03 Holdover

ARTICLE 2 . RENT/SECURITY and AD VALOREM TAX DEPOSITS

§ 2.01 Base Rent

§ 2.02 Taxes and Assessments as Additional Rent; Payments in Lieu of Taxes

§ 2.03. Late Charges

§ 2.04. Security-Ad Valorem Tax/PILOT Deposits; Deposit Processing Fee

ARTICLE 3 . USE OF PREMISES

§ 3.01 Tenant's Warranty Regarding Use

§ 3.02 Compliance With Laws-Safety Requirements

§ 3.03 Rights of Inspection

§ 3.04 Environmental Reporting Requirements

§ 3.05 Condition of Premises

§ 3.06 Delivery of Premises at End of Term

§ 3.07 Blast Arcs

§ 3.08 Information to Be Provided to Landlord

ARTICLE 4 . REPAIRS AND MAINTENANCE

§ 4.01 Repairs and Maintenance by Tenant

§ 4.02 Tenant's Failure to Repair or Maintain

§ 4.03 Allocation of Environmental Cleanup Costs

§ 4.04 Repairs and Maintenance by Landlord

ARTICLE 5 . UTILITIES AND GARBAGE REMOVAL

§ 5.01 Utility Charges

§ 5.02 Meters and Pretreatment Requirements

§ 5.03 Garbage Removal

ARTICLE 6 . ALTERATIONS, ADDITIONS, AND IMPROVEMENTS

§ 6.01 Consent of Landlord

§ 6.02 Property of Landlord

§ 6.03 Alterations Required by Accessibility Laws

ARTICLE 7 . TRADE FIXTURES AND SIGNS

§ 7.01 Trade Fixtures

§ 7.02 Signs

ARTICLE 8 . MECHANIC'S LIEN

ARTICLE 9 . INSURANCE AND INDEMNITY

§ 9.01 Tenant's Property Insurance

§ 9.02 Landlord's Property Insurance

§ 9.03 Tenant's Liability Insurance

§ 9.04 Remedy for Failure to Provide Insurance

§ 9.05 Tenant's Environmental Indemnity

§ 9.06 Hold-Harmless Clause

§ 9.07 Release of Claims/Subrogation

§ 9.08 Pollution Legal Liability Insurance

§ 9.09 Explosives Insurance Requirement

§ 9.10 Performance Bond

ARTICLE 10 . DAMAGE OR DESTRUCTION

§ 10.01 Notice to Landlord

§ 10.02 Destruction

§ 10.03 Clean-up of Premises

§ 10.04 Replacement Bunkers

ARTICLE 11 . CONDEMNATION

§ 11.01 Total Condemnation

§ 11.02 Partial Condemnation

§ 11.03 Replacement Bunkers

§ 11.04 Condemnation Award

ARTICLE 12 . DEFAULT

§ 12.01 Tenant's Default

§ 12.02 Landlord's Lien

§ 12.03 Landlord's Default

§ 12.04 Cumulative Remedies

§ 12.05 Waiver of Breach

§ 12.06 Indemnities in Event of Termination

§ 12.07 Limitation of Landlord's Liability

ARTICLE 13 . INSPECTION BY LANDLORD

ARTICLE 14 . ASSIGNMENT AND SUBLEASE

§ 14.01 Assignment and Subletting by Tenant

§ 14.02 Assignment by Landlord

ARTICLE 15 . MISCELLANEOUS

§ 15.01 Notices and Addresses

§ 15.02 Parties Bound

§ 15.03 Texas Law to Apply

§ 15.04 Legal Construction

§ 15.05 Prior Agreements Superseded

§ 15.06 Amendment

§ 15.07 Rights and Remedies Cumulative

§ 15.08 Attorney's Fees and Costs

§ 15.09 Force Majeure

§ 15.10 Time of Essence

§ 15.11 Alternate Dispute Resolution

§ 15.12 Limitation of Warranties

§ 15.13 Abandoned Property

§ 15.14 Municipal and Emergency Services

§ 15.15 Army Imposed Restrictions

§ 15.16 Reservation of Rights

§ 15.17 Common Area Charges

§ 15.18 Advertising and Promotion Rights

§ 15.19 Annual Reports

§ 15.20 Guarantee

§ 15.21 Governmental Immunity

§ 15.22 Option to Purchase – Intentionally Deleted

§ 15.23 Expansion Option

ARTICLE 16. LESSEE AFFIRMATIONS
Execution

Exhibit "A" – Premises Description
Exhibit "B" – Option to Purchase - Intentionally Deleted

BUNKER LEASE
(EAST CAMPUS)

This Lease is entered into between TAC EAST HOLDINGS COMPANY NO. 1 ("Landlord"), a political subdivision of the State of Texas, and EnviroSafe Demil, LLC ("Tenant"),a Nevada Limited Liability Company.

GRANT OF LEASE

1. In consideration of the mutual covenants and agreements of this lease, and other good and valuable consideration, Landlord demises and leases to Tenant, and Tenant leases from Landlord, the premises situated at Area V, in Hooks, Bowie County, Texas, consisting of igloo storage bunker numbered 10 on Nacogdoches Street, together with the safety arc areas as described on Exhibit A attached to this lease, and made a part of this lease for all purposes (collectively referred to as "the premises" or "the leased premises" in this lease).

2. Landlord reserves the right to harvest any and/or all timber located upon the leased premises together with the right of ingress and egress to and from the leased premises for said harvesting by Landlord and/or its contractors.

3. Landlord reserves the right to lease to third parties, areas within the Premises which are located more than fifty (50) feet from the base perimeter of each leased igloo storage bunker for passive uses including but not limited to solar panels and related accessories and power lines. Said passive uses shall not include residential or other structures capable of habitation by human beings.

ARTICLE 1 . TERM

§ 1.01. **Term of Lease.** The term of this lease is Six (6) years, beginning on October 1, 2022, and ending on September 30, 2028, unless terminated sooner as provided in this lease.

§ 1.02. **Option to Extend Term and Expand.** Tenant may extend the term of this lease beyond the expiration date provided in § 1.01 on the following conditions:

a. Tenant may, if it is not in default either on the date required for the notice or on the date such extension commences, extend the lease term for Four (4) additional periods of One (1) year(s) each. The extended term will begin on the day following the expiration date of the lease term specified in § 1.01, or on the day following the expiration date of the immediately preceding extended term, as applicable. If, at the date the original term or any extended term expires, Tenant is in default beyond any grace period provided in this lease in performing any of the terms of this lease, the remaining option or options are void. All of the terms and covenants of this lease apply to all extended lease terms except for the rent which shall be as set forth in paragraph 2.01.

b. Tenant may exercise each option to extend this lease by giving Landlord notice of its intention to do so not later than six (6) months before the then current lease term expires, in the case of the initial option to extend, or the extended lease term, in the case of successive options to extend. Notice of an intention to exercise an option under this lease must, to be effective, be sent by mail or fax to Landlord at the address provided in § 15.01 and must be postmarked no later than the latest date provided in this section for Tenant's exercising the option.

§ 1.03. **Holdover.** If Tenant holds over and continues in possession of the premises after the lease term (or any extension) expires, other than as provided in § 1.02, Tenant will be considered to be occupying the premises on a month-to-month tenancy, subject to all the terms of this lease. Landlord may terminate the tenancy upon ten (10) days written notice to Tenant.

ARTICLE 2 . RENT/SECURITY DEPOSIT AND AD VALOREM TAX/PILOT DEPOSITS

§ 2.01. **Base Rent.**
a. Tenant will pay Landlord $ 985.58 per month for two (2) 1,648 square foot bunker ($3.07 per square foot of bunker space annually and $245.97 per acre of blast arc space annually) on or before the first day of each month as base rent for the next month. Rent for any fractional month at the beginning or end of the lease term will be prorated on a per-day basis.
b. Tenant will pay this base rent to Landlord at Landlord's office, located at 107 Chapel Lane, New Boston, Texas 75570, or at such other location or locations that Landlord may from time to time designate by written notice to Tenant.
c. The base rent will increase for each extended lease term so that the base rent during the first extended term will be $1,015.15; the base rent during the second extended term will be $1,045.60, and the base rent during the third extended term will be $1,076.97. the base rent during the fourth extended term will be $1,109.28; and the base rent during the fifth extended term will be $1,142.56.
(alt)
c. The base rent will increase on each anniversary of the Lease Commencement Date by three percent (3.0%) of the rent amount payable during the last month prior to the anniversary date.

§ 2.02. **Taxes and Assessments as Additional Rent; Payments in Lieu of Taxes.**

a. In addition to the base rent specified in § 2.01, Tenant will pay in full all real-property taxes, special assessments, and governmental charges of any kind imposed on the premises or leasehold interest in the Premises commencing on the first day of the lease term and continuing through the end of the calendar year in which the term ends, including any special assessments imposed on or against the premises for constructing or improving public works. This additional rent is payable directly to the entity imposing the tax, assessment, or charge at least 30 days before the date payment is due. Tenant will provide Landlord with a receipt or other evidence of payment for each tax, assessment, or charge paid as soon as a receipt or other evidence is available to Tenant, but not later than the date payment is due.

b. Tenant may, at its own expense, contest any tax or assessment for which it is responsible under subparagraph a. Except as provided in subparagraph c, Tenant need not pay the tax, assessment, or charge while the contest is pending. Except as provided in subparagraph c, Tenant may prevent Landlord from paying any tax, assessment, or charge that Tenant is contesting under this subparagraph, pending resolution of the contest, by depositing with Landlord the full amount of the tax or assessment, plus the

amount of any penalty that might be imposed for failing to make timely payment and one year of interest at the rate imposed by the entity levying the tax or assessment. When the contest is resolved, Tenant may use the money deposited with Landlord to pay any tax or assessment, plus any penalty or interest, due under the final resolution and keep any balance of the deposit. If the deposit is insufficient to pay these amounts, Tenant must immediately pay the balance due to the entity imposing the tax, assessment, or charge.

c. Notwithstanding subparagraph b, Landlord may pay, or require Tenant to pay, any tax, assessment, or charge for which Tenant is responsible under subparagraph a, pending resolution of Tenant's contest of the tax, assessment, or charge, if payment is demanded by a holder of a mortgage on the premises or if failing to pay will subject all or part of the premises to forfeiture or loss.

d. Tenant Payment in Lieu of Taxes (PILOT). If Tenant's leasehold interest in the Premises is or hereafter becomes exempt from real property taxes, Tenant shall pay to Landlord annually a payment in lieu of taxes (PILOT) in an amount as agreed by Landlord and Tenant; provided, however, that said PILOT shall not exceed the amount that Tenant would be required to pay in real property taxes if the leasehold interest were not exempt. If Landlord and Tenant are not able to agree upon the amount of the PILOT within ninety (90) days after the leasehold interest becomes exempt from taxes, the amount of the PILOT shall be an amount equal to ninety percent (90%) of what the real property taxes would be if the leasehold interest were not exempt. Landlord and Tenant shall document the agreement regarding the PILOT as an amendment to this Lease Agreement. The agreement may be for a single year, or multiple years, and may, or may not, provide for an adjustment of the PILOT periodically. If at any time the PILOT agreement of the parties lapses, expires or is terminated pursuant to its terms, and the leasehold interest is exempt from real property taxes, Tenant shall pay to Landlord annually a PILOT in an amount equal to ninety percent (90%) of what the real property taxes would be if the leasehold interest were not exempt. PILOT payments shall be payable to Landlord on or before January 31 of each year.

§2.03. **Late Charges.** Tenant shall pay a late charge of five percent (5%) of any rent not received by Landlord by the tenth day of the month in which said rent is due.

§2.04. **Security and Ad Valorem Tax/PILOT Deposits; Deposit Processing Fee.**

A. Security Deposit. Upon execution of this Lease, Tenant shall deposit the sum of $ 1,500.00 with Landlord as a deposit. Said deposit shall not accrue interest. Landlord may use the deposit to pay arrears of rent, to repair any damage or injury to the Premises, or to pay any expense or liability incurred by Landlord as a result of any default by Tenant under this Lease including but not limited to payment of ad valorem taxes upon the premises or the leasehold interest in the premises. If Landlord uses the deposit, or any portion thereof as authorized above, Tenant shall restore the deposit to its original amount within ten (10) days after notice from Landlord. Failure to restore the deposit to its original amount within the required time shall constitute a default under the Lease. Within 30 days after Tenant surrenders the Premises, or completion of repairs or replacement of damaged or destroyed property, whichever is later, Landlord shall return to Tenant any remaining portion of the deposit less the Processing Fee provided in Subsection C. below, after any lawful deductions, provided Tenant has given to Landlord an address specifically for that purpose. IT IS SPECIFICALLY PROVIDED, HOWEVER, THAT TENANT SHALL NOT BE ENTITLED TO ANY PORTION OF THE SECURITY DEPOSIT AS A REFUND UNLESS TENANT GIVES LANDLORD SIXTY (60) DAYS NOTICE OF SURRENDERING THE PREMISES.

B. Ad Valorem Tax/PILOT Deposit. Upon execution of this Lease Tenant shall deposit the sum of $2,000.00 with Landlord as an Ad Valorem Tax/PILOT Deposit. Said deposit shall not accrue interest. Landlord may upon expiration or termination of this Lease use the deposit to pay the taxes actually due, or hold for payment of, estimated ad valorem taxes due or to become due upon the leased premises and for which Tenant is responsible under the Terms of this Lease. Provided Tenant pays all ad valorem taxes for which Tenant is responsible under this Lease, the deposit shall be refunded to Tenant at the address Tenant has given to Landlord for this specific purpose. If taxes have not been assessed and levied for the year in which this Lease expires or is terminated, Landlord may hold the deposit until said taxes have been determined; and, if Tenant does not pay said taxes at least 30 days before delinquency, Landlord may apply the deposit to the taxes due. Nothing in this subsection shall relieve Tenant of its obligation to pay ad valorem taxes upon the leased premises prior to delinquency as provided elsewhere in this Lease. In the event the Premises are exempt from real property taxes, the Ad Valorem/PILOT Deposit may be applied to any deficiency or default in payment of the PILOT as provided for in Section 2.02.d of this Lease.

C. Processing Fee. Landlord shall be and is hereby entitled and authorized to withhold and pay to Landlord a Processing Fee of $100.00 from the refund by Landlord of the Security and/or Ad Valorem Tax Deposits for the purpose of defraying Landlord's lease administration expense, including but not limited to review of documents, tracking payment of the taxes, utilities and miscellaneous fees, coordination processing, and payment of security and Ad Valorem Tax deposits refunds and related expenses.

ARTICLE 3 . USE OF PREMISES

§ 3.01. **Tenant's Warranty Regarding Use.** Tenant represents and warrants to Landlord that Tenant intends to use the premises for storage of ammunition, munitions, equipment, and any related items, and that Tenant's use of the property is restricted to those purposes specified in this section unless Tenant obtains Landlord's prior written consent to any change in use. Before the lease term begins, Tenant must give Landlord an affidavit of an officer of Tenant, referred to as the "Officer's Affidavit," setting forth a detailed description of the operations that Tenant will conduct on the premises and stating any applicable permit numbers. The Officer's Affidavit must be organized and prepared in a narrative form, including a description and quantification of all hazardous materials to be generated, manufactured, refined, transported, treated, stored, handled, or disposed of on the premises. After the lease term begins, Tenant must notify Landlord as to any changes in Tenant's operation or use or generation of hazardous materials by way of a supplemental Officer's Affidavit. Tenant must also supplement and update the Officer's Affidavit on each anniversary of the commencement of the lease term. Tenant may not begin or alter any operations on the property before (a) obtaining all required operating and discharge permits or approvals, including but not limited to air pollution control permits and pollution discharge elimination system permits, from all governmental or public authorities having jurisdiction over the Tenant's operations or the property, and (b) providing copies of such permits and approvals to the Landlord.

§ 3.02. **Compliance With Laws-Safety Requirements.**

a. Tenant may not use, or permit using, the premises in any manner that results in waste of premises or constitutes a nuisance or for any illegal purpose. Tenant, at its own expense, will comply, and will cause its officers, employees, agents, and invitees to comply, with all applicable laws, ordinances, and governmental rules and regulations concerning the use of the premises, including Hazardous Materials

Laws, fire and safety regulations and explosives regulations, including but not limited to Title 27, Chapter 11, Subchapter C, Part 555 of the Code of Federal Regulations regarding commerce in explosives.

b. Tenant, at its sole cost, must comply with all Hazardous Materials Laws in connection with Tenant's use of the premises.

c. "Hazardous Materials" means any substance, material, or waste that is or becomes regulated by any local governmental agency, the State of Texas, or the federal government, including, but not limited to, any material or substance that is upon commencement of the term or at any time during the term, (1) designated as a "hazardous substance" pursuant to Section 311 of the Clean Water Act, 33 U.S.C. § 1251 et seq., or listed pursuant to Section 307 of the Clean Water Act, 33 U.S.C. § 1317, (2) defined as a "hazardous substance" pursuant to Section 101 of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9601 et seq., (3) defined as a "hazardous waste" pursuant to Section 1004 of the Resource Conservation and Recovery Act, 42 U.S.C. § 6901 et seq., (4) petroleum, (5) asbestos, and (6) polychlorinated biphenyls.

d. "Hazardous Materials Laws" means any federal, state, or local statute, ordinance, order, rule, or regulation of any type relating to the storage, handling, use, or disposal of any Hazardous Materials, the contamination of the environment, or any removal of such contamination, including, without limitation, those statutes referred to in subparagraph c.

e. Tenant shall coordinate with Landlord and the U.S. Army regarding environmental issues related to the leased premises as provided in Section 15.15.

f. Tenant shall obtain any and all permits and/or licenses required to conduct its business on the Premises and provide a copy of same to Landlord.

g. Tenant shall provide a monthly report to Landlord of all materials manufactured and/or stored in the Premises which constitute hazardous materials, explosives, petrochemicals, alcohols and any other materials which constitute a danger due to their fire, explosive or environmental hazard.

h. Tenant shall clearly indicate on the outside of each igloo/warehouse the type of materials manufactured or stored therein.

i. Tenant shall furnish, install, and maintain during the term such safety devices, such as fire suppression systems, spark arresters, lightning rods and static electricity suppressors, as are required or are customarily installed in facilities manufacturing or storing explosives, hazardous materials, petrochemicals, alcohols and other materials constituting a danger due to explosives or fire.

j. Tenant shall construct a secure perimeter fence around the Leased Premises sufficient to deter persons not affiliated with Tenant from gaining access to storage facilities in which explosives, hazardous materials, petrochemicals, alcohols and other materials constituting a danger due to explosions or fire are kept or stored.

k. Tenant shall not store any hazardous materials, explosives, explosive constituents, petro chemicals, alcohols, or any other materials which constitute a danger due to their fire, explosive or environmental hazard on the Premises other than inside the igloo bunkers secured by a locked door.

§ 3.03. **Rights of Inspection.** Tenant must permit Landlord and Landlord's agents, servants, and employees, including but not limited to legal counsel and environmental consultants and engineers, access to the premises upon at least 24 hours' prior written notice for the purpose of conducting environmental inspections and sampling during regular business hours, and during other hours either by agreement of the parties or in the event of an environmental emergency. Tenant may not restrict access to any part of the premises, and Tenant may not impose any conditions to access. If Landlord's environmental inspection includes sampling and testing of the premises, Landlord must use its best efforts to avoid interfering with Tenant's use of the premises, and on completion of sampling and testing must repair and restore the affected areas of the premises as made necessary by any sampling and testing.

§ 3.04. **Environmental Reporting Requirements.**

a. Tenant must promptly supply Landlord with copies of all notices, reports, correspondence, and submissions made by Tenant to the Texas Commission on Environmental Quality, the United States Environmental Protection Agency, the United States Occupational Safety and Health Administration, or any other local, state, or federal authority that requires submission of any information concerning environmental matters or hazardous materials pursuant to hazardous materials laws. Tenant shall provide to Landlord copies of all permits and/or licenses issued to Tenant for operation of its business on the leased premises and all modifications, amendments and other changes within 30 days after issuance of same.

b. Tenant must promptly notify Landlord in advance of any scheduled meeting between Tenant and any of the agencies specified in subparagraph a.

c. Tenant must promptly notify Landlord as to any liens threatened or attached against the premises pursuant to any environmental law. If an environmental lien is filed against the premises, Tenant must, within 30 days from the date on which the lien is placed against the premises, and at any rate before the date on which any governmental authority begins proceedings to sell the premises pursuant to a lien, either: (1) pay the claim and remove the lien from the premises; or (2) furnish either (a) a bond satisfactory to the Landlord in the amount of the claim on which the lien is based, or (b) other security satisfactory to the Landlord in an amount sufficient to discharge the claim on which the lien is based.

§ 3.05. **Condition of Premises.** Tenant accepts the Premises in their present condition "AS IS" and acknowledges that the Premises are, or will be modified or repaired by Tenant to be, suitable for Tenant's intended use.

§ 3.06. **Delivery of Premises at End of Term.** Tenant shall remove all personal property, Tenant owned equipment and stored items from the leased premises at the end of the term or extended term of this Lease. The leased premises shall be returned to Landlord in clean, empty and good condition reasonable wear and tear excepted. Under no circumstances shall stored items be left on or in the premises.

§ 3.07. **Blast Arcs.** Tenant shall not use the leased premises for any purpose or in a way that allows or requires that blast safety arcs extend outside the leased premises or encroach upon or overlap on or across the adjoining roadways known as Cypress Street, Maple Street and Freedom Way.

§ 3.08. **Information to Be Provided to Landlord.** On or before the tenth day of each month during the Lease Term, Tenant shall provide to Landlord a report indicting the type and quantity of each explosive material stored in or one of the leased premises (including individual bunkers/igloos) as of the first day of said month.

ARTICLE 4 . REPAIRS AND MAINTENANCE

§ 4.01. **Repairs and Maintenance by Tenant.** Tenant will except as provided in paragraph 4.04, throughout the lease term and any extensions of it, at its own expense and risk, maintain the premises and all improvements on them in good order and condition, including but not limited to making all repairs and replacements necessary to keep the premises and improvements in that condition. All maintenance, repairs, and replacements required by this section must be performed promptly when required.

§ 4.02. **Tenant's Failure to Repair or Maintain.** If Tenant fails to perform its obligation to repair, replace, or maintain, as set forth in § 4.01, within a reasonable time after notice from Landlord of the need for the repair, replacement, or maintenance, Landlord may enter the premises and make the repairs or replacements, or perform the maintenance, or have the repairs or replacements made or maintenance performed, at its own expense. On Landlord's notice to Tenant of the performance and cost of any maintenance, repairs, or replacements under this section, Tenant must immediately reimburse Landlord for any reasonable costs incurred by Landlord under this section, together with interest on the sum at the highest legal rate from the date of the notice until the date paid by Tenant to Landlord.

§ 4.03. **Allocation of Environmental Cleanup Costs.** Tenant is responsible only for the payment of that portion of any cleanup costs necessary for compliance with Hazardous Materials Laws that arise as a result of Tenant's discharge of hazardous materials on the premises during the Tenant's occupancy of the premises and/or as a result of Tenant's violation of any restrictive covenants relating to the Premises which are of Record in Bowie County, Texas. Landlord is responsible for ensuring that any other responsible party participate in the cleanup to the extent of its responsibility for a release.

§ 4.04. **Repairs and Maintenance by Landlord.** Landlord shall not be responsible for any repairs or maintenance of the Premises during the Term of the Lease.

ARTICLE 5 . UTILITIES AND GARBAGE REMOVAL

§ 5.01. **Utility Charges.** Tenant will pay all utility and connection charges for water, sewer, electricity, heat, gas, cable, fiber optic and telephone service used in and about the premises during the lease term. Tenant will pay the charges directly to the utility company or governmental agency furnishing the service before the charges are delinquent.

§ 5.02. **Meters and Pretreatment Requirements.** Tenant shall pay for the cost for individual meters for utility services and installation of them if individual meters to the Premises are not in place at the time of execution of this Lease. Tenant agrees to pretreat at its cost any waste streams which require pretreatment as determined by Landlord or the respective utility provider prior to discharge of such waste into the sanitary sewer system.

§ 5.03. **Garbage Removal.** Tenant will pay for all garbage removal from the premises during the lease term.

ARTICLE 6 . ALTERATIONS, ADDITIONS, AND IMPROVEMENTS

§ 6.01. **Consent of Landlord.** Tenant may not make any alterations, additions, or improvements to the premises without Landlord's prior written consent. Landlord may not unreasonably withhold consent for nonstructural alterations, additions, or improvements.

§ 6.02. **Property of Landlord.** All alterations, additions, or improvements made by Tenant will become Landlord's property when the lease terminates. However, Landlord may, when the lease terminates, remove any alterations, additions, and improvements made by Tenant and any other property it placed in the premises, and charge Tenant the cost of removal plus interest which amount shall be paid within 30 days of Landlord's notice to Tenant of the amount due.

§ 6.03. **Alterations Required by Accessibility Laws.** If any alterations, additions, or improvements to the premises are mandated by legal requirements related to accessibility by persons with disabilities ("accessibility alterations"), Tenant is responsible for making them. This allocation of responsibility for compliance with such legal requirements is a material inducement for the parties to enter this lease.

ARTICLE 7 . TRADE FIXTURES AND SIGNS

§ 7.01. **Trade Fixtures.** Tenant may, at all times, erect or install shelves, bins, machinery, equipment, or other trade fixtures, in, on, or about the premises, if Tenant complies with all applicable governmental laws, ordinances, and regulations regarding the fixtures. Tenant may remove all trade fixtures when this lease terminates, if Tenant is not in default under the lease and the fixtures can be removed without structural damage to the building. Tenant must repair any damage to the premises caused by removing trade fixtures, and all the repairs must be completed before the lease terminates. Any trade fixtures not removed by Tenant when this lease terminates are considered abandoned by Tenant and will automatically become Landlord's property. If any trade fixture installed by Tenant is abandoned when the lease terminates, Tenant must pay Landlord any reasonable expense actually incurred by Landlord to remove the fixture from the premises, which amount shall be paid within 15 days of Landlord's notice to Tenant of the amount due.

§ 7.02. **Signs.** Tenant may erect signs on any portion of the premises, including but not limited to the exterior walls, subject to applicable laws, ordinances, and regulations, and after approval of the proposed signage by Landlord. Tenant must remove all signs when this lease terminates and repair any damage resulting from erecting or removing the signs.

ARTICLE 8 . MECHANIC'S LIEN

Tenant will not permit any mechanic's lien to be placed on the premises or improvements on the premises. Tenant will promptly pay any mechanic's lien that is filed on the premises or on improvements located on the premises. If default in payment of the lien continues for 20 days after Landlord's written notice to Tenant, Landlord may, at its option, pay the lien or any portion of it without inquiring into its validity. Any amounts Landlord pays to remove a mechanic's lien caused by Tenant to be filed against the premises or improvements on them, including expenses and interest, are due from Tenant to Landlord and must be repaid to Landlord immediately on rendition of notice, together with interest at eighteen (18) percent annually until repaid.

ARTICLE 9 . INSURANCE AND INDEMNITY; Performance Bond

§ 9.01. **Tenant's Property Insurance.** Tenant must, at its own expense during the lease term, maintain insurance on Tenant's personal property, furniture, fixtures and equipment in such amounts as Tenant deems necessary.

§ 9.02. **Landlord's Property Insurance.** Landlord may, at its discretion, and, at its expense, keep the bunkers on the Premises insured against loss or damage in an amount determined by Landlord in its sole discretion. Tenant will have no claim to any proceeds of Landlord's insurance policies.
§ 9.03. **Tenant's Liability Insurance.** Tenant, at its own expense, must provide and maintain in force during the lease term (a) a policy of commercial liability insurance with a single limit each occurrence of not less than $1,000,000.00 and general aggregate of not less than $2,000,000.00, and (b) a policy of Worker's Compensation Insurance as required by applicable law. This insurance is to be carried by one or more insurance companies authorized or admitted to transact business in Texas. The liability policy must cover Landlord as well as Tenant, for any liability for property damage or personal injury arising from Tenant's occupying or Landlord's owning the premises. The commercial liability insurance policy, and the Umbrella Liability Policy required below, shall specifically provide coverage for claims arising out of Tenants manufacture, storage, and transportation of explosives and highly flammable materials including but not limited to petrochemicals and derivatives thereof, alcohols and blended fuels. Tenant shall additionally carry an Umbrella Liability Policy in an amount of not less than $5,000,000.00 . Landlord shall be an additional insured under all liability insurance policies.

§ 9.04. **Remedy for Failure to Provide Insurance.** Tenant must furnish Landlord with certificates of all insurance required by this article. If Tenant does not provide the certificates when Landlord delivers possession to Tenant and within ten days prior to any renewal date, or if Tenant allows any insurance required under this article to lapse, Landlord may, at its option, take out and pay the premiums on the necessary insurance to comply with Tenant's obligations under this article. Landlord is entitled to reimbursement from Tenant for all amounts spent to procure and maintain the insurance, with interest at the rate of eighteen (18) percent annually from the date Tenant receives Landlord's notice of payment until reimbursement.

§ 9.05. **Tenant's Environmental Indemnity.** Tenant agrees to indemnify, defend, and hold harmless Landlord from and against all claims, liabilities, losses, damages, and costs, foreseen or unforeseen, including without limitation counsel, engineering, and other professional or expert fees, that Landlord may incur by reason of Tenant's action or inaction with regard to Tenant's obligations under Articles 3

and 4 of this lease. This section survives the expiration or earlier termination of this lease.

§ 9.06. **Hold-Harmless Clause.** Tenant will indemnify and hold Landlord harmless against any claims, demands, damages, costs, and expenses, including reasonable attorney's fees for defending claims and demands, arising from the conduct or management of Tenant's business on the premises or its use of them; from any breach by Tenant of any conditions of this lease; or from any act of negligence of Tenant, its agents, contractors, employees, subtenants, concessionaires, or licensees in or about the premises. If any action or proceeding is brought against Landlord by reason of any such claim, Tenant, on notice from Landlord, will defend the action or proceeding by counsel acceptable to Landlord.

§ 9.07. **Release of Claims/Subrogation.** Landlord and Tenant release each other from any claim, by subrogation or otherwise, for any damage to the Premises, the building, or personal property within the building, regardless of cause, including negligence of Landlord or Tenant, however, the release applies only to the extent it is permitted by law, the damage is covered by insurance proceeds, and the release does not adversely affect any insurance coverage. Landlord and Tenant will notify their insurance companies of the release set forth herein and will have the insurance policies, endorsed, if necessary, to prevent invalidation of the insurance coverage.

§ 9.08. **Pollution Legal Liability Insurance.** Tenant shall carry and provide during the term of this Lease Pollution Legal Liability insurance providing the following coverages:

a. On-site cleanup of new conditions arising after the commencement of this Lease triggered by first-party discovery or third-party claim
b. Third-party claims for on-site bodily injury, property damage or cleanup costs arising from new conditions arising after the commencement of this Lease;
c. Pollution conditions resulting from transported cargo (third-party carrier or owned vehicle) while on TAC properties or adjacent entrances or exits;
d. Coverage for punitive damages, fines and penalties, if insurable in this jurisdiction
The policy shall provide coverages of not less than $1,000,000.00 per loss and not less than $2,000,000.00 in the aggregate.
The deductible on the policy shall not be greater than $25,000.00 per occurrence.

§ 9.09. **Additional Explosives Insurance Requirement.** This Section 9.09 applies only if and when Landlord exercises its right to lease portions of the Premises to third parties as provided in Grant of Lease paragraph 3. In the event that Tenant manufactures, uses, stores, disassembles, transports, renders inert, or otherwise handles explosive materials, and/or highly flammable materials, including but not limited to petrochemicals, derivatives thereof, alcohols and blended fuels, in an igloo storage bunker, or on the Premises, Tenant shall provide liability insurance for personal injury and/or death and property damage arising from Tenant's occupancy and use of the Leased Premises specifically arising out of explosion and/or fire of the explosive and/or highly flammable materials. Said insurance coverage may be provided by an endorsement to its commercial liability policy as provided by Section 9.03 or by a specific Explosives Liability Policy. The policy must provide a single limit for each occurrence and general aggregate in amounts specified by Landlord. Tenant shall be entitled to a reduction of the rent in an amount mutually agreed by the parties.

§ 9.10. **Performance Bond.** Tenant is obligated pursuant to Section 3.06 of the agreement to leave the premises in clean, empty and good condition. All stored items must be removed from the premises at the end of the term or extended term of this lease. In the event Tenant fails to leave the premises in the required condition, Landlord has the right, but not the obligation, to remove and/or destroy any property left in or on the premises pursuant to Section 15.13 of this lease. To ensure that Landlord has the means and funds necessary to remove any property left on the leased premises by Tenant, Tenant shall provide prior to occupancy of the premises a Performance Bond to Landlord in the amount of not less than $500,000 to provide the funds necessary to remove any such property from the premises and restore the premises to a clean and empty condition.

ARTICLE 10 . DAMAGE OR DESTRUCTION OF PREMISES

§ 10.01. **Notice to Landlord.** If the premises, or any structures or improvements on them, are damaged or destroyed by fire, tornado, or other casualty, Tenant must immediately give Landlord written notice of the damage or destruction, including a general description of the damage and, as far as known to Tenant, the cause of the damage.

§ 10.02. **Destruction.** If an igloo bunker or bunkers are totally destroyed or partially damaged by fire, tornado, winds, explosions or other casualty, Landlord shall not be required to repair or rebuild the damaged or destroyed igloo bunker(s), and this lease will terminate as to the damaged or destroyed bunker(s) and the related safety arcs around said bunker(s). In such event, the rent will be reduced proportionately for the unexpired term of this lease, effective as of the date of written notification as provided in §10.01.

§ 10.03. **Clean-up of Premises.** If the damage or destruction of the bunker(s) is due to the negligence, gross negligence or intentional act of Tenant or any person in or about the leased premises with Tenant's express or implied consent, Tenant shall be responsible for all costs and expense to remove the damaged or destroyed bunker(s) and all debris and restore the surface of the ground to a smooth surface and revegetate the same. Tenant shall complete the required work within 180 days after receipt of notice from Landlord to commence the work.

§10.04. **Replacement Bunkers.** In the event of damage or destruction of a bunker as described in this Section 10, Landlord shall lease an equivalent number of bunkers to Tenant upon the same terms as this Lease for the remainder of the lease term, provided Landlord has such unoccupied and unleased bunkers available. If additional bunker(s) are not available, Tenant shall have the option to terminate this lease.

ARTICLE 11 . CONDEMNATION

§ 11.01. **Total Condemnation.** If, during the lease term or any extension or renewal of it, all of the premises are taken for any public or quasi-public use under any governmental law, ordinance, or regulation, or by right of eminent domain, or are sold to the condemning authority under threat of condemnation, this lease will terminate, and the rent will be abated during the unexpired portion of this lease, effective as of the date the condemning authority takes the premises.

§11.02. **Partial Condemnation.** If one or more of the igloo bunkers under lease, but not all of said

bunkers under lease, are taken for any public or quasi-public use under any governmental law, ordinance, or regulation, or by right of eminent domain, or is sold to the condemning authority under threat of condemnation, this lease will terminate as to the bunkers and related safety arcs condemned or sold, and the rent shall be reduced proportionately for the unexpired term of this lease effective as of the date the condemning authority takes the premises.

§11.03. **Replacement Bunkers.** In the event of condemnation of one or more bunkers as described in this Section 11, Landlord shall lease an equivalent number of bunkers to Tenant upon the same terms as this lease for the remainder of the lease term provided Landlord has such unoccupied and unleased bunkers available. If replacement bunkers are not available, Tenant shall have the option to terminate this lease.

§ 11.04. **Condemnation Award**. Landlord is entitled to receive and retain the entire award in any condemnation proceedings, except for any portion attributable to trade fixtures, and/or relocation expenses, which Tenant is entitled to receive and retain. The termination of this lease will not affect the right to this award.

ARTICLE 12 . DEFAULT

§ 12.01. **Tenant's Default.** If Tenant allows the rent to be in arrears more than fifteen (15) days after its due date, or remains in default under any other condition of this lease for 30 days after written notice from Landlord, Landlord may, at its option, without notice to Tenant, terminate this lease, or, in the alternative, Landlord may reenter and take possession of the premises and remove all persons and property without being considered guilty of any manner of trespass and may (but is not required to) relet the premises (or any part of them) for all or any part of the remainder of the lease term, to a party satisfactory to Landlord and at the monthly rental as Landlord can secure with reasonable diligence. If Landlord cannot relet after reasonable efforts to do so or if the monthly rental is less than the rental Tenant was obligated to pay under this lease (or any renewal of it) plus the expense of reletting, then Tenant must pay Landlord the amount of the deficiency.

§ 12.02. **Landlord's Lien.** If Tenant defaults in paying rent or any other sum due from Tenant to Landlord under this lease, Landlord has a lien on all fixtures, chattels, or other property of any description belonging to Tenant that are placed in, or become a part of, the premises as security for rent due and to become due for the remainder of the current lease term and any other sum Tenant owes Landlord. This lien is not in lieu of, nor in any way affects, the statutory landlord's lien but is in addition to that lien, and Tenant grants Landlord a security interest in all of Tenant's property placed in or on the premises for purposes of this contractual lien. This does not prevent Tenant's selling any merchandise in the ordinary course of business free of such Landlord's lien. If Landlord exercises the option to terminate the leasehold, reenter, and relet the premises as provided in the preceding paragraph and gives Tenant reasonable notice of the intent to take possession and an opportunity for a hearing on the matter, Landlord may take possession of all of Tenant's property on the premises and sell it at public or private sale after giving Tenant reasonable notice of the time and place of any public sale or of the time after which any private sale is to be made, for cash or on credit, for the prices and terms that Landlord considers best, with or without having the property present at the sale. The proceeds of the sale will be applied first to the necessary and proper expense of removing, storing, and selling the property, then to the payment of any rent due or to become due under this lease; any balance will be paid to Tenant.

Tenant further grants Landlord a security interest in Tenant's personal property now or subsequently placed in or on the Premises. This Lease is a Security Agreement under the Texas Business and Commerce Code. Landlord may file a Financing Statement to perfect its Security Interest.

§ 12.03. **Landlord's Default.** If Landlord defaults in performing any term or covenant that Landlord must perform under this agreement, Tenant may, after not fewer than thirty (30) days' notice to Landlord, remedy the default by any necessary action and, in connection with the remedy, may pay expenses and employ counsel. Landlord must, on demand, pay Tenant all sums expended, or obligations incurred, by Tenant in connection with remedying Landlord's default. It is agreed, however, that if Landlord commences action within 30 days after receipt of notice to remedy any default and diligently pursue such action to conclusion, Tenant's rights under this section shall not apply.

§ 12.04. **Cumulative Remedies.** All Landlord's and Tenant's rights and remedies under this Article are cumulative, and none will exclude any other right or remedy provided by law or any other provision of this lease. All the consistent rights and remedies may be exercised and enforced concurrently and whenever occasion for their exercise arises.

§ 12.05. **Waiver of Breach.** All Landlord's or Tenant's waiving a breach of this lease by the other party does not constitute a continuing waiver or a waiver of any subsequent breach.

§ 12.06. **Indemnities in Event of Termination.** In the event that this Lease Agreement is terminated by either party as provided in this Agreement, and upon expiration of the Term, or extended term of this Lease Agreement, the Tenant's obligations to indemnify and hold harmless Landlord shall not terminate or expire and shall survive such termination and/or expiration and shall be fully binding upon Tenant.

§ 12.07. **Limitation of Landlord's Liability.** Notwithstanding anything to the contrary contained herein, no personal or individual liability of any kind or character whatsoever shall now or at any time hereafter attach to Landlord or its property other than leased premises for the payment of any amount payable under this Lease. The exclusive remedy of Tenant for the failure of Landlord to perform any of its obligations under this Lease shall be to proceed against the interest of Landlord in and to the leased premises.

ARTICLE 13 . INSPECTION BY LANDLORD

Tenant will permit Landlord and its agents, representatives, and employees to enter the premises upon at least 24 hours' prior written notice at all reasonable times for the purpose of inspection or any other purpose necessary to protect Landlord's interest in the premises or to perform Landlord's duties under this lease, or to show the Premises to prospective purchasers or future tenants.

ARTICLE 14 . ASSIGNMENT AND SUBLEASE

§ 14.01. **Assignment and Subletting by Tenant.**

a. Tenant may not sublet, assign, encumber, or otherwise transfer this lease, or any right or interest in it or in the premises or the improvements on them, without Landlord's written consent. If Tenant sublets, assigns, encumbers, or otherwise transfers its rights or interests in this lease or in the premises or the

improvements on them without Landlord's written consent, Landlord may, at its option, declare this lease terminated. If Landlord consents in writing to an assignment, sublease, or other transfer of all or any of Tenant's rights under this lease, the assignee or subtenant must assume all of Tenant's obligations under this lease, and Tenant will remain liable for every obligation under the lease. Landlord may not arbitrarily or unreasonably withhold consent under this section.

b. As a condition precedent to the Tenant's right to sublease the property or to assign this lease, the Tenant must, at the Tenant's own expense, fulfill all of the Tenant's environmental obligations under Article 3 of this lease. If this condition is not satisfied, the Landlord has the right to withhold consent to any proposed sublease or assignment.

§ 14.02. **Assignment by Landlord.** Landlord may assign or transfer any of its interests under this lease. On transfer, and on the transferee's assumption of its obligations, Landlord is relieved of its obligations under the lease.

ARTICLE 15 . MISCELLANEOUS

§ 15.01. **Notices and Addresses.** All notices required under this lease may be given by the following methods:

a. By certified mail, return receipt requested, addressed to the proper party, at the following addresses:

Landlord: TAC East Holdings Company No. 1
107 Chapel Lane
New Boston, Texas 75570
Attn: Executive Director

Tenant: EnviroSafe Demil, LLC
12763 Lovelock Hwy.
Fallon, Nevada 89406

Guarantor: N/A
N/A
N/A

b. By fax transmission, to the proper party, at the following fax numbers:

Landlord: 903-223-8742 Attn: Executive Director

Notices are effective when received. Either party may change the address or fax number to which notices are to be sent by sending written notice of the new address or number to the other party in accordance with the provisions of this section.

§ 15.02. **Parties Bound.** This agreement binds, and inures to the benefit of, the parties to the lease and their respective heirs, executors, administrators, legal representatives, successors, and assigns when this agreement permits.

§ 15.03. **Texas Law to Apply.** This agreement is to be construed under Texas law, and all obligations of the parties created by this lease are performable in Bowie County, Texas.

§ 15.04. **Legal Construction.** If one or more of the provisions contained in this agreement are for any reason held by a court of competent jurisdiction to be invalid, illegal, or unenforceable in any respect, the invalidity, illegality, or unenforceability will not affect any other provision of the agreement, which will be construed as if it had not included the invalid, illegal, or unenforceable provision.

§ 15.05. **Prior Agreements Superseded.** This agreement constitutes the parties' sole agreement and supersedes any prior understandings or written or oral agreements between the parties with respect to the subject matter.

§ 15.06. **Amendment.** No amendment, modification, or alteration of this agreement is binding unless in writing, dated subsequent to the date of this agreement, and duly executed by the parties.

§ 15.07. **Rights and Remedies Cumulative.** The rights and remedies provided by this lease are cumulative, and either party's using any right or remedy will not preclude or waive its right to use any other remedy. These rights and remedies are in addition to any other rights the parties may have by law, statute, ordinance, or otherwise.

§ 15.08. **Attorney's Fees and Costs.** If, as a result of either party's breaching this agreement, the other party employs an attorney to enforce its rights under this lease, then the breaching or defaulting party will pay the other party the reasonable attorney's fees and costs incurred to enforce the lease.

§ 15.09. **Force Majeure.** Neither Landlord nor Tenant is required to perform any term or covenant in this lease so long as performance is delayed or prevented by *force majeure,* which includes acts of God, strikes, lockouts, material or labor restrictions by any governmental authority, civil riot, floods, and any other cause not reasonably within Landlord's or Tenant's control and that Landlord or Tenant cannot, by exercising due diligence and paying money, prevent or overcome, in whole or part.

§ 15.10. **Time of Essence.** Time is of the essence of this agreement.

§ 15.11. **Alternate Dispute Resolution.** Landlord and Tenant shall submit in good faith to mediation any and all disputes before filing suit. Each party shall pay its own counsel fees in such mediations and shall each pay one-half of the mediator's charges. The parties shall mutually agree upon the mediator, and upon failure to agree within 30 days of a request by either party to mediation, shall request the County Judge of Bowie County to select a mediator whose selection shall be binding on the parties. All mediations shall take place in Bowie County, Texas.

§ 15.12. **LIMITATION OF WARRANTIES.** THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER KIND ARISING OUT OF THIS LEASE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THOSE, IF ANY, EXPRESSLY STATED IN THIS LEASE.

§ 15.13. **Abandoned Property.** Landlord may retain, remove, destroy and/or dispose of any property left on the Premises at the end of the Term without liability to Tenant for loss or damage. Tenant shall

reimburse Landlord for expenses incurred by Landlord to remove, destroy or dispose of such property within 30 days of Landlord's notice to Tenant of the amount due.

§ 15.14. **Municipal and Emergency Services.** Tenant shall pay for all municipal services (Police, Hazardous Spill Response, Emergency Medical Response and Fire Protection) used by Tenant, its employees, guests, invitees, and any and all persons while upon the Premises. Said services may be furnished by local law enforcement agencies and by the U.S. Department of the Army as provided in that certain Municipal Services Agreement between Red River Army Depot and Red River Redevelopment Authority dated the 4th day of February 1998, as it may be amended from time to time. Tenant shall pay to, or reimburse, Landlord for all municipal services furnished to Tenant or to persons on the Premises within ten (10) days after receipt of an invoice for said services from Landlord. Tenant shall be entitled to receive and shall handle all documentation for reimbursement by insurance companies or other third-party benefit plan providers.

§ 15.15. **Army Imposed Restrictions.** Notwithstanding any other provision of this Lease, this Lease Agreement is made subject to, and Tenant agrees to be bound by those certain exceptions, limitations, covenants, conditions and reservations set forth in the Deed Without Warranty conveying the Premises from the United States of America, acting by and through the Secretary of the Army to Red River Redevelopment Authority dated September 1, 2010, and recorded in Volume 5898, Page 1 of the Real Property Records, Bowie County, Texas, to the extent said provisions apply to the Premises. A copy of the Deed Without Warranty is available at the offices of Landlord.

§ 15.16. **Reservation of Rights.** Landlord reserves the right to include the Premises including the easement locations, if any, together with other adjoining property owned by Landlord in a subdivision plat and subject the property described in said platted subdivision to utility easements and common restrictive covenants; provided, however, that said restrictive covenants and easements shall not interfere unreasonably with Tenant's use and related uses. It shall not be necessary or required that Tenant join in the execution of any such plat dedication or declaration of restrictive covenants and easements.

§ 15.17. **Common Area Charges.** Tenant acknowledges and agrees that it shall be responsible for and pay its proportionate share of the "TAC East Holdings Company Co. 1-East common area charges" based upon the square footage of the Premises as a percentage of the total area of the TAC East Holdings Company No. 1-East development area (excluding the "common areas"). The "common areas" are those areas of TAC East Holdings Company No.1 Center-East used by and/or for the benefit of all property owners or tenants within TAC East Holdings Company No.1-East, including but not limited to parks, recreational facilities, walkways, roadways and public parking areas. "Common area charges" are those property taxes, user charges, payments in lieu of taxes, maintenance, improvement, and betterment charges, and other local, county, TAC East Holdings Company No.1, or other governmental assessments on or against the Commerce Park common areas. The common area charges, other than taxes, shall not exceed ten cents ($0.10) per $100.00 valuation of the Premises based upon the fair market value thereof as determined by the Bowie Central Appraisal District for the year in which the assessment is made.

Landlord shall notify Tenant of the amount of the assessment, and Tenant shall pay said assessment within thirty (30) days.

§ 15.18. **Advertising and Promotions Rights.** Tenant, by entering into this Lease Agreement, authorizes Landlord to use in its advertising and promotion of TAC East Holdings Company No.1 and its properties the fact that Tenant has leased property from Landlord including but not limited to photographs of the leased premises, Tenant signage, Tenant equipment and vehicles, and Tenant employees; inclusion of Tenant's name and any "doing business as" names in Landlord's client/customer listings; and quotations of Tenant and Tenant's representatives. This authorized use includes all forms of media including but not limited to print, radio and other audio media, television and other video media, internet and other telecommunications media, and social media such as Facebook, Twitter, LinkedIn and others . This section constitutes a license from Tenant to Landlord to use for the limited purposes set forth herein any and all trademarks, tradenames and related intellectual property generally available and visible to the general public

§ 15.19. **Annual Reports.** Tenant agrees to annually, on or about, June 30 of each year during the Term and all extensions of the Term, and at such other times as Landlord may request, to provide to Landlord a report setting forth the following information for the prior calendar year:

1. Maximum number of Full Time Equivalent jobs;

2. Minimum number of Full Time Equivalent jobs;

3. Total Payroll for jobs on the Premises;

4. An employee census by position (no names);

5. Number of employees making above the average wage for Bowie County as determined by the Texas Workforce Commission;

6. Average wage for all employees;

7. Such other information as Landlord may reasonably request to support its redevelopment efforts, including but not limited to information required by authorities issuing grants for which Landlord may apply.

§ 15.20. **Guarantee.** Guarantor agrees to guarantee payment and performance by Tenant of its obligations under this Lease. Guarantor agrees to pay and perform the obligations of Tenant within 15 days of receipt of notice from Landlord of failure of Tenant to pay or perform under the Lease. This is an unconditional guaranty of payment and performance, not of collection, and it is an agreement of guaranty, not of suretyship. Guarantor waives all requirements of law, if any, that any collection efforts be made against Tenant or that any action be commenced against Tenant before resorting to this guaranty. Guarantor acknowledges but that for Guarantor providing this guaranty, Landlord would not have entered into this Lease with Tenant.

§ 15.21. **Governmental Immunity.** By execution of this Agreement, TAC East Holdings Company No.1 does not waive its governmental immunity except to the extent it is contractually liable for damages for

failure to perform its responsibilities under this Agreement. This limited waiver of governmental immunity shall not extend to, or for the benefit of, any third parties.

§ 15.22. **Option to Purchase.** Intentionally Deleted.

§ 15.23. **Expansion Option.** Tenant shall have the right to expand its leased premises into the contiguous bunkers (Magazines) (Igloos) Numbered 20, 30 & 40 (Expansion Area) on Nacogdoches Street upon the following terms:

1) In the event Landlord receives a bona fide third party written offer for the Expansion Area; Tenant shall have ten (10) business days to exercise its right to lease said space upon the same terms as the third-party offer. Rent payment shall commence as provided in the third-party offer.

2) In the absence of a third-party offer, should Tenant desire to expand its rented premises to include the Expansion Area, Tenant shall notify Landlord of said fact and said space shall be rented upon the same terms of this lease.

3) Expansion Area be leased "AS IS-WHERE IS" and without any obligation of Landlord to repair or modify the Expansion Area.

4) This Option shall expire on the 30th day of September, 2028.

5) Upon exercise of the Option, the parties shall execute a Written Addendum to this lease to document the action of the parties.

ARTICLE 16. LESSEE AFFIRMATIONS

1. **FALSE STATEMENTS.** Lessee represents and warrants that all statements and information prepared and submitted in response to the solicitation are current, complete, true and accurate. Signing the solicitation with a false statement is a material breach of this Purchase Order and shall void the submitted response or any resulting Purchase Orders and may result in removal of the Lessee from the Centralized Master Bidder List.

2. (Intentionally Deleted)

3. (Intentionally Deleted)

4. (Intentionally Deleted)

5. (Intentionally Deleted)

6. (Intentionally Deleted)

7. **PROHIBITION AGAINST BOYCOTTING ISRAEL.** Pursuant to Section 2271.002 of the Texas Government Code, Lessee certifies that either (i) it meets an exemption criteria under Section 2271.002; or (ii) it does not boycott Israel and will not boycott Israel during the term of the contract resulting from this solicitation. Lessee shall state any facts that make it exempt from the boycott certification in its Response.

8. **PROHIBITION AGAINST CONTRACTING WITH COMPANIES ENGAGED IN BUSINESS WITH IRAN, SUDAN, OR FOREIGN TERRORIST ORGANIZATIONS.** In accordance with Section 2252.152 of the Texas Government Code, TFC is prohibited from entering into a governmental contract (as defined in Texas Government Code Section 2252.151(3)) with a company that is identified on a list prepared and maintained under Texas Government Code Section 806.051, 807,051, or 2252.153. If Lessee is on the above referenced list the Contract will be considered void or voidable and TFC will not be responsible to pay Lessee for any work performed.

9. **EXCLUDED PARTIES.** Lessee certifies that it is not listed in the prohibited vendors list authorized by Executive Order No. 13224, "Blocking Property and Prohibiting Transactions with Persons Who Commit, Threaten to Commit, or Support Terrorism", published by the United States Department of the Treasury, Office of Foreign Assets Control.

10. **SUSPENSION AND DEBARMENT.** Lessee certifies that it and its principals are not suspended or debarred from doing business with the state or federal government as listed on the State of Texas Debarred Vendor List maintained by the Texas Comptroller of Public Accounts and the System for Award Management (SAM) maintained by the General Services Administration.

11. **PROHIBITION AGAINST ENERGY COMPANY BOYCOTTS.** Pursuant to Texas Government Code Chapter 2274, Lessee certifies that either (1) it meets an exemption criteria under said Chapter; or (2) it does not boycott energy companies and will not boycott energy companies during the term of this contract.

12. **PROHIBITION AGAINST DISCRIMINATION AGAINST FIREARM ENTITIES OR FIREARM TRADE ASSOCIATIONS.** Pursuant to Texas Government Code Chapter 2274, Lessee certifies that (1) it meets an exemption criteria under said Chapter, or (2) it does not have a practice, policy, guidance or directive that discriminates against a firearm entity or firearm trade association and will not discriminate during the term of this Contract against a firearm entity or firearm trade association.

13. **PROHIBITION AGAINST CONTRACTING WITH CERTAIN FOREIGN ENTITIES RELATING TO CRITICAL INFRASTRUCTURE.** Pursuant to the provision of Chapter 113 of the Texas Business and Commerce Code, Lessee certifies that (1) this contract does not relate to critical infrastructure, or if it does relate to critical infrastructure, (2) it is not a company owned by or the majority stock or other ownership interest of the Company is held or controlled by (a) individuals who are citizens of China, Iran, North Korea, Russia or other countries designated by the Governor of Texas, or (b) a company or other entity including a governmental entity that is owned or controlled by citizens of or is directly controlled by the government of China, Iran, North Korea, Russia, or other country designated by the Governor of the State of Texas.

The undersigned Landlord and Tenant execute this agreement on the 27th day of September, 2022.

LANDLORD
TAC EAST HOLDINGS COMPANY No.1

By: William Scott Norton
Name: William Scott Norton
Title: President

TENANT
ENVIROSAFE DEMIL, LLC
By:
Name: Thomas Ogden
Title: CEO

GUARANTOR
N/A
N/A
N/A
N/A

EXHIBIT "A"

PREMISES DESCRIPTION

The Premises are a portion of the Property conveyed by the United States of America to Red River Redevelopment Authority by that certain Deed Without Warranty dated September 1, 2010, recorded in Volume 5898, Page 1 of the Real Property Records of Bowie County, Texas.

Part A Application Form

Attachment B

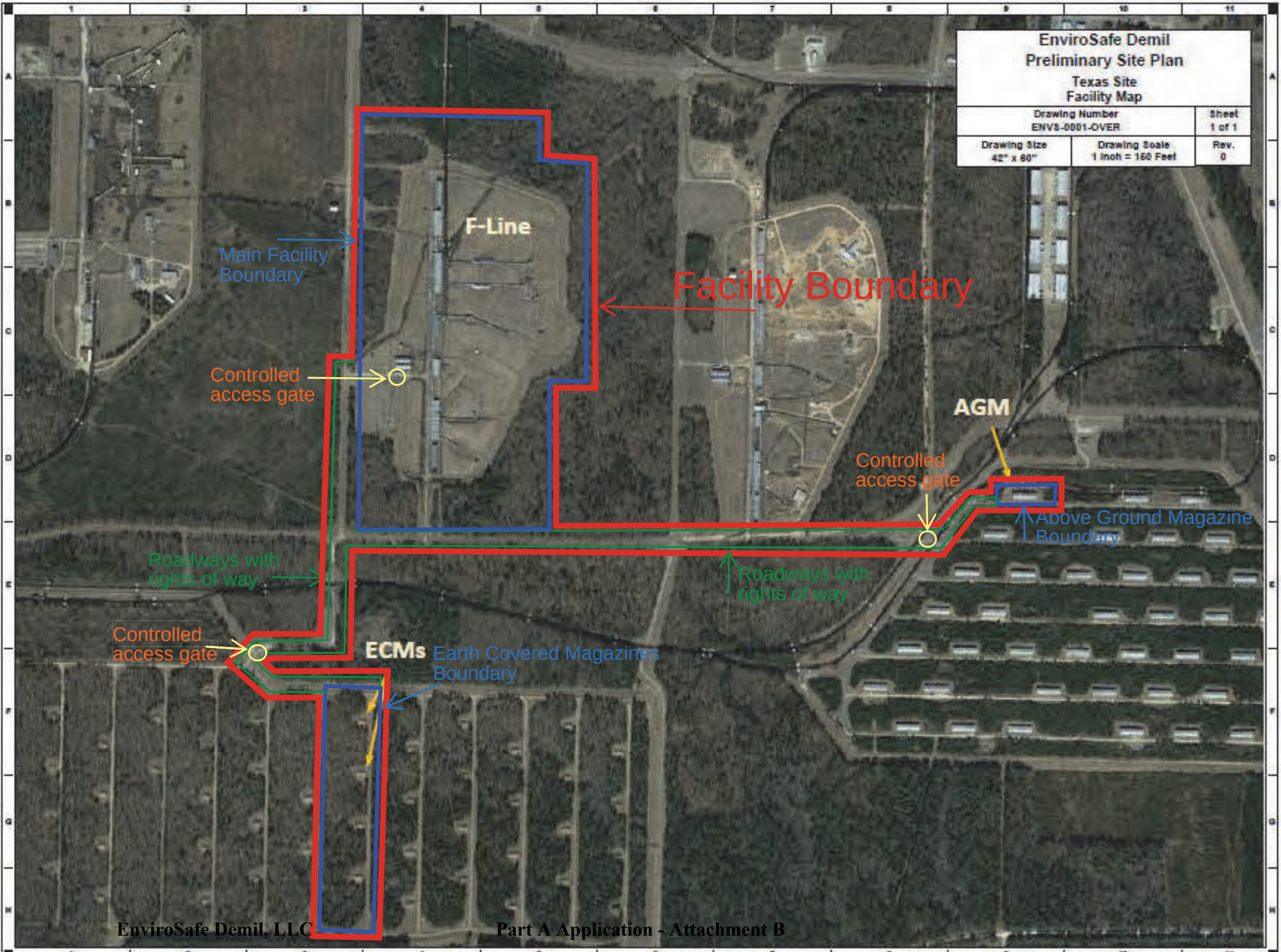
Legal Description of the Facility

EnviroSafe Demil, LLC (ESD) is a demilitarization facility in Hooks, Texas. The site for ESD is located on the F-Line of the former Lone Star Army Ammunition Plant (LSAAP), which is now part of the east campus of the TexAmericas Center (TAC East Campus). ESD purchased the former F-Line from TexAmericas Center and is the owner. Storage magazines ~~adjacent~~ proximate to the main facility will also be used – the earth covered magazines (ECMs) are located at LSAAP's former line V-13 and an above ground magazine (AGM) is located at LSAAP's Beech #10 location. ESD will transport material between the storage magazines and the main facility using Beech Street, Cherry Street, Cypress Street and Montague Street (soon to be renamed "Demil Way"). ESD's Industrial Lease provides a right-of-way for ESD to access these roads (see Sections 15.17 and 15.18 of the Industrial Lease document in the Part A Application – Attachment A.3).

Below is a summary of the owner/operator status:

- Main Facility – owned by ESD; operated by ESD
- Above Ground Magazine – owned by TAC East Holdings; operated by ESD
- Earth Covered Magazines - owned by TAC East Holdings; operated by ESD
- Roadways – owned by TexAmerica's Center; ESD has the right-of-way to use these roads

More information on the siting of the facility can be found in *Appendix II – Facility Siting Criteria* of the Part B Application. Legal descriptions ~~of the facility land can be found in the lease agreements included in *Attachment A – Lease Information* of the Part A Application Form~~including the surveyed boundaries of the facility are included with this attachment. A facility map showing the boundaries of the facility is included with this attachment.


EnviroSafe Demil
Preliminary Site Plan
Texas Site
Facility Map
Drawing Number
ENVS-0001-OVER
Sheet
1 of 1
Drawing Size
42" x 60"
Drawing Scale
1 inch = 160 Feet
Rev.
0
F-Line
Main Facility Boundary
Facility Boundary
Controlled access gate
AGM
Controlled access gate
Above Ground Magazine Boundary
Roadways with rights of way
Roadways with rights of way
Controlled access gate
ECMs
Earth Covered Magazines Boundary

EnviroSafe Demil
Site Plan
Texas Site
Facility Map
Drawing Number
ENVS-0001-SITE
Sheet
1 of 4
Drawing Size
42" x 60"
Drawing Scale
1 Inch = 150 Feet
Rev.
0
N Montague St
Energetic Activation Unit
PAS
Energetic and Reycling Ops Building
F-Line
Freedom Wy
Rocket Motor Ops Building
PAS
Hybrid Burn Chamber (HBC)
Pine St
Pine St

Property Description
229.522 Acres
Bowie County, Texas

All that certain lot, tract or parcel of land lying and situated in the William H. Fore Headright Survey, Abstract 215, the Jonas Reid Headright Survey, Abstract 511, the Mary Burnsides Headright Survey, Abstract 49, and the William H. Fore Headright Survey, Abstract 214, Bowie County, Texas, being all of that certain tract of land described as 130.000 acres in the deed from TAC East Holdings Company No. 1 to F Line Holdings, LLC, dated February 26, 2025, recorded in Document No. 2025-00001780 of the Real Property Records of Bowie County, Texas, all of that certain tract of land described as 45.000 acres in the deed from TAC East Holdings Company No. 1 to F Line Holdings LLC, dated September 14, 2023, recorded in Document No. 2023-00008948 of the Real Property Records of Bowie County, Texas, being a part of those certain tracts of land described as Tract 3, with 2123.097 acres, Tract 8, with 4586.02 acre, and Tract 10, with 81.718 acres in the deed from the United States of America to Red River Redevelopment Authority, now known as TexAmericas Center, dated September 1, 2010, recorded in Volume 5898, Page 1 of the Real Property Records of Bowie County, Texas, being a part of that certain tract of land described as Tract 1 (Area V), with 646.998 acres in the deed from TexAmericas Center to TAC East Holdings Company No. 1, dated July 28, 2015, recorded in Document No. 2015-8269 of the Real Property Records of Bowie County, Texas, and being a part of that certain tract of land described as 1.808 acres in the deed from TexAmericas Center to TAC East Holdings Company No. 1, and being more particularly described by metes and bounds as follows:

THENCE North 89 degrees 38 minutes 24 seconds East a distance of 148.98 feet along the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, an outside ell corner of the said 130.000 acre tract, the Northwest corner of the said 45.000 acre tract;

THENCE North 89 degrees 38 minutes 12 seconds East a distance of 631.22 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, an outside ell corner of the said 45.000 acre tract;

THENCE South 00 degrees 50 minutes 08 seconds East a distance of 450.17 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, an inside ell corner of the said 45.000 acre tract;

THENCE North 89 degrees 24 minutes 40 seconds East a distance of 100.00 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, an inside ell corner of the said 45.000 acre tract;

THENCE North 00 degrees 50 minutes 08 seconds West a distance of 449.77 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, an outside ell corner of the said 45.000 acre tract;

THENCE North 89 degrees 38 minutes 14 seconds East a distance of 839.43 feet along the North line of the said 45.000 acre tract and the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, the Northeast corner of the said 130.000 acre tract;

THENCE South 00 degrees 21 minutes 51 seconds East a distance of 366.14 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011-00, an inside ell corner of the said 130.000 acre tract;

THENCE North 89 degrees 38 minutes 32 seconds East a distance of 380.02 feet along the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, an outside ell corner of the said 130.000 acre tract;

THENCE South 00 degrees 50 minutes 08 seconds East a distance of 2134.21 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, an outside ell corner of the said 130.000 acre tract;

THENCE South 89 degrees 23 minutes 15 seconds West a distance of 244.93 feet along the South line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, an outside ell corner of the said 130.000 acre tract;

THENCE South 00 degrees 03 minutes 41 seconds West a distance of 1381.52 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, the Southeast corner of the said 130.000 acre tract, lying in the North line of the said 81.718 acre tract, at the beginning of circular curve to the left;

THENCE in a Northeasterly direction along the arc of the said circular curve a distance of 968.35 feet, with a delta angle of 03 degrees 43 minutes 03 seconds, a radius of 14925.00 feet, a chord bearing of North 87 degrees 57 minutes 50 seconds East, and a chord distance of 968.18 feet to a 1/2 inch steel rod found for a corner, capped TX MG 5760, at the end of the said circular curve;

THENCE North 86 degrees 06 minutes 19 seconds East, tangent to the said circular curve a distance of 1087.47 feet along the North line of the said 81.718 acre tract the South line of that certain tract of land described as 318.555 acres in the deed from TexAmericas Center to TAC East Holdings Company No. 1, dated April 25, 2017, recorded in Document No. 2017-4829 of the Real Property Records of Bowie County, Texas, and the South line of that certain tract of land described as 165.54 acres in the deed from LSK RE Holdings, LLC, to Sabine Strategic Solutions, LLC, dated July 7, 2025, recorded in Document No. 2025-00007067 of the Real Property Records of Bowie County, Texas, to a point for a corner, at an angle point;

THENCE North 86 degrees 05 minutes 07 seconds East a distance of 509.53 feet along the North line of the said 81.718 acre tract and the South

line of the said 165.54 acre tract to a point for a corner, at the beginning of a circular curve to the left, tangent to the said line;

THENCE in a Northeasterly direction along the arc of the said circular curve a distance of 452.98 feet, with a delta angle of 19 degrees 07 minutes 13 seconds, a radius of 1357.39 feet, a chord bearing of North 76 degrees 31 minutes 31 seconds East, and a chord distance of 450.88 feet to a point for a corner, at the end of the said circular curve;

THENCE South 23 degrees 02 minutes 06 seconds East radial to said curve, a distance of 150.00 feet across and through the said 81.718 acre tract to a point for a corner, lying in the South line of the said 81.718 acre tract and the North line of the said 4586.02 acre tract;

THENCE North 87 degrees 51 minutes 18 seconds East a distance of 367.75 feet across the said 4586.02 acre tract to a point for a corner, at an angle point;

THENCE South 88 degrees 19 minutes 42 seconds East a distance of 164.43 feet across the said 4586.02 acre tract to a point for a corner, at an angle point;

THENCE South 54 degrees 03 minutes 53 seconds East a distance of 27.10 feet across the said 4586.02 acre tract to a point for a corner, at the beginning of a circular curve to the left, tangent to the said line;

THENCE in a Northeasterly direction along the arc of the said circular curve a distance of 90.95 feet, with a delta angle of 90 degrees 00 minutes 00 seconds, a radius of 57.90 feet, a chord bearing of North 80 degrees 56 minutes 07 seconds East, and a chord distance of 81.88 feet to a point for a corner, at the end of the said circular curve;

THENCE North 35 degrees 56 minutes 07 seconds East, tangent to the said circular curve a distance of 356.60 feet to a point for a corner, at the beginning of a circular curve to the right, tangent to the said line;

THENCE in a Northeasterly direction along the arc of the said circular curve a distance of 177.63 feet, with a delta angle of 53 degrees 34 minutes 01 seconds, a radius of 190.00 feet, a chord bearing of North 62 degrees 43 minutes 07 seconds East, and a chord distance of 171.24 feet to a point for a corner, at the end of the said circular curve;

THENCE North 89 degrees 30 minutes 08 seconds East tangent to said curve, a distance of 243.24 feet across the said 4586.02 acre tract to a point for a corner;

THENCE North 00 degrees 00 minutes 00 seconds East a distance of 121.61 feet across the said 4586.02 acre tract to a point for a corner;

THENCE North 89 degrees 21 minutes 00 seconds East a distance of 285.94 feet across the said 4586.02 acre tract to a point for a corner;

THENCE South 00 degrees 00 minutes 00 seconds West a distance of 152.37 feet across the said 4586.02 acre tract to a point for a corner;

THENCE South 89 degrees 30 minutes 08 seconds West a distance of 528.91 feet across the said 4586.02 acre tract to a point for a corner, at the beginning of a circular curve to the left, tangent to the said line;

THENCE in a Southwesterly direction along the arc of the said circular curve a distance of 149.59 feet, with a delta angle of 53 degrees 34 minutes 01 seconds, a radius of 160.00 feet, a chord bearing of South 62 degrees 43 minutes 07 seconds West, and a chord distance of 144.20 feet to a point for a corner, at the end of the said circular curve;

THENCE South 35 degrees 56 minutes 07 seconds West, tangent to the said curve a distance of 448.37 feet to a point for a corner;

THENCE North 54 degrees 03 minutes 53 seconds West a distance of 111.43 feet across the said 4586.02 acre tract to a point for a corner, at an angle point;

THENCE North 88 degrees 19 minutes 42 seconds West a distance of 147.31 feet across the said 4586.02 acre tract to a point for a corner, at an angle point;

THENCE South 87 degrees 51 minutes 18 seconds West a distance of 453.13 feet across the said 4586.02 acre tract to a point for a corner, lying in a circular curve to the right in the North line of the said 4586.02 acre tract and the South line of the said 81.718 acre tract;

THENCE in a Southwesterly direction along the arc of the said circular curve a distance of 411.58 feet, with a delta angle of 15 degrees 38 minutes 39 seconds, a radius of 1507.39 feet, a chord bearing of South 78 degrees 15 minutes 48 seconds West, and a chord distance of 410.30 feet to a point for a corner, at the end of the said circular curve;

THENCE South 86 degrees 05 minutes 07 seconds West, tangent to the said circular curve a distance of 509.55 feet along the North line of the said 4586.02 acre tract and the South line of the said 81.718 acre tract to a point for a corner, at an angle point;

THENCE South 86 degrees 06 minutes 19 seconds West a distance of 1087.49 feet along the North line of the said 4586.02 acre tract and the South line of the said 81.718 acre tract to a point for a corner, at the beginning of a circular curve to the right, tangent to the said line;

THENCE in a Southwesterly direction along the arc of the said circular curve a distance of 1080.93 feet, with a delta angle of 04 degrees 06 minutes 30 seconds, a radius of 15075.00 feet, a chord bearing of South 88 degrees 09 minutes 34 seconds West, and a chord distance of 1080.70 feet to a point for a corner, at the end of the said circular curve;

THENCE North 89 degrees 47 minutes 11 seconds West, tangent to the said circular curve a distance of 1859.31 feet along the North line of the said 4586.02 acre tract, the North line of the said 646.998 acre tract, and the South line of the said 81.718 acre tract to a point for a corner;

THENCE South 02 degrees 13 minutes 49 seconds East a distance of 383.28 feet across the said 646.998 acre tract to a point for a corner, at an angle point;

THENCE South 02 degrees 54 minutes 07 seconds East a distance of 432.28 feet across the said 646.998 acre tract to a point for a corner, at the beginning of a circular curve to the right, tangent to the said line;

THENCE in a Southwesterly direction along the arc of the said circular curve a distance of 183.74 feet, with a delta angle of 91 degrees 32 minutes 29 seconds, a radius of 115.00 feet, a chord bearing of South 42 degrees 52 minutes 07 seconds West, and a chord distance of 164.81 feet to a point for a corner, at the end of the said circular curve;

THENCE across the said 646.998 acre tract the following courses and distances:

South 88 degrees 38 minutes 22 seconds West a distance of 476.00 feet to a point for a corner, at an angle point;

South 74 degrees 58 minutes 26 seconds West a distance of 97.43 feet to a point for a corner, at an angle point;

South 48 degrees 50 minutes 55 seconds West a distance of 125.11 feet to a point for a corner, at an angle point;

South 01 degrees 38 minutes 05 seconds West a distance of 33.96 feet to a point for a corner, at an angle point;

South 45 degrees 34 minutes 16 seconds East a distance of 232.30 feet to a point for a corner, at an angle point;

South 59 degrees 40 minutes 10 seconds East a distance of 103.18 feet to a point for a corner, at an angle point;

South 82 degrees 00 minutes 12 seconds East a distance of 114.18 feet to a point for a corner, at an angle point;

North 89 degrees 23 minutes 26 seconds East a distance of 951.83 feet to a point for a corner;

South 00 degrees 36 minutes 21 seconds East a distance of 2207.00 feet to a point for a corner;

South 89 degrees 27 minutes 39 seconds West a distance of 480.00 feet to a point for a corner;

North 00 degrees 36 minutes 21 seconds West a distance of 2176.42 feet to a point for a corner;

South 89 degrees 23 minutes 26 seconds West a distance of 473.35 feet to a point for a corner, at an angle point;

North 81 degrees 54 minutes 23 seconds West a distance of 122.84 feet to a point for a corner, at an angle point;

North 59 degrees 37 minutes 18 seconds West a distance of 114.60 feet to a point for a corner, at an angle point;

North 45 degrees 29 minutes 48 seconds West a distance of 224.32 feet to a point for a corner, at an angle point;

North 33 degrees 05 minutes 55 seconds West a distance of 67.79 feet to a point for a corner, at an angle point;

North 48 degrees 50 minutes 55 seconds East a distance of 174.44 feet to a point for a corner, at an angle point;

North 74 degrees 58 minutes 26 seconds East a distance of 107.98 feet to a point for a corner, at an angle point;

North 88 degrees 38 minutes 22 seconds East a distance of 479.59 feet to a point for a corner, at the beginning of a circular curve to the left, tangent to the said line;

THENCE in a Northeasterly direction along the arc of the said circular curve a distance of 135.80 feet, with a delta angle of 91 degrees 32 minutes 29 seconds, a radius of 85.00 feet, a chord bearing of North 42 degrees 52 minutes 07 seconds East, and a chord distance of 121.81 feet to a point for a corner, at the end of the said circular curve;

THENCE North 02 degrees 54 minutes 07 seconds West, tangent to the said circular curve a distance of 432.45 feet to a point for a corner, at an angle point;

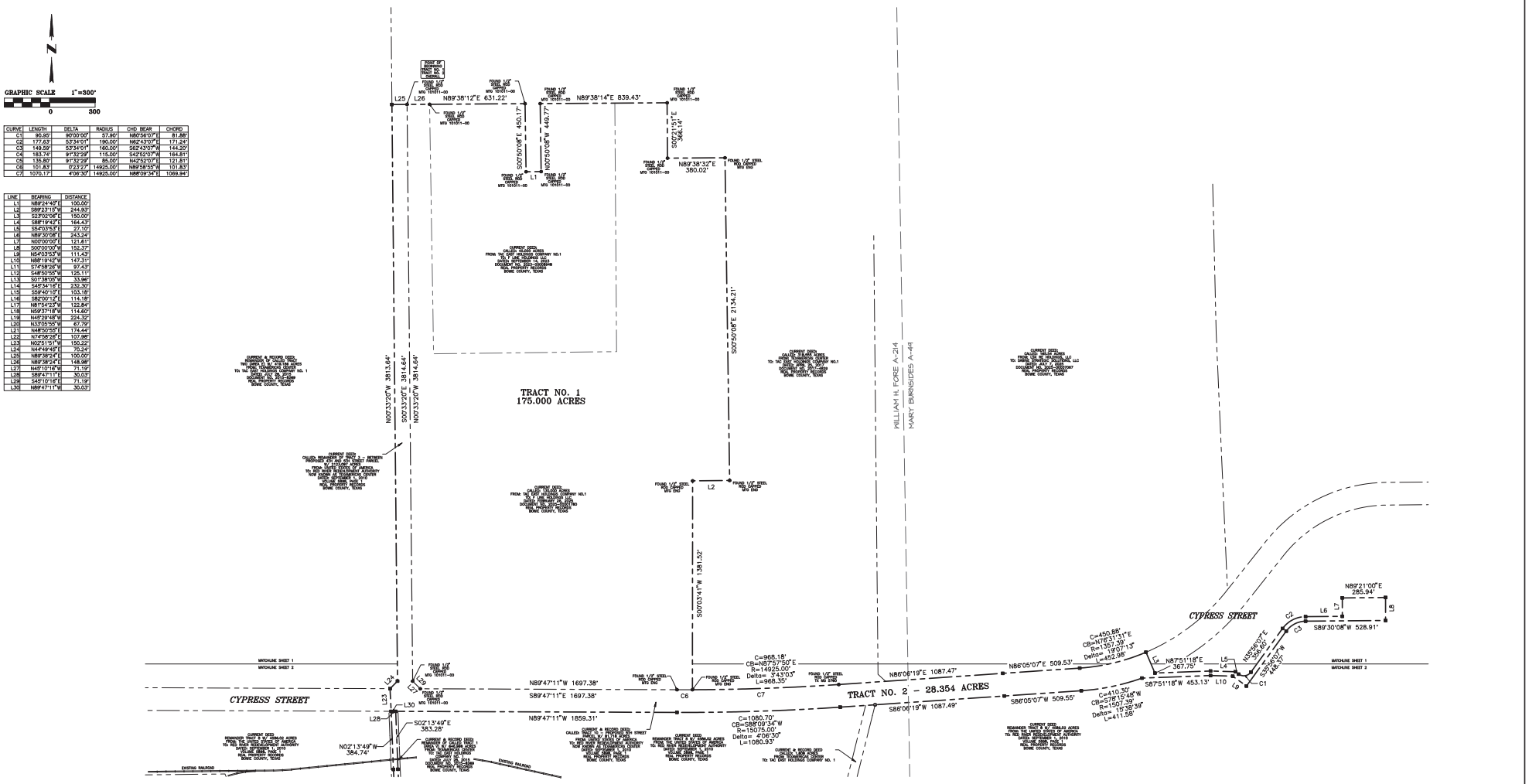
THENCE North 02 degrees 13 minutes 49 seconds West a distance of 384.74 feet across and through the said 646.998 acre tract to a point for a corner, lying in the North line of the said 646.998 acre tract and the South line of the said 81.718 acre tract;

THENCE North 02 degrees 51 minutes 51 seconds West a distance of 150.22 feet across and through the said 81.718 acre tract to a point for a corner, lying in the North line of the said 81.718 acre tract, the Southeast corner of that certain tract of land described as Tract Two, with 719.186 acres in the deed from TexAmericas Center to TAC East Holdings Company No. 1, dated July 28, 2015, recorded in Document No. 2015-8269 of the Real Property Records of Bowie County, Texas;

THENCE North 44 degrees 49 minutes 45 seconds East a distance of 70.24 feet along the East line of the said 419.186 acre tract to a point for a corner, at an angle point;

THENCE North 00 degrees 33 minutes 20 seconds West a distance of 3813.64 feet along the East line of the said 419.186 acre tract to a point for a corner;

THENCE North 89 degrees 38 minutes 24 seconds East a distance of 100.00 feet toto the point of beginning and containing 229.522 acres of land, at the time of this survey.



CURVE	LENGTH	DELTA	RADIUS	CHD BEAR	CHORD
C1	90.95'	90°00'00"	57.90'	N80°56'07"E	81.88'
C2	177.63'	53°34'01"	190.00'	N62°43'07"E	171.24'
C3	149.59'	53°34'01"	160.00'	S62°43'07"W	144.20'
C4	183.74'	91°32'29"	115.00'	S42°52'07"W	164.81'
C5	135.80'	91°32'29"	85.00'	N42°52'07"E	121.81'
C6	101.83'	0°23'27"	14925.00'	N89°58'35"W	101.83'
C7	1070.17'	4°06'30"	14925.00'	N88°09'34"E	1069.94'

LINE	BEARING	DISTANCE
L1	N89°21'40"E	100.00'
L2	S89°23'15"W	244.93'
L3	S27°02'08"E	150.00'
L4	S88°19'42"E	164.43'
L5	S54°03'53"E	27.10'
L6	N89°30'08"E	243.24'
L7	N00°00'00"E	121.61'
L8	S00°00'00"W	152.37'
L9	N54°03'53"W	111.43'
L10	N88°19'42"W	147.31'
L11	S74°38'28"W	97.43'
L12	S48°50'58"W	125.11'
L13	S01°38'05"W	33.96'
L14	S45°34'16"E	232.30'
L15	S59°45'10"E	103.18'
L16	S82°00'12"E	114.18'
L17	N81°54'23"W	122.84'
L18	N59°37'18"W	114.60'
L19	N45°29'48"W	224.32'
L20	N33°05'55"W	67.79'
L21	N48°50'05"E	174.44'
L22	N7°45'8"26"E	107.98'
L23	N02°51'51"E	150.22'
L24	N44°49'48"E	70.24'
L25	N89°38'12"E	100.00'
L26	N89°38'24"E	148.98'
L27	N41°10'16"W	71.19'
L28	S89°47'11"E	30.03'
L29	S45°10'16"E	71.19'
L30	N89°47'11"W	30.03'

THE BEARINGS ARE BASED ON GRID NORTH WITHIN THE "TEXAS COORDINATE SYSTEM OF 1983, NORTH CENTRAL ZONE", NAD83 (CORS96, EPOCH 2002.0), GRID, WITH A BEARING OF NORTH 00 DEGREES 33 MINUTES 20 SECONDS WEST, THE FOLLOWING CONTROL MONUMENTS WERE USED TO ESTABLISH THE BASIS OF BEARINGS.

CONTROL MONUMENT #1
N=7239853.7637
E=3262371.2656

CONTROL MONUMENT #2
N=7239868.2210
E=3262334.2871

SURVEYOR CERTIFICATE:

THIS IS TO CERTIFY THAT THIS SURVEY WAS MADE ON THE GROUND UNDER MY SUPERVISION ON SEPTEMBER 30, 2025, THAT THIS PLAT (MAP OR DRAWING) SUBSTANTIALLY COMPLIES WITH THE CURRENT PROFESSIONAL AND TECHNICAL STANDARDS OF THE TEXAS BOARD OF PROFESSIONAL LAND SURVEYING, AND REPRESENTS THE FACTS FOUND AT THE TIME OF THE SURVEY.

JEFFREY A. WOOD
REGISTERED PROFESSIONAL LAND SURVEYOR
NO. 6220, STATE OF TEXAS
FIRM CERTIFICATE NO. 101011-00
DATE: SEPTEMBER 30, 2025

STATE OF TEXAS
JEFFREY A. WOOD
#6220
REGISTERED
PROFESSIONAL
LAND SURVEYOR

ENVIROSAFE DEMIL

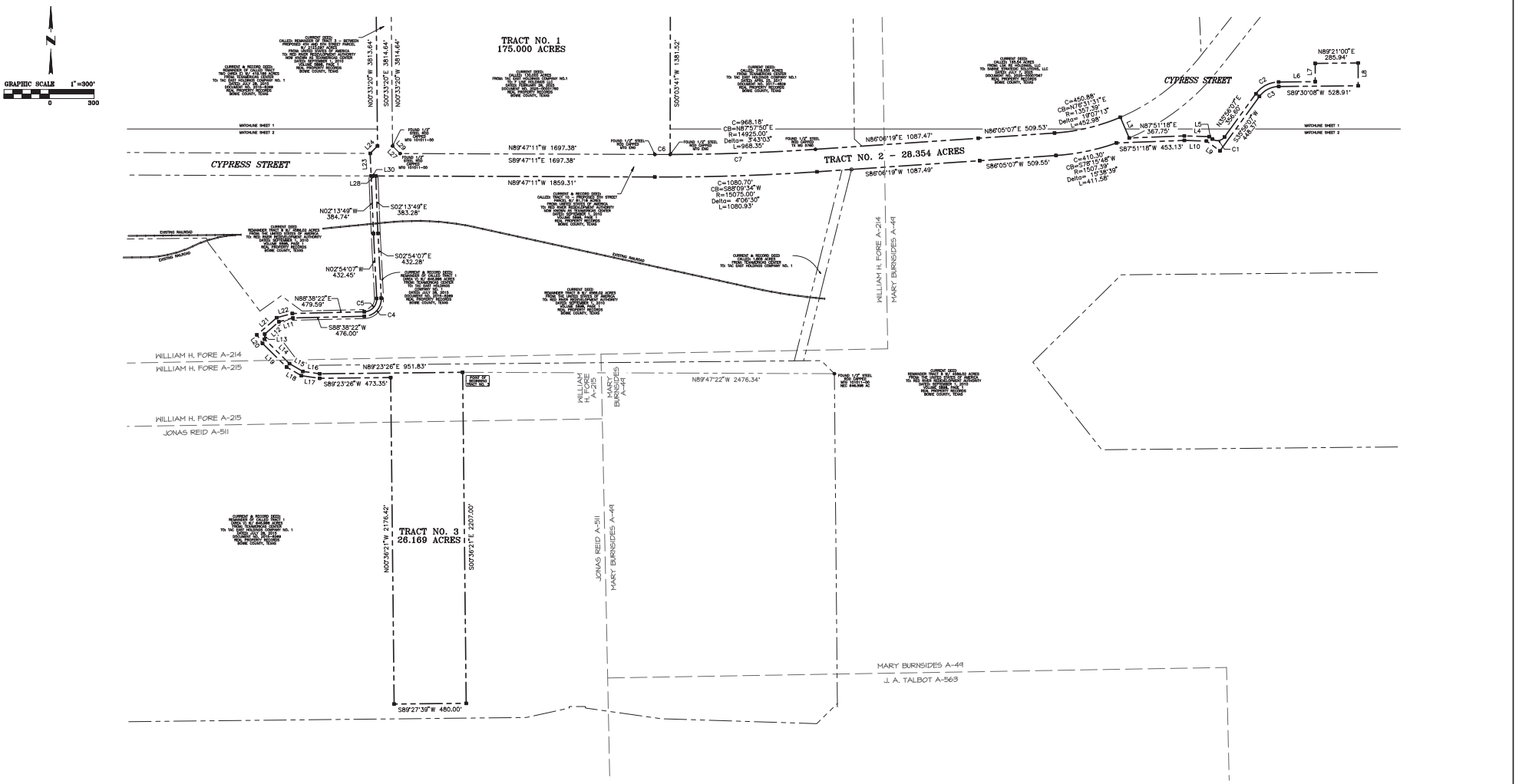
3 TRACTS IN THE TEXAMERICAS CENTER (EAST) CAMPUS
BOWIE COUNTY, TEXAS

Date	Revision/Description

Drawn By	Checked By	Project No.	Dwg. Date
BW	JW	256064	9/25/2025

File No. 256064 | Sheet No. 1 OF 3

MTG ENGINEERS &SURVEYORS
5830 SUMMERHILL ROAD TEXARKANA, TX
P: 903.838.9343 www.mtgsurveying.com
TBPE FIRM NO. F-304 TBPLS FIRM NO. 125
© MTG 2024



THE BEARINGS ARE BASED ON GRID NORTH WITHIN THE "TEXAS COORDINATE SYSTEM OF 1983, NORTH CENTRAL ZONE - 4202", (CORS96, EPOCH 2002.0), SAID BEARINGS ARE DERIVED FROM OBSERVATIONS AT MINUTES, 20 SECONDS WEST. THE FOLLOWING CONTROL MONUMENTS WERE USED TO ESTABLISH THE BASIS OF BEARINGS:

CONTROL MONUMENT #1
N=7235853.7637
E=3262371.2656

CONTROL MONUMENT #2
N=7239658.2210
E=3262334.2871

SURVEYOR CERTIFICATE:

THIS IS TO CERTIFY THAT THIS SURVEY WAS MADE ON THE GROUND UNDER MY SUPERVISION ON SEPTEMBER 30, 2025, THAT THIS PLAT (MAP OR DRAWING) SUBSTANTIALLY COMPLIES WITH THE CURRENT PROFESSIONAL AND TECHNICAL STANDARDS OF THE TEXAS BOARD OF PROFESSIONAL LAND SURVEYING, AND REPRESENTS THE FACTS FOUND AT THE TIME OF THE

JEFFREY A. WOOD
REGISTERED PROFESSIONAL LAND SURVEYOR
NO. 6220, STATE OF TEXAS
FIRM CERTIFICATE NO. 101011-00
DATE: SEPTEMBER 30, 2025

JEFFREY A. WOOD
#6220
REGISTERED
PROFESSIONAL
LAND SURVEYOR

ENVIROSAFE DEMIL

3 TRACTS IN THE TEXAMERICAS CENTER (EAST) CAMPUS
BOWIE COUNTY, TEXAS

Date	Revision/Description

Drawn By	Checked By	Project No.	Dwg. Date
BW	JW	256064	9/25/2025

File No. 256064 | Sheet No. 2 OF 3

MTG ENGINEERS &SURVEYORS
5830 SUMMERHILL ROAD TEXARKANA, TX
P: 903.838.9233 www.mtgengineering.com
TBPE FIRM NO. F-1704 TBPLS FIRM NO. 10124400

© MTG 2024

Property Description – Overall
229.522 Acres
Bowie County, Texas

All that certain lot, tract or parcel of land lying and situated in the William H. Fore Headright Survey, Abstract 215, the Jonas Reid Headright Survey, Abstract 511, the Mary Burnsides Headright Survey, Abstract 49, and the William H. Fore Headright Survey, Abstract 214, Bowie County, Texas, being all of that certain tract of land described as 130.000 acres in the deed from TAC East Holdings Company No. 1 to F Line Holdings, LLC, dated February 26, 2025, recorded in Document No. 2025-00001780 of the Real Property Records of Bowie County, Texas, being all of that certain tract of land described as 45.000 acres in the deed from TAC East Holdings Company No. 1 to F Line Holdings LLC, dated September 14, 2023, recorded in Document No. 2023-00008948 of the Real Property Records of Bowie County, Texas, being a part of those certain tracts of land described as Tract 3, with 2123.097 acres, Tract 8, with 4586.02 acre, and Tract 10, with 81.718 acres in the deed from the United States of America to Red River Redevelopment Authority, now known as Texarkercies Center, dated September 1, 2010, recorded in Volume 5898, Page 1 of the Real Property Records of Bowie County, Texas, being all of that certain tract of land described as Tract 1 (Area V), with 646.998 acres in the deed from Texarkercies Center to TAC East Holdings Company No. 1, dated July 28, 2015, recorded in Document No. 2015-8269 of the Real Property Records of Bowie County, Texas, and being a part of that certain tract of land described as 1.808 acres in the deed from Texarkercies Center to TAC East Holdings Company No. 1, and being more particularly described by metes and bounds as follows:

THENCE North 89 degrees 38 minutes 24 seconds East a distance of 148.98 feet along the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, on outside all corner of the said 130.000 acre tract, the Northeast corner of the said 45.000 acre tract;

THENCE North 89 degrees 38 minutes 12 seconds East a distance of 631.22 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an outside all corner of the said 45.000 acre tract;

THENCE South 00 degrees 50 minutes 08 seconds East a distance of 450.17 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 45.000 acre tract;

THENCE North 89 degrees 24 minutes 40 seconds East a distance of 100.00 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 45.000 acre tract;

THENCE North 00 degrees 50 minutes 08 seconds West a distance of 449.77 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an outside all corner of the said 45.000 acre tract;

THENCE North 89 degrees 38 minutes 14 seconds East a distance of 839.43 feet along the North line of the said 45.000 acre tract and the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 130.000 acre tract;

THENCE South 00 degrees 21 minutes 51 seconds East a distance of 366.14 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 130.000 acre tract;

THENCE North 89 degrees 38 minutes 32 seconds East a distance of 380.02 feet along the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an outside all corner of the said 130.000 acre tract;

THENCE South 00 degrees 03 minutes 41 seconds West a distance of 1381.52 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, the Southeast corner of the said 130.000 acre tract, lying in the North line of the said 81.718 acre tract, at the beginning of circular curve to the left;

THENCE in a Northeasterly direction along the arc of the said circular curve a distance of 988.35 feet, with a delta angle of 03 degrees 43 minutes 03 seconds, a radius of 14925.00 feet, a chord bearing of North 87 degrees 57 minutes 50 seconds East, and a chord distance of 988.18 feet to a 1/2 inch steel rod found for a corner, capped TX MG 5760, at the end of the said circular curve;

THENCE North 86 degrees 06 minutes 19 seconds East, tangent to the said circular curve a distance of 1087.47 feet along the North line of the said 81.718 acre tract the South line of that certain tract of land described as 318.555 acres in the deed from Texarkercies Center to TAC East Holdings Company No. 1, dated April 25, 2017, recorded in Document No. 2017–4829 of the Real Property Records of Bowie County, Texas, and the South line of that certain tract of land described as 165.54 acres in the deed from LSK RE Holdings, LLC, to Sabine Strategic Solutions, LLC, dated July 7, 2025, recorded in Document No. 2025–00007067 of the Real Property Records of Bowie County, Texas, to a point for a corner, at an angle point;

THENCE North 86 degrees 05 minutes 07 seconds East a distance of 509.53 feet along the North line of the said 81.718 acre tract and the South line of the said 165.54 acre tract to a point for a corner, at the beginning of a circular curve to the left, tangent to the said line;

THENCE in a Northeasterly direction along the arc of the said circular curve a distance of 452.98 feet, with a delta angle of 17 degrees 13 seconds, a radius of 1357.39 feet, a chord bearing of North 76 degrees 31 minutes 31 seconds East, and a chord distance of 450.88 feet to a point for a corner, at the end of the said circular curve;

THENCE South 23 degrees 02 minutes 06 seconds East radial to said curve, a distance of 150.00 feet across and through the said 81.718 acre tract to a point for a corner, lying in the South line of the said 81.718 acre tract and the North line of the said 4586.02 acre tract;

THENCE North 87 degrees 51 minutes 18 seconds East a distance of 367.75 feet across the said 4586.02 acre tract to a point for a corner, at an angle point;

THENCE South 88 degrees 19 minutes 42 seconds East a distance of 164.43 feet across the said 4586.02 acre tract to a point for a corner, at an angle point;

THENCE South 54 degrees 03 minutes 53 seconds East a distance of 27.10 feet across the said 4586.02 acre tract to a point for a corner, at the beginning of a circular curve to the left, tangent to the said line;

THENCE in a Northeasterly direction along the arc of the said circular curve a distance of 10.35 feet, with a delta angle of 00 degrees 00 minutes 20 seconds, a radius of 72190 feet, a chord bearing of North 80 degrees 56 minutes 07 seconds East, and a chord distance of 81.88 feet to a point for a corner, at the end of the said circular curve;

THENCE North 35 degrees 56 minutes 07 seconds East, tangent to the said circular curve a distance of 356.60 feet to a point for a corner, at the beginning of a circular curve to the right, tangent to the said line;

THENCE in a Northeasterly direction along the arc of the said circular curve a distance of 177.83 feet, with a delta angle of 53 degrees 34 minutes 01 seconds, a radius of 190.00 feet, a chord bearing of North 62 degrees 43 minutes 07 seconds East, and a chord distance of 171.24 feet to a point for a corner, at the end of the said circular curve;

THENCE North 89 degrees 30 minutes 08 seconds East tangent to said curve, a distance of 243.24 feet across the said 4586.02 acre tract to a point for a corner;

THENCE North 00 degrees 00 minutes 00 seconds East a distance of 121.61 feet across the said 4586.02 acre tract to a point for a corner;

THENCE North 89 degrees 21 minutes 00 seconds East a distance of 285.94 feet across the said 4586.02 acre tract to a point for a corner;

THENCE South 00 degrees 00 minutes 00 seconds West a distance of 152.37 feet across the said 4586.02 acre tract to a point for a corner;

THENCE South 89 degrees 30 minutes 08 seconds East a distance of 528.91 feet across the said 4586.02 acre tract to a point for a corner, at the beginning of a circular curve to the left, tangent to the said line;

THENCE in a Southeasterly direction along the arc of the said circular curve a distance of 149.56 feet, with a delta angle of 53 degrees 39 minutes 01 seconds, a radius of 160.00 feet, a chord bearing of South 62 degrees 43 minutes 07 seconds West, and a chord distance of 144.20 feet to a point for a corner, at the end of the said circular curve;

THENCE South 35 degrees 56 minutes 07 seconds West, tangent to the said curve a distance of 448.37 feet to a point for a corner;

THENCE North 54 degrees 03 minutes 53 seconds West a distance of 111.43 feet across the said 4586.02 acre tract to a point for a corner, at an angle point;

THENCE North 88 degrees 19 minutes 42 seconds West a distance of 147.31 feet across the said 4586.02 acre tract to a point for a corner, at an angle point;

THENCE South 87 degrees 51 minutes 18 seconds West a distance of 453.13 feet across the said 4586.02 acre tract to a point for a corner, lying in a circular curve to the right in the North line of the said 4586.02 acre tract and the South line of the said 81.718 acre tract;

THENCE in a Southwesterly direction along the arc of the said circular curve a distance of 411.58 feet, with a delta angle of 15 degrees 38 minutes 39 seconds, a radius of 1507.39 feet, a chord bearing of South 78 degrees 15 minutes 48 seconds West, and a chord distance of 410.30 feet to a point for a corner, at the end of the said circular curve;

THENCE South 86 degrees 05 minutes 07 seconds West, tangent to the said circular curve a distance of 509.55 feet along the North line of the said 4586.02 acre tract and the South line of the said 81.718 acre tract to a point for a corner, at an angle point;

THENCE South 86 degrees 06 minutes 19 seconds West a distance of 1087.49 feet along the North line of the said 4586.02 acre tract and the South line of the said 81.718 acre tract to a point for a corner, at the beginning of a circular curve to the right, tangent to the said line;

THENCE in a Southwesterly direction along the arc of the said circular curve a distance of 1080.93 feet, with a delta angle of 04 degrees 06 minutes 30 seconds, a radius of 15075.00 feet, a chord bearing of South 88 degrees 09 minutes 34 seconds West, and a chord distance of 1080.70 feet to a point for a corner, at the end of the said circular curve;

THENCE North 89 degrees 47 minutes 11 seconds West, tangent to the said circular curve a distance of 1859.31 feet along the North line of the said 4586.02 acre tract, the North line of the said 646.998 acre tract, and the South line of the said 81.718 acre tract to a point for a corner;

THENCE South 02 degrees 13 minutes 49 seconds East a distance of 383.28 feet across the said 646.998 acre tract to a point for a corner, at an angle point;

THENCE South 02 degrees 54 minutes 07 seconds East a distance of 432.28 feet across the said 646.998 acre tract to a point for a corner, at the beginning of a circular curve to the right, tangent to the said line;

THENCE in a Southwesterly direction along the arc of the said circular curve a distance of 183.74 feet, with a delta angle of 91 degrees 32 minutes 29 seconds, a radius of 115.00 feet, a chord bearing of South 42 degrees 52 minutes 07 seconds West, and a chord distance of 164.81 feet to a point for a corner, at the end of the said circular curve;

THENCE across the said 646.998 acre tract the following courses and distances:

South 88 degrees 38 minutes 22 seconds West a distance of 476.00 feet to a point for a corner, at an angle point;

South 74 degrees 58 minutes 26 seconds West a distance of 97.43 feet to a point for a corner, at an angle point;

South 48 degrees 50 minutes 55 seconds West a distance of 125.11 feet to a point for a corner, at an angle point;

South 01 degrees 38 minutes 05 seconds West a distance of 33.96 feet to a point for a corner, at an angle point;

South 45 degrees 29 minutes 48 seconds West a distance of 224.32 feet to a point for a corner, at an angle point;

North 33 degrees 05 minutes 55 seconds West a distance of 67.79 feet to a point for a corner, at an angle point;

North 48 degrees 50 minutes 55 seconds East a distance of 174.44 feet to a point for a corner, at an angle point;

North 74 degrees 58 minutes 26 seconds East a distance of 107.98 feet to a point for a corner, at an angle point;

North 88 degrees 38 minutes 22 seconds East a distance of 479.59 feet to a point for a corner, at the beginning of a circular curve to the left, tangent to the said line;

THENCE in a Northeasterly direction along the arc of the said circular curve a distance of 101.83 feet, with a delta angle of 00 degrees 03 minutes 27 seconds, a radius of 14925.00 feet, a chord bearing of North 89 degrees 58 minutes 55 seconds East, and a chord distance of 101.83 feet to a 1/2 inch steel rod found for a corner, capped MTG ENG, at the end of the said circular curve;

THENCE North 89 degrees 47 minutes 11 seconds West, tangent to the said circular curve, a distance of 1697.38 feet along the South line of the said 130.000 acre tract and the North line of the said 81.718 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, the Southwest corner of the said 130.000 acre tract;

THENCE North 45 degrees 10 minutes 16 seconds East a distance of 71.19 feet along the West line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, the Southwest corner of the said 45.000 acre tract;

THENCE North 89 degrees 38 minutes 12 seconds East a distance of 631.22 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an outside all corner of the said 45.000 acre tract;

THENCE South 00 degrees 50 minutes 08 seconds East a distance of 450.17 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 45.000 acre tract;

THENCE North 89 degrees 24 minutes 40 seconds East a distance of 100.00 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 45.000 acre tract;

THENCE North 00 degrees 50 minutes 08 seconds West a distance of 449.77 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an outside all corner of the said 45.000 acre tract;

THENCE North 89 degrees 38 minutes 14 seconds East a distance of 839.43 feet along the North line of the said 45.000 acre tract and the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 130.000 acre tract;

THENCE South 00 degrees 21 minutes 51 seconds East a distance of 366.14 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 130.000 acre tract;

THENCE North 89 degrees 38 minutes 32 seconds East a distance of 380.02 feet along the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, an outside all corner of the said 130.000 acre tract;

THENCE South 00 degrees 50 minutes 08 seconds East a distance of 2134.21 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, an outside all corner of the said 130.000 acre tract;

THENCE South 89 degrees 23 minutes 15 seconds West a distance of 244.93 feet along the South line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, an outside all corner of the said 130.000 acre tract;

THENCE South 00 degrees 03 minutes 41 seconds West a distance of 1381.52 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, the Southeast corner of the said 130.000 acre tract, lying in the North line of that certain tract of land described as 165.54 acres in the deed from Texarkercies Center to TAC East Holdings Company No. 1, dated July 28, 2015, recorded in Document No. 2015-8269 of the Real Property Records of Bowie County, Texas, to a point for a corner, at an angle point;

THENCE North 89 degrees 38 minutes 24 seconds East a distance of 148.98 feet along the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, on outside all corner of the said 130.000 acre tract, the Northeast corner of the said 45.000 acre tract;

THENCE North 89 degrees 38 minutes 12 seconds East a distance of 631.22 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an outside all corner of the said 45.000 acre tract;

THENCE South 00 degrees 50 minutes 08 seconds East a distance of 450.17 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 45.000 acre tract;

THENCE North 89 degrees 24 minutes 40 seconds East a distance of 100.00 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 45.000 acre tract;

THENCE North 00 degrees 50 minutes 08 seconds West a distance of 449.77 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an outside all corner of the said 45.000 acre tract;

THENCE North 89 degrees 38 minutes 14 seconds East a distance of 839.43 feet along the North line of the said 45.000 acre tract and the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 130.000 acre tract;

THENCE South 00 degrees 21 minutes 51 seconds East a distance of 366.14 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 130.000 acre tract;

THENCE North 89 degrees 38 minutes 32 seconds East a distance of 380.02 feet along the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, an outside all corner of the said 130.000 acre tract;

THENCE South 00 degrees 50 minutes 08 seconds East a distance of 2134.21 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, an outside all corner of the said 130.000 acre tract;

THENCE South 89 degrees 23 minutes 15 seconds West a distance of 244.93 feet along the South line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, an outside all corner of the said 130.000 acre tract;

THENCE South 00 degrees 03 minutes 41 seconds West a distance of 1381.52 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, the Southeast corner of the said 130.000 acre tract, lying in the North line of that certain tract of land described as 165.54 acres in the deed from Texarkercies Center to TAC East Holdings Company No. 1, dated July 28, 2015, recorded in Document No. 2015-8269 of the Real Property Records of Bowie County, Texas, and being more particularly described by metes and bounds as follows:

BEGINNING at a 1/2 inch steel rod found for a corner, capped MTG 101011–00, the Northeast corner of the said 130.000 acre tract;

THENCE North 89 degrees 38 minutes 24 seconds East a distance of 148.98 feet along the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, on outside all corner of the said 130.000 acre tract, the Northeast corner of the said 45.000 acre tract;

THENCE North 89 degrees 38 minutes 12 seconds East a distance of 631.22 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an outside all corner of the said 45.000 acre tract;

THENCE South 00 degrees 50 minutes 08 seconds East a distance of 450.17 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 45.000 acre tract;

THENCE North 89 degrees 24 minutes 40 seconds East a distance of 100.00 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 45.000 acre tract;

THENCE North 00 degrees 50 minutes 08 seconds West a distance of 449.77 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an outside all corner of the said 45.000 acre tract;

THENCE North 89 degrees 38 minutes 14 seconds East a distance of 839.43 feet along the North line of the said 45.000 acre tract and the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 130.000 acre tract;

THENCE South 00 degrees 21 minutes 51 seconds East a distance of 366.14 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 130.000 acre tract;

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THENCE South 00 degrees 03 minutes 41 seconds West a distance of 1381.52 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, the Southeast corner of the said 130.000 acre tract, lying in the North line of that certain tract of land described as 1015 Proposed 5th Street Parcel w/ 81.718 acres in the deed from United States of America to Red River Redevelopment Authority, now known as Texarkercies Center, dated September 1, 2010, recorded in Volume 5898, Page 1 of the Real Property Records in Bowie County, Texas, at the beginning of circular curve to the right;

THENCE in a Northeasterly direction along the arc of the said circular curve a distance of 101.83 feet, with a delta angle of 00 degrees 03 minutes 27 seconds, a radius of 14925.00 feet, a chord bearing of North 89 degrees 58 minutes 55 seconds East, and a chord distance of 101.83 feet to a 1/2 inch steel rod found for a corner, capped MTG ENG, at the end of the said circular curve;

THENCE North 89 degrees 47 minutes 11 seconds West, tangent to the said circular curve, a distance of 1697.38 feet along the South line of the said 130.000 acre tract and the North line of the said 81.718 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, the Southwest corner of the said 130.000 acre tract;

THENCE North 45 degrees 10 minutes 16 seconds East a distance of 71.19 feet along the West line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, the Southwest corner of the said 45.000 acre tract;

THENCE North 89 degrees 38 minutes 12 seconds East a distance of 631.22 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an outside all corner of the said 45.000 acre tract;

THENCE South 00 degrees 50 minutes 08 seconds East a distance of 450.17 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 45.000 acre tract;

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THENCE North 89 degrees 38 minutes 14 seconds East a distance of 839.43 feet along the North line of the said 45.000 acre tract and the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 130.000 acre tract;

THENCE South 00 degrees 21 minutes 51 seconds East a distance of 366.14 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an inside all corner of the said 130.000 acre tract;

THENCE North 89 degrees 38 minutes 32 seconds East a distance of 380.02 feet along the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, an outside all corner of the said 130.000 acre tract;

THENCE South 00 degrees 50 minutes 08 seconds East a distance of 2134.21 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, an outside all corner of the said 130.000 acre tract;

THENCE South 89 degrees 23 minutes 15 seconds West a distance of 244.93 feet along the South line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, an outside all corner of the said 130.000 acre tract;

THENCE South 00 degrees 03 minutes 41 seconds West a distance of 1381.52 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG ENG, the Southeast corner of the said 130.000 acre tract, lying in the North line of that certain tract of land described as 165.54 acres in the deed from Texarkercies Center to TAC East Holdings Company No. 1, dated July 28, 2015, recorded in Document No. 2015-8269 of the Real Property Records of Bowie County, Texas, and being more particularly described by metes and bounds as follows:

BEGINNING at a 1/2 inch steel rod found for a corner, capped MTG 101011–00, the Northeast corner of the said 130.000 acre tract;

THENCE North 89 degrees 38 minutes 24 seconds East a distance of 148.98 feet along the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, on outside all corner of the said 130.000 acre tract, the Northeast corner of the said 45.000 acre tract;

THENCE North 89 degrees 38 minutes 12 seconds East a distance of 631.22 feet along the North line of the said 45.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, an outside all corner of the said 45.000 acre tract;

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THENCE North 45 degrees 10 minutes 16 seconds East a distance of 71.19 feet along the West line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, the Southwest corner of the said 45.000 acre tract;

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THENCE North 89 degrees 38 minutes 24 seconds East a distance of 148.98 feet along the North line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped MTG 101011–00, on outside all corner of the said 130.000 acre tract, the Northeast corner of the said 45.000 acre tract;

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THENCE South 00 degrees 03 minutes 41 seconds West a distance of 1381.52 feet along the East line of the said 130.000 acre tract to a 1/2 inch steel rod found for a corner, capped M

Part A Application Form

Attachment C

Topographic Maps

This attachment includes topographical maps that extend at least one mile beyond the facility boundaries. The facility boundaries are within one mile of the borders of the Hooks Quadrangle map, so a second map (Leary Quadrangle) is included in order to show at least one mile beyond the facility boundaries. The maps included in this attachment are:

- Facility Plot Plan (2 pages)
- USGS Map; Hooks Quadrangle, Texas – Bowie County, 7.5-Minute Series (Full Resolution Map)
- USGS Map; Leary Quadrangle, Texas – Bowie County, 7.5-Minute Series (Full Resolution Map)
- USGS Map; Hooks Quadrangle, Texas – Bowie County, 7.5-Minute Series (Facility Boundaries Shown)
- USGS Map; Leary Quadrangle, Texas – Bowie County, 7.5-Minute Series (Facility Boundaries Shown)

The facility boundaries indicated on the map encompasses approximately 175 acres for the main portion of the facility. The facility plot plans show the locations proposed for the facility's units.

The following items listed in the Part A Application Form do not exist at the facility and are therefore not shown on the topographic map. These items are:

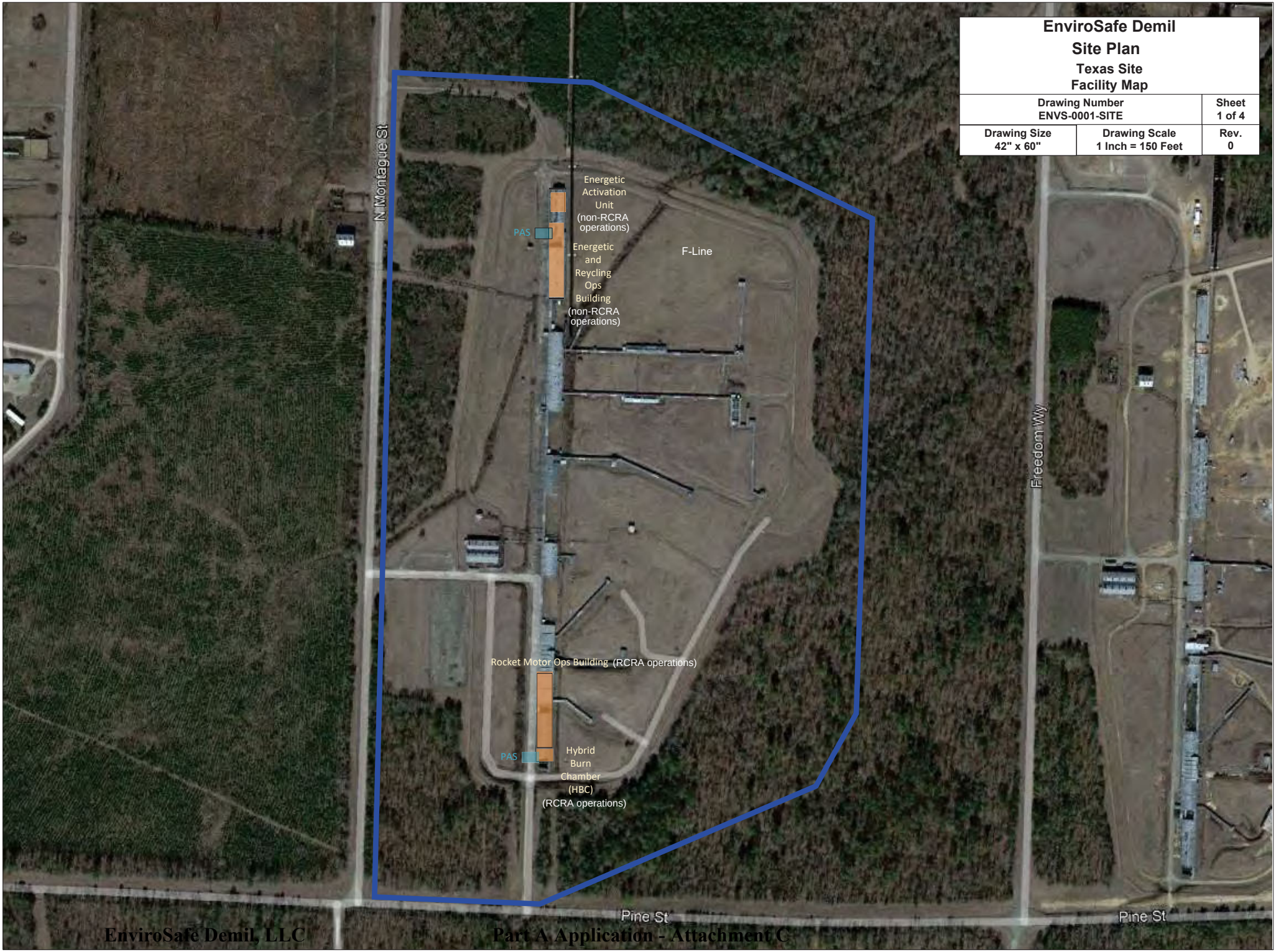
- surface intake and discharge structures
- on-site injection wells where liquids are injected underground
- any known monitor wells and boreholes within the property boundaries of the facility
- wells, springs, other surface water bodies, and drinking water wells

Per §270.14(b)(19)(v), a wind rose (prevailing wind-speed and direction) must also be included with the permit application. The wind rose for the nearest regional airport is included in this attachment.

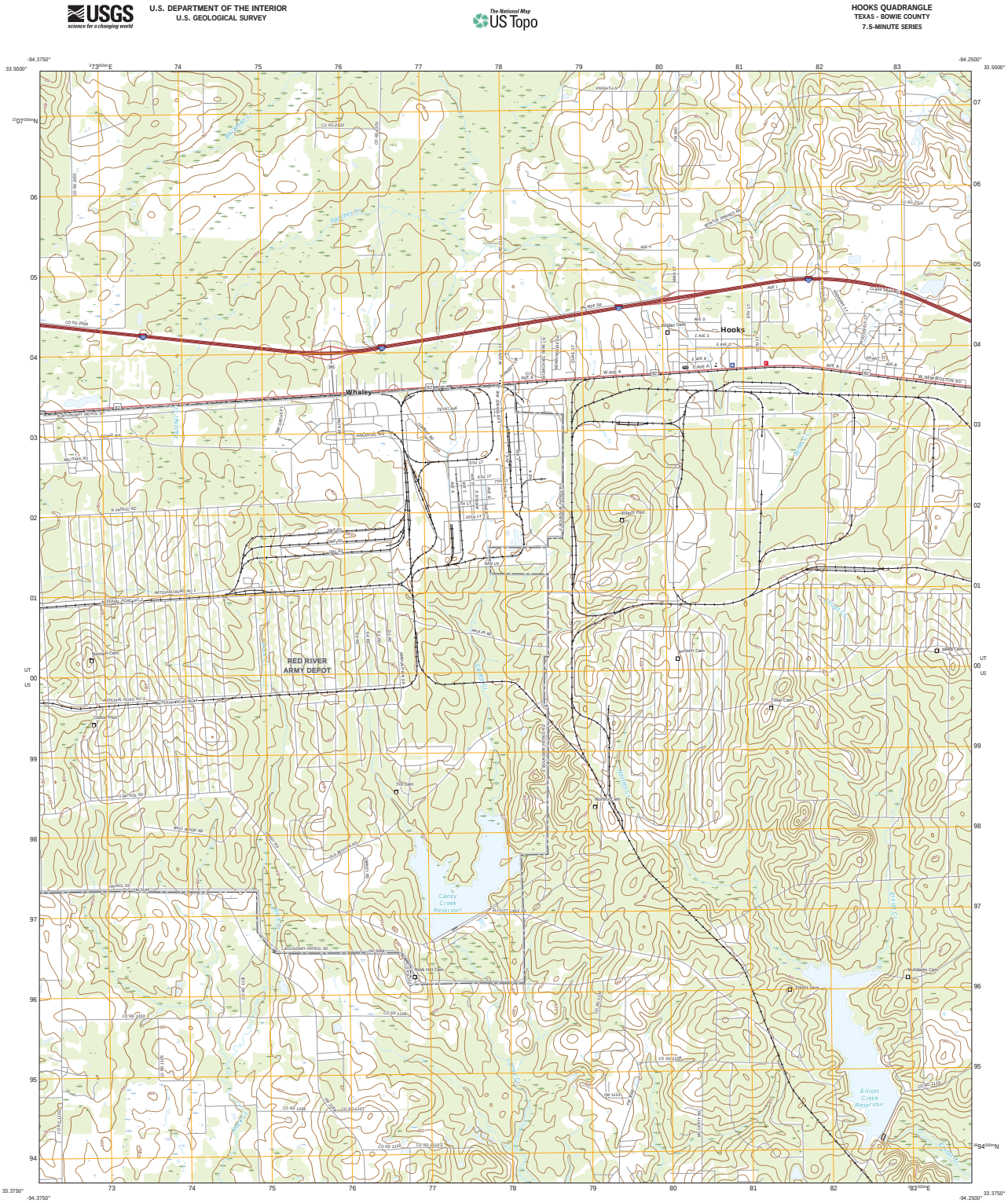
EnviroSafe Demil
Site Plan
Texas Site
Facility Map

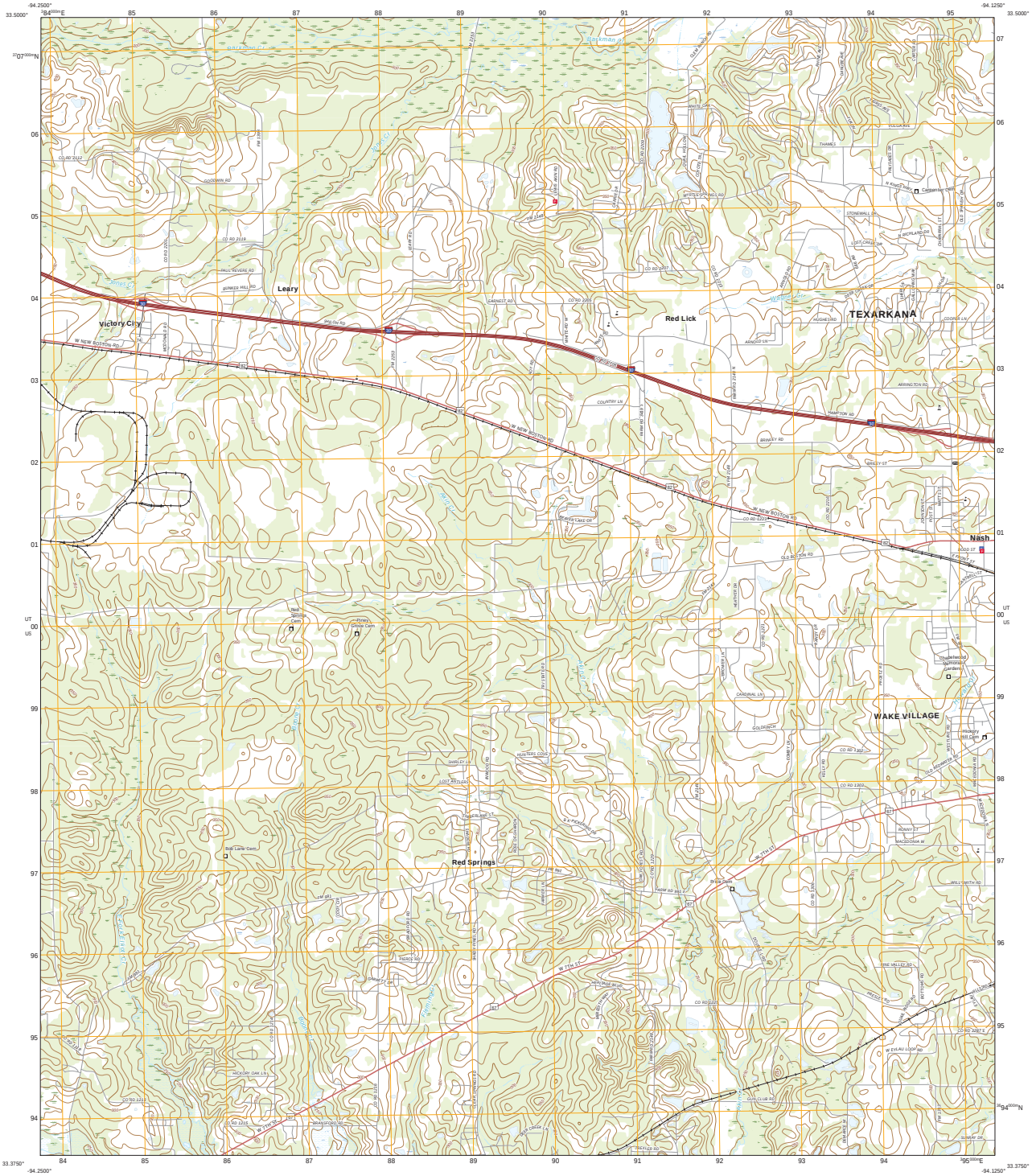
Drawing Number	Sheet
ENVS-0001-SITE	1 of 4

Drawing Size	Drawing Scale	Rev.
42" x 60"	1 Inch = 150 Feet	0



EnviroSafe Demil
Preliminary Site Plan
Texas Site
Facility Map
Drawing Number
ENVS-0001-OVER
Sheet
1 of 1
Drawing Size
42" x 60"
Drawing Scale
1 Inch = 150 Feet
Rev.
0
F-Line
AGM
ECMs


USGS
science for a changing world
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
The National Map
US Topo
HOOKS QUADRANGLE
TEXAS - BOWIE COUNTY
7.5-MINUTE SERIES
Hooks
Whaley
RED RIVER
ARMY DEPOT
Caney
Creek
Reservoir
Elliott
Creek
Reservoir
Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid Universal Transverse Mercator, Zone 15S
This map is not a legal document. Boundaries may be
generalized for this map scale. Private lands within government
reservations may not be shown. Obtain permission before
entering private lands.
Imagery.....NAIP, August 2016 - November 2016
Roads.....U.S. Census Bureau, 2015 - 2018
Names.....GNIS, 1979 - 2018
Hydrography.....National Hydrography Dataset, 2002 - 2018
Contours.....National Elevation Dataset, 2004
Boundaries.....Multiple sources; see metadata file 2016 - 2017
Wetlands.....FWS National Wetlands Inventory 1979 - 2002
UTM GRID AND 2019 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET
SCALE 1:24 000
CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
This map was produced to conform with the
National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18
ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route
1 Daniels Chapel
2 Redbank
3 Barkman
4 New Boston
5 Leary
6 Corley
7 Maud
8 Wright Patman Lake
ADJOINING QUADRANGLES
HOOKS, TX
2019


U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
The National Map US Topo
LEARY QUADRANGLE
TEXAS - BOWIE COUNTY
7.5-MINUTE SERIES
Leary
Victory City
Red Lick
TEXARKANA
Nash
WAKE VILLAGE
Red Springs
Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid Universal Transverse Mercator, Zone 15S
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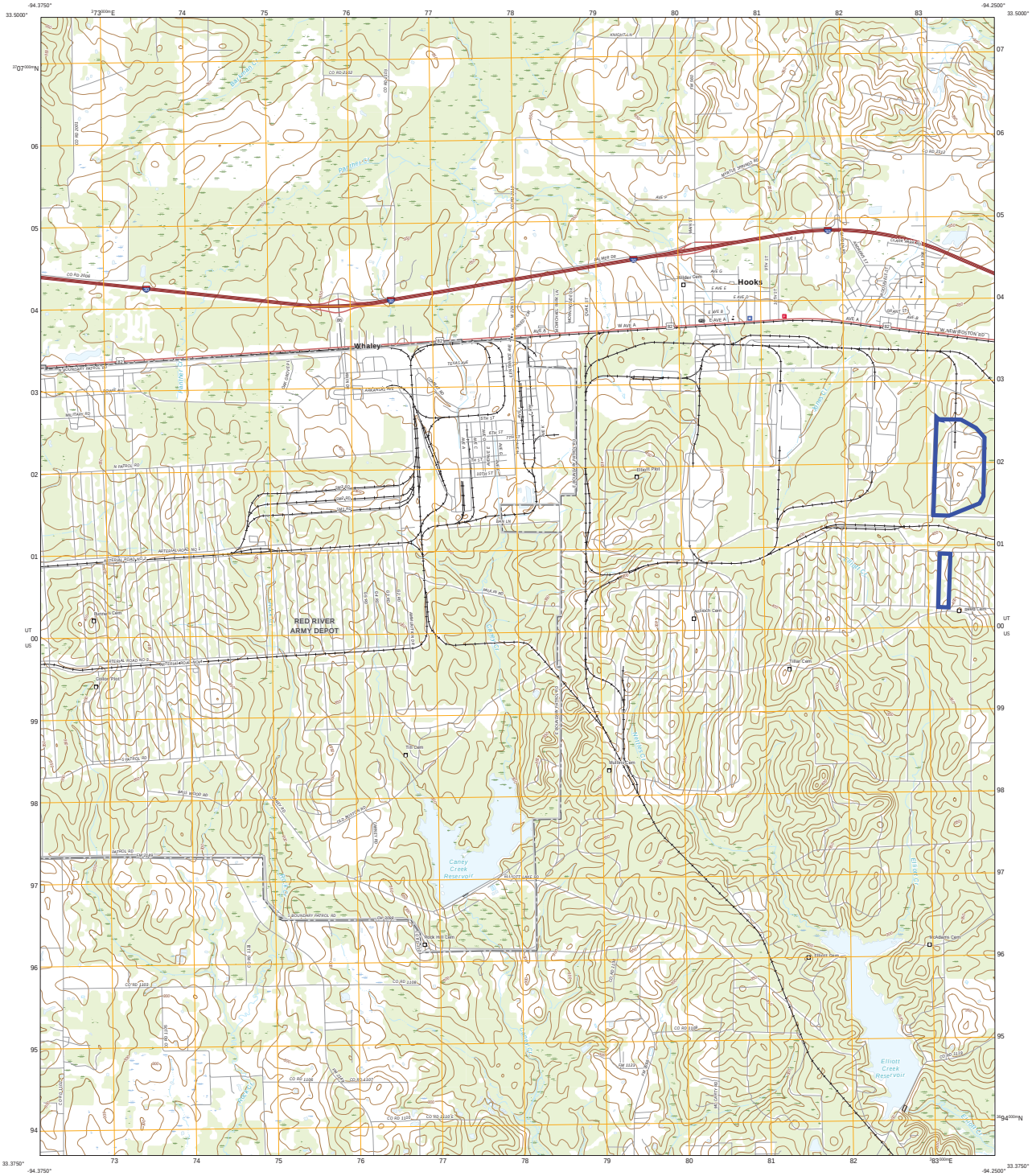
Imagery NAIP, August 2016 - November 2016
Roads U.S. Census Bureau, 2015 - 2018
Names GNIS, 1979 - 2018
Hydrography National Hydrography Dataset, 2002 - 2018
Contours National Elevation Dataset, 2004
Boundaries Multiple sources; see metadata file 2016 - 2017
Wetlands FWS National Wetlands Inventory 1979 - 1995
SCALE 1:24 000
CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
This map was produced to conform with the
National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18
ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route
LEARY, TX
2019


USGS
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Reservoir
Produced by the United States Geological Survey
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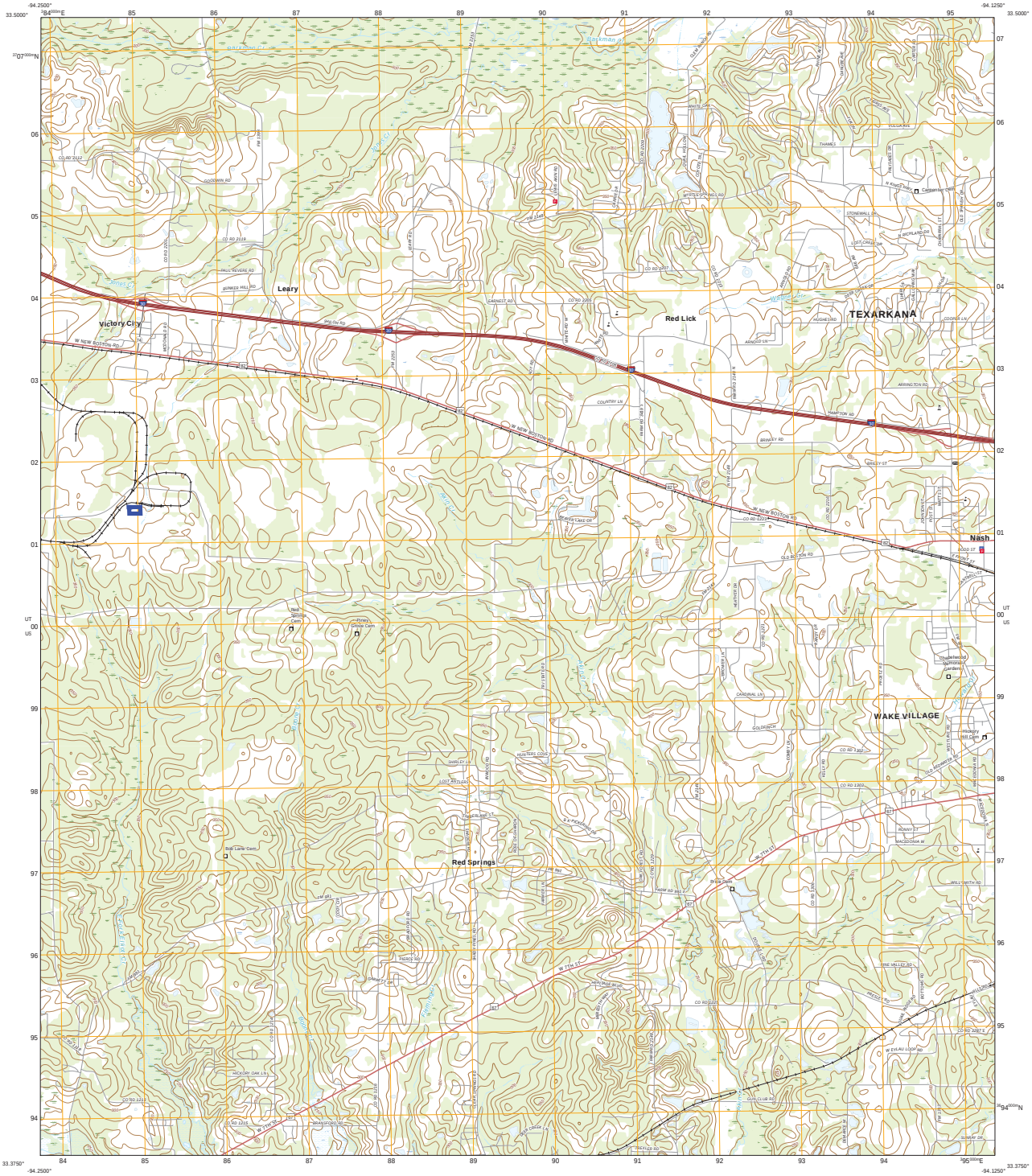
Names GNIS, 1979 - 2018
Hydrography National Hydrography Dataset, 2002 - 2018
Contours National Elevation Dataset, 2004
Boundaries Multiple sources; see metadata file 2016 - 2017
Wetlands FWS National Wetlands Inventory 1979 - 2002
UTM GRID AND 2019 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET
SCALE 1:24 000
CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
This map was produced to conform with the
National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18
ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route
1 Daniels Chapel
2 Redbank
3 Barkman
4 New Boston
5 Leary
6 Corley
7 Maud
8 Wright Patman Lake
ADJOINING QUADRANGLES
HOOKS, TX
2019


U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
The National Map US Topo
LEARY QUADRANGLE
TEXAS - BOWIE COUNTY
7.5-MINUTE SERIES
Leary
Victory City
Red Lick
TEXARKANA
Nash
WAKE VILLAGE
Red Springs
Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid Universal Transverse Mercator, Zone 15S
This map is not a legal document. Boundaries may be
generalized for this map scale. Private lands within government
reservations may not be shown. Obtain permission before
entering private lands.
Imagery NAIP, August 2016 - November 2016
Roads U.S. Census Bureau, 2015 - 2018
Names GNIS, 1979 - 2018
Hydrography National Hydrography Dataset, 2002 - 2018
Contours National Elevation Dataset, 2004
Boundaries Multiple sources; see metadata file 2016 - 2017
Wetlands FWS National Wetlands Inventory 1979 - 1995
UTM GRID AND 2019 MAGNETIC NORTH
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NORTH AMERICAN VERTICAL DATUM OF 1988
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National Geospatial Program US Topo Product Standard, 2011.
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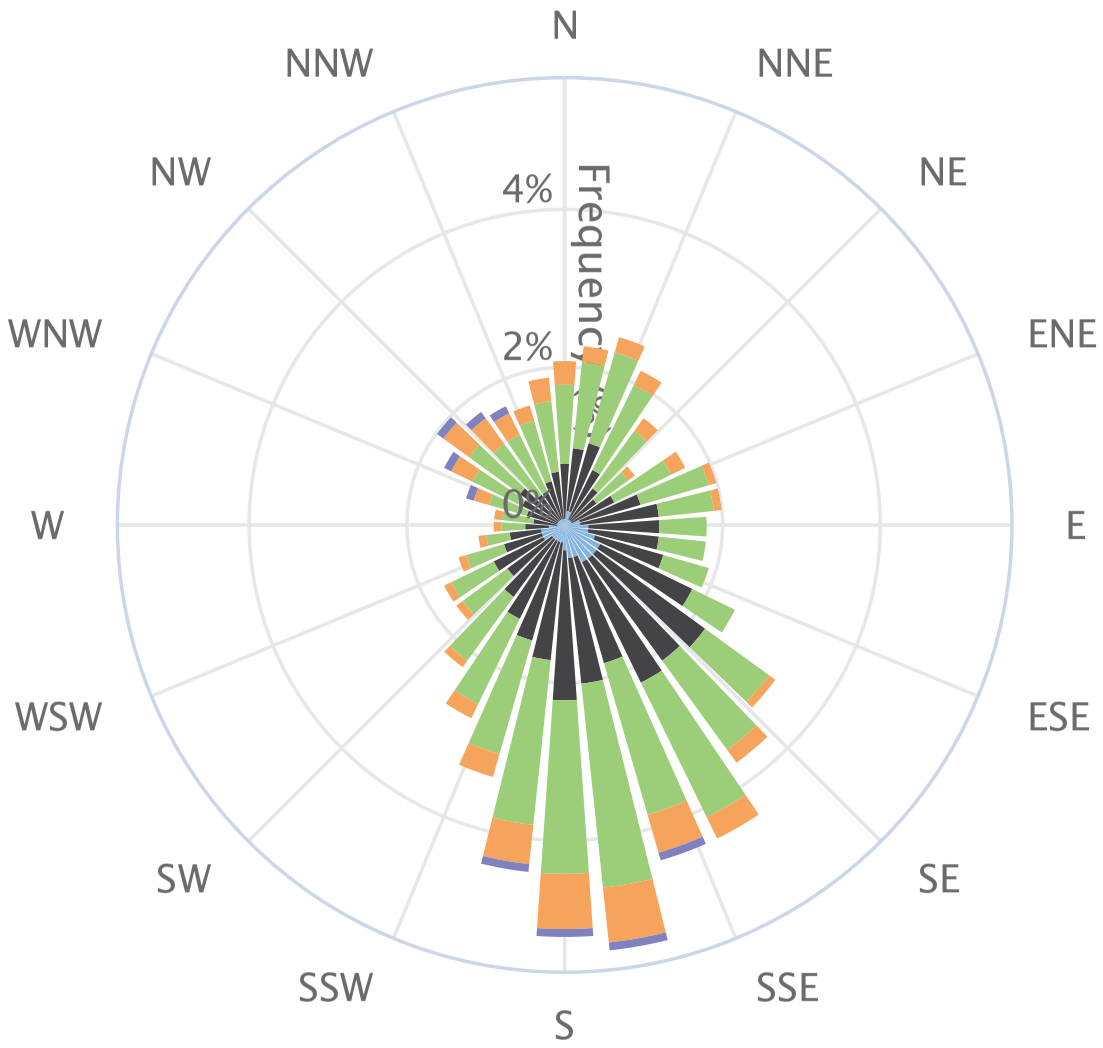
ROAD CLASSIFICATION
Expressway
Local Connector
Secondary Hwy
Local Road
Ramp
4WD
Interstate Route
US Route
State Route
1 Redbank
2 Barkman
3 Ogden
4 Hooks
5 Texarkana
6 Maud
7 Wright Patman Lake
8 Domino
LEARY, TX
2019

SHREVEPORT RGNL AP (LA) Wind Rose

Feb. 1, 2018 – Feb. 1, 2023
Sub-Interval: Jan. 1 – Dec. 31, 0 – 23



Wind Speed (m/s)

- 1.3 – 1.8
- 1.8 – 3.6
- 3.6 – 5.85
- 5.85 – 8.55
- 8.55 – 11.25
- 11.25 – 14.4
- 14.4 – 17.55
- 17.55 – 21.15
- 21.15 –

Click and drag to zoom

Part A Application Form

Attachment D

Photographs

This attachment includes photographs showing the already built storage magazines and an aerial view of the preparation building.

Storage Magazines:

- Above Ground Magazine (AGM)
- Earth Covered Magazines (ECMs)

Preparation Building:

- Rocket Motor Ops Building

This attachment also includes an aerial view showing the site of the processing unit. The processing unit will include an air pollution control system / pollution abatement system (APCS / PAS).

Processing Unit:

- Hybrid Burn Chamber (HBC) – future installation

Main Facility Overview

Part A Application Form, Attachment D
Photographs

Storage Magazines Overview

Part A Application Form, Attachment D
Photographs

Earth Covered Magazines – View from the South

Earth Covered Magazines – View from the East

Earth Covered Magazine – V-13-1 Exterior

Earth Covered Magazine – V-13-2 Exterior

Earth Covered Magazine – V-13-2 Label

Above Ground Magazine – View from the South

Above Ground Magazine – View from the East

Above Ground Magazine – Exterior

Part A Application Form, Attachment D
Photographs

Part A Application Form

Attachment E

Process Descriptions and Process Flow Diagram

This attachment includes a description of the process flow for the energetic materials arriving on-site all the way through their processing in the Hybrid Burn Chamber (HBC). An overall process flow diagram for the facility is included.

More detailed information on specific units can be found in *Appendix V – Engineering Reports* and *Appendix XIII – Confidential Material*. More detailed process flow diagrams are included in *Appendix XIII – Confidential Material.*

Waste Classification Codes
The waste classification codes for the energetic materials can be found in Table III-1 of the Part A Application Form (TCEQ-0283).

Originating Point of Waste
All energetic materials are generated off-site and are shipped to the ESD site (none are generated on-site). These energetic materials come from various government and commercial customers, such as federal, state or local agencies, explosive manufacturing facilities, chemical and specialty industries, military and defense industries, and/or emergency response agencies.

Materials are received and inspected and are then either sent directly to the Rocket Motor Ops Building (for materials being processed in the HBC) or they are sent to the storage magazines that are ~~adjacent~~ proximate to the main facility.

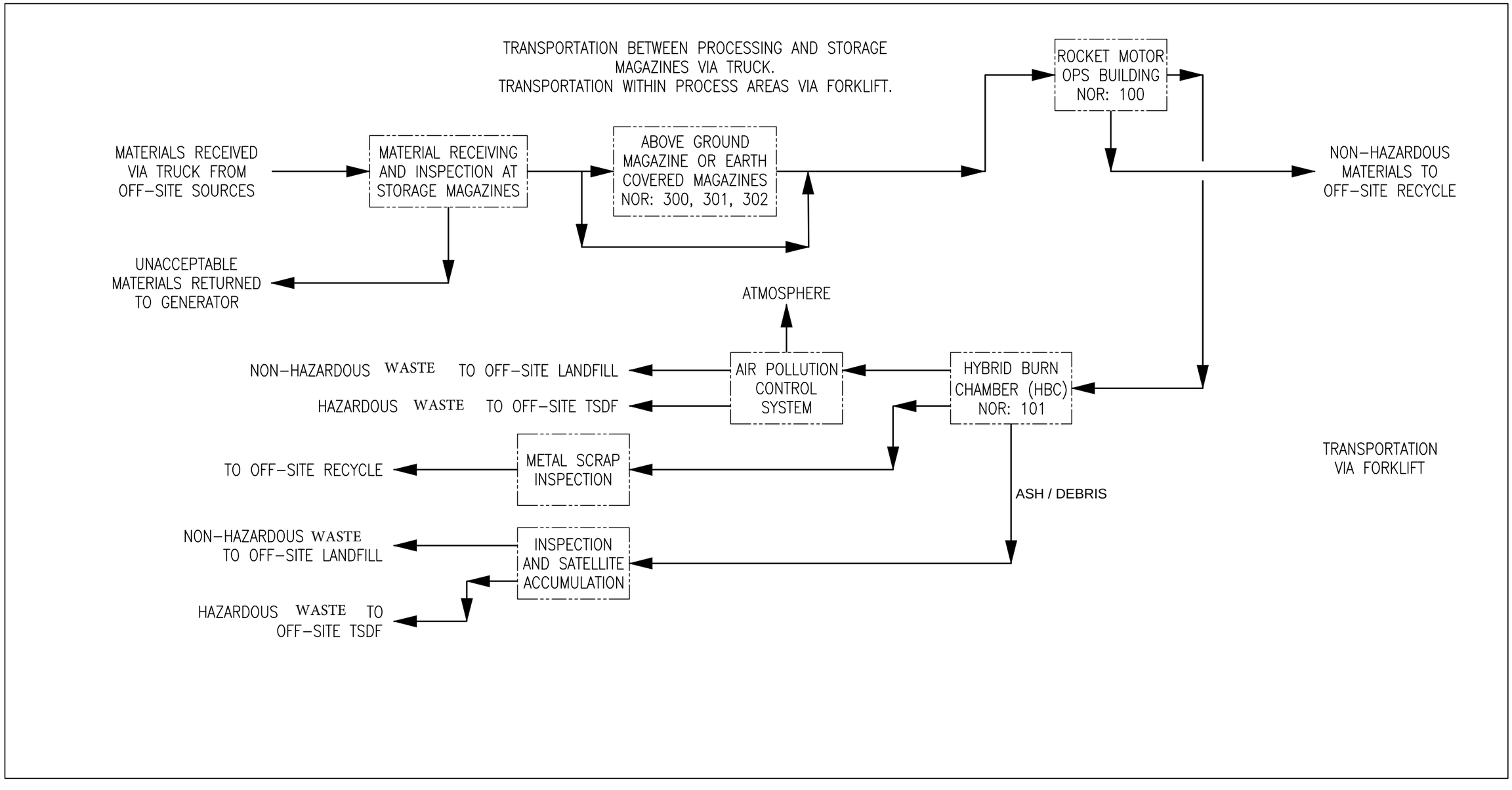
Process Flow for Materials Processed in the Hybrid Burn Chamber (HBC)
The Rocket Motor Ops Building will be used to prepare the materials for processing in the Hybrid Burn Chamber (HBC). The energetic materials are processed in the HBC and the exhaust gases are collected and treated by the air pollution control systems (APCS).

A step-by-step word description of the process flow is shown below:

1. Materials from off-site generators will be transported to ESD via flatbed trucks.
2. Materials will be received and inspected at the storage magazines.
3. Accepted materials will be stored in the storage magazines or will be sent directly to the Rocket Motor Ops Building to be prepared for processing in the HBC.

4. Materials from the storage magazines will be sent to the Rocket Motor Ops Building via flatbed trucks. Ground handling equipment such as a pallet jack and/or forklift will be used to load and unload the materials from the flatbed trucks.
5. Materials will be unpacked and prepared for processing in the Rocket Motor Ops Building.
6. Prepared materials will be placed in cradles and loaded on forklifts to be transported to the HBC.
7. The HBC will process the energetic material and the associated air pollution control equipment will capture emissions created by the HBC process.
8. Large pieces of metal remaining after processing in the HBC will be inspected to ensure no energetic material remains and then will be shipped off-site for disposal or for recycling.
9. Ash and debris from the HBC will be periodically collected and placed into containers. If the waste profile indicates the material is hazardous, the containers of ash and debris will be transported to a central accumulation area where they will be stored for less than 180 days before being shipped off-site to a TSDF. If the material is non-hazardous, it will be shipped off-site to a landfill.
10. Wastes generated from the air pollution control system will be collected in containers. If the waste profile indicates the material is hazardous, the containers will be transported to a central accumulation area where they will be stored for less than 180 days before being shipped off-site for disposal. If the material is non-hazardous, it will be shipped off-site to a landfill.

Process Flow Diagram
EnviroSafe Demil, LLC



Texas Commission on Environmental Quality
Permit Application for Industrial and Hazardous Waste Storage/Processing/Disposal Facility with Compliance Plan

Part B Application

The TCEQ is committed to accessibility. You may request an accessible version of these documents, by contacting the Industrial and Hazardous Waste permits section program at (512)-239-2335 or by email at ihwper@tceq.texas.gov.

Disclaimer:

This document is intended for use in the RCRA Part B application preparation and review process. It contains a screening sheet that will produce a customized Part B application outline that is based on a facility's specific operating characteristics. This screening sheet and application outline are not a substitute for required application materials. This document may omit requirements applicable to the facility and/or include requirements that are not applicable. Please use the knowledge about the facility's operational design and history to ensure that a complete application based on 40 Code of Federal Regulations Part 270 and 30 Texas Administrative Code (TAC) Chapter 305 and Chapter 335 is submitted. Please include any necessary information that may have been mistakenly screened out. If regulatory requirements change during the application process, the TCEQ may request additional information before a permit is issued.

Quick Start Instructions for Part B Application with Screening Tool

Go to screening sheet

View Entire Application

Screening Sheet for Industrial and Hazardous Waste Permitted Facilities.

Please provide a response to all items. **Note: depending on certain selections you make, answers to some questions will automatically default to "No" but some questions will remain to be answered by the user as "Yes" or "No", and if the user does not provide a "Yes" or "No" answer, the application will be generated as if answered "Yes".** It is critical that each response is accurate to ensure retrieval of all applicable application items. If you need to change any response after the initial answer, change the answer and the application will update the application. Print (electronic or physical) a copy of the application materials to create the physical appendix format of your application.

Please answer Questions 1 through 11 and DO NOT leave any questions) unanswered to ensure an complete application.

1.	Is this an application for a compliance plan only?	○ Yes	◉ No
2.	Is this permit for post-closure care only?[1]	○ Yes	◉ No
3.	Is this an application for a compliance plan and post-closure care only?	○ Yes	◉ No
4.	Is this an application for WMU(s) with a compliance plan?[2]	○ Yes	◉ No
5.	Is this an application for WMU(s) with post-closure care?	○ Yes	◉ No
6.	Is this an application for WMU(s), with compliance plan and post-closure care?	○ Yes	◉ No
7.	Is this an application for WMU(s) only?	◉ Yes	○ No
	Any Land Based Units?	○ Yes	◉ No
	Surface Impoundments	○ Yes	◉ No
	Waste Piles	○ Yes	◉ No
	Land Treatment Units	○ Yes	◉ No
	Landfills[3]	○ Yes	◉ No
	Container Storage Areas	◉ Yes	○ No
	Tank and Tank Systems	○ Yes	◉ No
	Incinerators	○ Yes	◉ No
	Boilers/Industrial Furnaces	○ Yes	◉ No
	Drip Pads	○ Yes	◉ No
	Containment Buildings	○ Yes	◉ No
	Miscellaneous Units[4]	◉ Yes	○ No
8.	Is this a new commercial facility?	◉ Yes	○ No
9.	Is this a "One-Stop" application with air provisions?	○ Yes	◉ No
10.	Is this facility military, federal, or state owned?	○ Yes	◉ No
11.	Does the application contain Confidential Materials?	◉ Yes	○ No

Reset All Screening Questions | Jump to Table of Content(s) / Applicable Tables | Generate Application and Save

1 - If "Yes" is indicated for Post-Closure Care only, then all non-land-based units above will default to "No". Additionally if "Yes" is indicated for Post-Closure Care only, then at least one Land-Based Unit must be "Yes."

2 - If "Yes" is indicated for Active Permit Unit(s) with a Compliance Plan, then at least one unit must be "Yes."

3 - Select "Landfills- Yes" for any land-based unit that was closed as a landfill. (Example Surface Impoundment closed s a landfill.)

4 - For Miscellaneous Units, select "yes" and also select "Yes for the appropriate unit types (s) shown above. Address all applicable engineering requirements (e.g., landfill requirements from Section V.G) in Section V.K.

WMU- Waste Management Unit

Table of Contents
EnviroSafe Demil, LLC – RCRA Permit Application
Permit Number 50424

Section	Description	Page
I	General Information	Section I – Page 1
	A. General Information – Table I	Section I – Page 3
	B. TCEQ Core Data Form (Form 10400)	Section I – Page 9
	C. Signature Page	Section I – Page 12
	D. Interim Status Land Disposal Unit(s) Certification (N/A)	Section I – Page 13
	E. List and Map of Adjacent Landowners	Section I – Page 14
II	Facility Siting Criteria	Section II – Page 1
	A. Requirements for Storage or Processing Facilities, Land Treatment Facilities, Waste Piles, Storage Surface Impoundments, and Landfills (N/A)	Section II – Page 9
	B. Additional Requirements for Land Treatment Facilities	RESERVED
	C. Additional Requirements for Waste Piles	RESERVED
	D. Additional Requirements for Storage Surface Impoundments	RESERVED
	E. Additional Requirements for Landfills (and Surface Impoundments Closed as Landfills with wastes in place)	RESERVED
	F. Flooding	Section II – Page 60
	G. Additional Information Requirements	Section II – Page 77
III	Facility Management	Section III – Page 1
	A. Compliance History and Applicant Experience	Section III – Page 6
	B. Personnel Training Plan	Section III – Page 7
	C. Security	Section III – Page 11
	D. Inspection Schedule	Section III – Page 12
	E. Contingency Plan	Section III – Page 21
	F. Emergency Response Plan	Section III – Page 45
IV	Wastes and Waste Analysis	Section IV – Page 1
	A. Waste Management Information	Section IV – Page 3
	B. Waste Managed In Permitted Units	Section IV – Page 4
	C. Sampling and Analytical Methods	Section IV – Page 5
	D. Waste Analysis Plan	Section IV – Page 6
V	Engineering Reports	Section V – Page 1
	A. General Engineering Reports	Section V – Page 10
	B. Container Storage Areas	Section V – Page 18
	C. Tanks and Tank Systems	RESERVED
	D. Surface Impoundments	RESERVED
	E. Waste Piles	RESERVED
	F. Land Treatment Units	RESERVED
	G. Landfills	RESERVED
	H. Incinerators	RESERVED

RESERVED means this topic is not applicable.

Table of Contents
EnviroSafe Demil, LLC – RCRA Permit Application
Permit Number 50424 (Continued)

Section	Description	Page
	I. Boilers and Industrial Furnaces	RESERVED
	J. Drip Pads	RESERVED
	K. Miscellaneous Units	Section V – Page 54, 62
	L. Containment Buildings	RESERVED
VI	Geology Report	Section VI – Page 1
	A. Geology and Topography	Section VI – Page 6
	B. Facility Groundwater	RESERVED
	C. Exemption from Groundwater Monitoring for an Entire Facility	RESERVED
	D. Unsaturated Zone Monitoring	RESERVED
VII	Closure and Post-Closure Plans	Section VII – Page 1
	A. Closure	Section VII – Page 4
	B. Closure Cost Estimate (including contingent closure) [30 TAC 335.178, 40 CFR 264.142]	Section VII – Page 26
	C. Post-closure	RESERVED
	D. Post-closure Cost Estimate [40 CFR 264.144]	RESERVED
	E. Closure and Post-Closure Cost Summary	Section VII – Page 30
VIII	Financial Assurance	Section VIII – Page 1
	A. Financial Assurance Information Requirements for all Applicants (30 TAC Chapter 37, Subchapter P, 305.50(a)(4)(A-E), 335.152(a)(6) and 335.179)	Section VIII – Page 8, Section VIII – Page 9
	B. Applicant Financial Disclosure Statements for a new permit, permit amendment, or permit modification, or permit renewal (30 TAC 305.50(a)(4))	Section VIII – Page 8, Section VIII – Page 13
	C. Information for Applicants Subject to Financial Capability Requirements	Section VIII – Page 8, Section VIII – Page 13
IX	Releases from Solid Waste Units and Corrective Action	Section IX – Page 1
	A. Preliminary Review Checklists	Section IX – Page 5
	B. Preliminary Review Facility Checklist	Section IX – Page 6
	C. Preliminary Review Unit Checklist	Section IX – Page 8
	D. Appendices to Preliminary Review (PR)	Section IX – Page 10
	E. Preliminary Review Submittal Format	N/A
X	Air Emission Standards	Section X – Page 1
	A. Process Vents	Section X – Page 5
	B. Equipment Leak	Section X – Page 6
	C. Tanks, Surface Impoundments, and Containers	Section X – Page 7
	D. "One-Stop" Permits	RESERVED
XI	Compliance Plan	RESERVED
	Figure 1	RESERVED
	Figure 2	RESERVED

RESERVED means this topic is not applicable.

Table of Contents
EnviroSafe Demil, LLC – RCRA Permit Application
Permit Number 50424 (Continued)

Section	Description	Page
	Figure 3	RESERVED
	A. Site Specific Information	RESERVED
	B. Hazardous Constituents In Groundwater and Groundwater Protection Standards (GWPSs)	RESERVED
	C. Compliance Monitoring Program	RESERVED
	D. Correction Action Program	RESERVED
	E. Cost Estimates for Financial Assurance	RESERVED
	CP Attachment A - Maps	RESERVED
	CP Attachment B – Well Design and Construction Specifications	RESERVED
	CP Attachment C – Sampling and Analysis Plan	RESERVED
XII	Hazardous Waste Permit Application Fee	Section XI – Page 1
XIII	Confidential Material	Section XIII – Page 1
	Additional Information Submitted with the Part B Application	
	Pre-Application Public Meeting	Additional Information – Page 1
	Information on Compact Disks	Additional Information – Page 6
	Electronic Mailing List of Adjacent Landowners	Compact Disk
	RCRA Part B Administrative and Technical Evaluation Electronic Checklist (Form #00136)	Compact Disk

RESERVED means this topic is not applicable.

Texas Commission on Environmental Quality
Industrial & Hazardous Waste Part B Permit Application

I. General Information

Provide all Part B responsive information in Appendix I. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

Provide responsive information in Appendix I.

a. Complete Table I - General Information

Table I – General Information is Included in Appendix I.

b. For all incoming New, Renewal, Class 3 Permit Modification, and Major Amendment applications, the TCEQ requires that a Core Data Form (CDF) be submitted whether or not a change has occurred in the previously submitted form.

For Minor Amendment, Class 1, Class 1[1] , and Class 2 Permit Modification applications, the TCEQ requires that the CDF be only submitted if a change in any information in the previously submitted form has occurred at the time of the application submittal.

For more information regarding the Core Data Form, call (512) 239 1575 or go to the TCEQ Web site at https://www.tceq.texas.gov/permitting/central_registry/guidance.html

The Core Data Form is included in Appendix I.

c. Signature on Application

It is the duty of the operator to submit an application for a permit. The person who signs the application form will often be the operator himself; when another person signs on behalf of the applicant, his title or relationship to the applicant will be shown. In all cases, the person signing the form must be authorized to do so by the applicant. An application submitted by a corporation must be signed by a responsible corporate officer such as a president, secretary, treasurer, vice president, or by his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the activity described in the form originates. In the case of a partnership or a sole proprietorship, the application must be signed by a general partner or the proprietor, respectively. In the case of a municipal, state, federal, or other public facility, the application must be signed by a principal executive officer, a ranking elected official, or another duly authorized employee. A person signing an application on behalf of an applicant must provide notarized proof of authorization.

d. Complete Interim Status Land Disposal Unit(s) Certification, as applicable

Not Applicable.

e. Submit List and Map of Adjacent Landowners List, as applicable.

The List and Map of Adjacent Landowners is included in Appendix I.

Section I – General Information

Appendix I – General Information

This section of the permit application includes the following:

- Table I – General Information
- Table I.1 – Description of Proposed Application Changes
- TCEQ Core Data Form (updated since last submittal)
- Signature Page
- List and Map of Adjacent Land Owners

Table I: General Information

A. Applicant: Facility Operator (or Facility Owner & Operator, if same)

Name[1]	EnviroSafe Demil, LLC
Address	401 Demil Way
City, State	Hooks, Texas
Zip Code	75561-0019
Telephone Number	206-999-8684 (TJ Ogden)
Alternate Telephone Number	360-480-9320 (Michael Wentz)
Fax:	
TCEQ Solid Waste Registration No.	98470
EPA I.D. No.	TXR000086289
Permit No.	50424
County	Bowie
Regulated Entity Name	EnviroSafe Demil, LLC
Regulated Entity Reference Number (RN)	RN 111572442
Customer Name	EnviroSafe Demil, LLC
Customer Reference Number:	CN606060028
Charter Number[2]	805003546
Previous or Former Names of the Facility (if applicable)	N/A

B. Facility Owner: Identify the Facility Owner if different than the Facility Operator[3]

☒ Same as Facility Operator?

Name	**Main Facility Owner Name** EnviroSafe Demil, LLC
Address	401 Demil Way
City, State	Hooks, Texas
Zip Code	75561-0019
Telephone Number	206-999-8684 (TJ Ogden)
Alternate Telephone Number	360-480-9320 (Michael Wentz)
Fax:	

Above Ground Magazine and Earth Covered Magazine Owner Name
TAC East Holdings Co. No1
107 Chapel Lane
New Boston, Texas 75570

Roadways Owner Name
TexAmerica's Center
107 Chapel Lane
New Boston, Texas 75570

C. Facility Contact

1. Persons or firms who will act as primary contact:

Name, Title:	TJ Ogden, CEO & Founder
Address	401 Demil Way
City, State:	Hooks, TX
Zip Code	75561-0019
Telephone Number	206-999-8684
Alternate Telephone Number	
E-mail	[redacted]
Fax:	

Persons or firms who will act as primary contact (if more than one):

Name, Title:	
Address	
City, State:	
Zip Code	
Telephone Number	
Alternate Telephone Number	
E-mail	
Fax:	

Remove Last Primary Contact Fields | Add Additional Primary Contact Fields

2. Agent in Service or Agent of Service (if you are an out-of-state company)[4]:

Name, Title:	Michael Wentz, President
Address	401 Demil Way
City, State:	Hooks, TX
Zip Code	75561-0019

3. Individual responsible for causing notice to be published:

Name:	Michael Wentz, President
Address	401 Demil Way
City, State:	Hooks, TX
Zip Code	75561-0019
Telephone Number	360-480-9320
Alternate Telephone Number	
E-mail	[redacted]
Fax:	

4. Public place in county where application will be made available[5]:

Name	Texarkana Public Library
Address	600 W 3rd Street
City, State	Texarkana, Texas

Zip Code 75501

D. Application Type and Facility Status

1. Application Type

- ☒ Permit
- ☒ New
- ☐ Interim status
- ☐ Renewal
- ☐ RD&D
- ☐ Compliance Plan
- ☐ Amendment
- ☐ Major
- ☐ Minor
- ☐ Modification
- ☐ Class 3
- ☐ Class 2
- ☐ Class 1[1]
- ☐ Class 1

2. Part of a Consolidated Permit Processing request? [30 TAC Chapter 33] No

3. Does the application contain confidential material?[6] Yes

4. Facility Status. Check all that apply

- ☒ Proposed
- ☐ Existing
- ☒ On-Site
- ☐ Off-Site
- ☒ Commercial
- ☐ Recycle
- ☐ Land Disposal
- ☐ Areal or capacity expansion
- ☐ Compliance plan

5. Is the facility within the Coastal Management Program boundary? **No**

6. Description of Application Changes

Complete Table I.1 - Description of Proposed Application Changes.

Note: List all changes requested in Table I.1. Unlisted requests risk remaining unaddressed or possibly denied if brought to the permit application reviewer's attention at a later time.

7. Total acreage of the facility being permitted: **175**

8. Identify the name of the drainage basin and segment where the facility is located

River Segment Jones Creek

River Basin Red River Basin

E. Facility Siting Summary:

Is the facility located or proposed to be located:

1. Within a 100-year floodplain?	No
2. in wetlands?	No
3. In the critical habitat of an endangered species of plant or animal?	No
4. On the recharge zone of a sole-source aquifer?	No
5. In an area overlying a regional aquifer?	No
6. Within 0.5 mile (2,640 feet) of an established residence, church, school, day care center, surface water body used for a public drinking water supply, or dedicated public park?[7] [30 TAC 335.202] If Yes: the TCEQ shall not issue a permit for this facility.	No
7. In an area in which the governing body of the county or municipality has prohibited the processing or disposal of municipal hazardous waste or industrial solid waste? If Yes: provide a copy of the ordinance or order.	No

F. Wastewater and Stormwater Disposition

1. Is the disposal of any waste to be accomplished by a waste disposal well at this facility?	No
If Yes: List WDW Permit No(s):	
2. Will any point source discharge of effluent or rainfall runoff occur as a result of the proposed activities?	No

3. If Yes, is this discharge regulated by a TPDES or TCEQ permit?

☐ Yes

TCEQ Permit No.

TPDES Permit No.

☐ No

Date TCEQ discharge permit application filed

Date TPDES discharge permit application filed:

G. Information Required to Provide Notice

State Officials List [30 TAC 39]

State Senator	Senator Bryan Hughes Texarkana College 2500 N Robinson Road, Suite 190 Texarkana, Texas 75599 (903) 223-7958 [redacted]

State Representative	VanDeaver, Gary Bowie County Courthouse 710 James Bowie Drive New Boston, Texas 75570 (903) 628-0361 [redacted]
Local Officials List [30 TAC 39]	
Mayor	Mayor Marc Reiter 603 E Ave A Hooks, Texas 75561 (903) 547-2261 [redacted]
Local Health Authority	N/A
County Judge	Judge Bobby Howell 710 James Bowie Drive New Boston, Texas 75570 (903)628-6718 [redacted]
County Health Authority	Texarkana-Bowie County Family Health Center Robby Robertson, Director 902 West 12th, Texarkana, Texas 75501 (903) 798-3999 [redacted]
Based on the questions in the Bilingual Notice Instructions for this form, are you required to make alternate (Bilingual) notice for this application?	No
Bilingual Language(s):	Not Applicable
TCEQ Core Data Form Submitted?(see Section I Instructions, Item b.)	Yes
Has any information changed on the TCEQ Core Data Form since the last submittal?	Yes
Signature on Application Submitted? (see Section I Instructions, Item c)	Yes

1. Individual, Corporation, or Other Legal Entity Name - must match the Secretary of State's database records for the Facility)
2. If the application is submitted on behalf of a corporation, please identify the Charter Number as recorded with the Office of the Secretary of State for Texas.
3. The operator has the duty to submit an application if the facility is owned by one person and operated by another [30 TAC 305.43(b)]. The permit will specify the operator and the owner who is listed on Part A of this application [Section 361.087, Texas Health and Safety Code].
4. If the application is submitted by a corporation or by a person residing out of state, the applicant must register an Agent in Service or Agent of Service with the Texas Secretary of State's office and provide a complete mailing address for the agent. The agent must be a Texas resident.

5. For applications for new permits, renewals, major amendments and Class 3 modifications a copy of the administratively complete application must be made available at a public place in the county where the facility is, or will be, located for review and copying by the public. Identify the public place in the county (e.g., public library, county court house, city hall), including the address, where the application will be made available for review and copying by the public.
6. For confidential information cross-reference the confidential material throughout the application to Section XIII: Confidential Material, and submit as a separate Section XIII document or binder conspicuously marked "CONFIDENTIAL".
7. Use only for a new commercial hazardous waste management facility or areal expansion of an existing commercial hazardous waste management facility or unit of that facility as defined in 30 TAC 335.202

Save Form Print Form

Table I.1-Description of Proposed Application Changes

Permit/Compliance Plan Application Appendix/Section	Brief Description of Proposed Change	Modification or Amendment Type	Supporting Regulatory Citation
New Permit	New Permit	N/A - New Permit	See information in new permit application

TCEQ Use Only

TCEQ Core Data Form

For detailed instructions on completing this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission (*If other is checked please describe in space provided.*)

☒ New Permit, Registration or Authorization (*Core Data Form should be submitted with the program application.*)

☐ Renewal *(Core Data Form should be submitted with the renewal form)* ☐ Other

u

2. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	**3. Regulated Entity Reference Number** *(if issued)*
CN 606060028		**RN 111572442**

SECTION II: Customer Information

4. General Customer Information	**5. Effective Date for Customer Information Updates** (mm/dd/yyyy)	9/26/2022

☐ New Customer ☒ Update to Customer Information ☐ Change in Regulated Entity Ownership

☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).

6. Customer Legal Name *(If an individual, print last name first: eg: Doe, John)* *If new Customer, enter previous Customer below:*

EnviroSafe Demil, LLC

7. TX SOS/CPA Filing Number	**8. TX State Tax ID** (11 digits)	**9. Federal Tax ID** (9 digits)	**10. DUNS Number** *(if applicable)*
805003546	32089250859	352318751	

11. Type of Customer: ☐ Corporation ☐ Individual Partnership: ☐ General ☒ Limited

Government: ☐ City ☐ County ☐ Federal ☐ Local ☐ State ☐ Other ☐ Sole Proprietorship ☒ Other: LLC

12. Number of Employees

☒ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher

13. Independently Owned and Operated?

☒ **Yes** ☐ **No**

14. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check one of the following*

☐ Owner ☐ Operator ☒ Owner & Operator ☐ Other:

☐ Occupational Licensee ☐ Responsible Party ☐ VCP/BSA Applicant

15. Mailing Address:	EnviroSafe Demil, LLC						
	401 N Montague Street						
	City	Hooks	**State**	TX	**ZIP**	75561	**ZIP + 4**

16. Country Mailing Information *(if outside USA)*	**17. E-Mail Address** *(if applicable)*
	[redacted]

18. Telephone Number	**19. Extension or Code**	**20. Fax Number** *(if applicable)*

(206) 999-8684		( ) -

SECTION III: Regulated Entity Information

21. General Regulated Entity Information *(If 'New Regulated Entity" is selected, a new permit application is also required.)*

☐ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated, in order to meet TCEQ Core Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name *(Enter name of the site where the regulated action is taking place.)*

EnviroSafe Demil, LLC

23. Street Address of the Regulated Entity: ***(No PO Boxes)***	EnviroSafe Demil, LLC							
	401 N Montague Street							
	City	Hooks	**State**	TX	**ZIP**	75561	**ZIP + 4**	
24. County	Bowie							

If no Street Address is provided, fields 25-28 are required.

25. Description to Physical Location:					
26. Nearest City			**State**		**Nearest ZIP Code**
New Boston			TX		75570

Latitude/Longitude are required and may be added/updated to meet TCEQ Core Data Standards. (Geocoding of the Physical Address may be used to supply coordinates where none have been provided or to gain accuracy).

27. Latitude (N) In Decimal:			**28. Longitude (W) In Decimal:**		
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
33	27	20	94	16	42

29. Primary SIC Code (4 digits)	**30. Secondary SIC Code** (4 digits)	**31. Primary NAICS Code** (5 or 6 digits)	**32. Secondary NAICS Code** (5 or 6 digits)
4953		332993 To thermally neutralize explosives and energetic materials	562211

33. What is the Primary Business of this entity? *(Do not repeat the SIC or NAICS description.)*

To thermally neutralize explosives and energetic materials

34. Mailing Address:	**EnviroSafe Demil, LLC**							
	401 N Montague Street							
	City	**Hooks**	**State**	**TX**	**ZIP**	**75561**	**ZIP + 4**	
35. E-Mail Address:	**tjogden@envirosafedemil.com**							

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(206) 999-8684		( ) -

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☐ Edwards Aquifer	☐ Emissions Inventory Air	☒ Industrial Hazardous Waste
☐ Municipal Solid Waste	☐ New Source Review Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS
☐ Sludge	☐ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
☐ Voluntary Cleanup	☐ Wastewater	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

SECTION IV: Preparer Information

40. Name:	TJ Ogden	41. Title:	CEO & Founder

42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(206) 999-8684		( ) -	[redacted]

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	EnviroSafe Demil, LLC	Job Title:	President
Name *(In Print)*:	Michael Wentz	Phone:	(430) 200- 2296
Signature:	[signature]	Date:	12/3/2024

Signature Page

I, Michael Wentz, President,
(Operator) *(Title)*

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: _____ Date: 12/3/2024

To be completed by the Operator if the application is signed by an Authorized Representative for the Operator

I, _____, hereby designate _____
[Print or Type Name] *[Print or Type Name]*

as my representative and hereby authorize said representative to sign any application, submit additional information as may be requested by the Commission; and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my authorized representative in support of the application, and for compliance with the terms and conditions of any permit which might be issued based upon this application.

_____
Printed or Typed Name of Operator or Principal Executive Officer

_____
Signature

SUBSCRIBED AND SWORN to before me by the said _____
On this 3rd day of December, 2024
My commission expires on the 31st day of August, 2025

Notary Public in and for Bowie County, Texas
*[**Note**: Application Must Bear Signature & Seal of Notary Public]*

PAMELA ANN RICHARDSON
NOTARY PUBLIC
ID# 1030415-5
State of Texas
Comm. Exp. 08-31-2025

Pamela Ann Richardson

Interim Status Land Disposal Unit(s) Certification

For all land disposal units managing wastes which are newly listed or identified as hazardous wastes, the following certification must be executed by or on the date 12 months after the effective date of the rule identifying or listing the waste as hazardous. If the operator fails to certify compliance with these requirements, the operator shall lose authority to operate under interim status. [40 CFR 270.73(d)]

I,_____, _____
(operator) *(title)*

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 the submitted information is true, accurate and complete.

I further certify that in accordance with Section 3005(e)(3) of the Resource Conservation and Recovery Act, as amended, the subject land disposal unit(s) are in compliance with all applicable groundwater monitoring and financial responsibility requirements of 30 TAC Sections 335.112, 335.116, and 335.117. I am aware there are significant penalties for submitting false information, including the possibility of civil penalty, criminal fines, and imprisonment.

Signature:_____ Date: _____

Not Applicable

Section I – General Information

Appendix I.E - List and Map of Adjacent Landowners

Landowners Cross-Referenced to Map

Adjacent Landowners List

The persons identified below would be considered as affected persons.

1. TEXAMERICAS CENTER PROPERTIES
   107 CHAPEL LANE
   NEW BOSTON TX 75570

2. ISONOVA TECHNOLOGIES
   180 OAK TREE
   HOOKS TX 75561

3. EXPAL USA
   690 N ELLIS
   HOOKS TX 75561

4. EXPANSION INDUSTRIES
   777 FREEDOM WAY
   HOOKS TX 75561

5. RED RIVER ARMY DEPOT
   100 JAMES CARLOW DRIVE
   TEXARKANA TX 75507

II. Facility Siting Criteria

Provide all Part B responsive information in Appendix II. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

For all new hazardous waste management facilities or areal expansions of existing hazardous waste management facilities provide a report which includes all applicable information regarding Unsuitable Site Characteristics found in 30 TAC Chapter 335, Subchapter G. The report must address each requirement applicable to the type of activity submitted in the application. Reference specific rule numbers whenever possible. Supporting information may be cross-referenced to other parts of this application such as Section V - Engineering Report or Section VI - Geology Report, but information submitted in previous applications must be fully reproduced herein. In addition, provide the information in Table II, as applicable.

For permit renewals provide a report which includes all applicable information regarding Unsuitable Site Characteristics found in 30 TAC Chapter 335, Subchapter G. In addition, provide the information in Table II, as applicable. The applicant may resubmit the information submitted with the original permit application provided this information has not changed. For a renewal this information is necessary to ensure a complete application is received.

For capacity expansions of existing facilities, please provide information in Table II, as applicable. Please note however, that additional technical information may be requested to address any facility siting characteristics noted in Table I, under Facility Siting Summary.

> **NOTE:** The standards contained in §335.204(a)(6) - (9), (b)(7) - (12), (c)(6) - (11), (d)(6) - (11), and (e) (8) - (13) are not applicable to facilities that have submitted a notice of intent to file a permit application pursuant to §335.391 of this title (relating to Pre-Application Review) prior to May 3, 1988, or to facilities that have filed permit applications pursuant to §335.2(a) of this title which were submitted in accordance with Chapter 305 of this title and that were declared to be administratively complete pursuant to §281.3 of this title (relating to Initial Review) prior to May 3, 1988.[30 TAC 335.201(b)]

A. Requirements for Storage or Processing Facilities, Land Treatment Facilities, Waste Piles, Storage Surface Impoundments, and Landfills.

Complete Table II.A-Requirements for Storage or Processing Facilities, Land Treatment Facilities, Waste Piles, Storage Surface Impoundments, and Landfills.

Table II.A is included in Appendix II.

B. Additional Requirements for Land Treatment Facilities [30 TAC 335.204(b)]

Complete Table II.B.-Additional Requirements for Land Treatment Facilities [30 TAC 335.204(b)

Table II.B is included in Appendix II. This table is N/A because there are no land treatment facilities.

C. Additional Requirements for Waste Piles [30 TAC 335.204(c)]

Complete Table II.C.-Additional Requirements for Waste Piles [30 TAC 335.204(c)]

Table II.C is included in Appendix II. This table is N/A because there are no waste piles.

D. Additional Requirements for Storage Surface Impoundments [30 TAC 335.204(d)]

Complete Table II.D.- Additional Requirements for Storage Surface Impoundments [30 TAC 335.204(d)]

Table II.D is included in Appendix II. This table is N/A because there are no surface impoundments.

E. Additional Requirements for Landfills (and Surface Impoundments Closed as Landfills with wastes in place)

Complete Table II.E. - Additional Requirements for Landfills (and Surface Impoundments Closed as Landfills with wastes in place)

Table II.E is included in Appendix II. This table is N/A because there are no landfills or surface impoundments closed and landfills with wastes in place.

F. Flooding

Information addressing the following items is included in Appendix II and in Appendix II.F – Flooding. The facility is not located within a 100-year floodplain.

1. Identify whether the facility is located within a 100-year flood plain [40 CFR 270.14(b)(11)(iii)]. This identification must indicate the source of data for such determination and include a copy of relevant documentation (e.g., flood maps, if used and/or calculations). The boundaries of the hazardous waste management facility must be shown on the flood plain map. If the facility is not subject to inundation as a result of a 100-year flood event, indicate that the facility is not within the 100-year flood plain, and do not complete the remainder of the Flooding section in Table II. An applicant for a proposed hazardous waste landfill, areal expansion of a hazardous waste landfill, or a commercial hazardous waste land disposal unit may not rely solely on flood plain maps prepared by the Federal Emergency Management Agency (FEMA) or a successor agency for this determination.

2. If the facility is located within the 100-year flood plain the applicant must provide information detailing the specific flooding levels and other events (e.g., Design Hurricane projected by Corps of Engineers) which impact the flood protection of the facility. Information shall also be provided identifying the 100-year flood level and any other special flooding factors (e.g., wave action) which must be considered in designing, construction, operating, or maintaining the facility to withstand washout from a 100-year flood.

3. State whether any flood protection devices exist at the facility (e.g., flood walls, dikes, etc.), designed to prevent washout from the 100-year flood.

   a. **If Yes**: provide in Section V an engineering analysis to indicate the various hydrodynamic and hydrostatic forces expected to result at the facility as

a consequence of a 100-year flood. [40 CFR 270.14(b)(11)(iv)(A)]

Include structural or other engineering studies showing the design of operational units (e.g., tanks, incinerators) and flood protection devices (e.g., flood walls, dikes) at the facility and how these will prevent washout. [40 CFR 270.14(b)(11)(iv)(B)]

b. **If No**: the applicant shall provide in Section V a plan for constructing flood protection devices and a schedule including specific time frames for completion. Provide engineering analyses to indicate the various hydrodynamic and hydrostatic forces expected to result at the facility as a consequence of a 100-year flood. [40 CFR 270.14(b)(11)(iv)(A)]

Include structural or other engineering studies showing the design of operational units (e.g., tanks, incinerators) and flood protection devices (e.g., flood walls, dikes) at the facility and how these will prevent washout. [40 CFR 270.14(b)(11)(iv)(B)]

4. If applicable, and in lieu of the flood protection devices from above, provide a detailed description of the procedures to be followed to remove hazardous waste to safety before the facility is flooded. [40 CFR 270.14(b)(11)(iv)(c)] The

procedures should include:

a. Timing of such movement relative of flood levels, including estimated time to move the waste, to show that such movement can be completed before flood waters reach the facility. Indicate which specific events shall be use to begin waste movement (e.g., Hurricane warning, Flash Flood watch, etc.);

b. A description of the location(s) to which the waste will be moved and a demonstration that these facilities will be eligible to receive hazardous waste in accordance with appropriate regulations (i.e., a permitted facility);

c. The planned procedures, equipment, and personnel to be used and the means to ensure that such resources will be available in time for use; and

d. The potential for accidental discharges of the waste during movement and precautions taken to preclude accidental discharges.

G. Additional Information Requirements

Information addressing the following items is included in Appendix II.G – Additional Information Requirements.

1. For a new hazardous waste management facility, include a map of relevant local land-use plans and descriptions of the major routes of travel in the vicinity of the facility to be used for the transportation of hazardous waste to and from the facility covering at least a five (5)-mile radius from the boundaries of the facility. [30 TAC 305.50(a)(10)(A)&(D)]

2. For a new commercial hazardous waste management facility as defined in 30 TAC 335.202 or the subsequent areal expansion of such a facility or unit of

that facility, indicate on the map the nearest established residence, church, school, day care center, surface water body used for a public drinking water supply, and dedicated public park.

3. For new commercial hazardous waste management facilities, submit the following: [30 TAC 305.50(a)(12)(A)]

   a. the average number, gross weight, type, and size of vehicles used to transport hazardous waste;

   b. the major highways nearest the facility irrespective of distance; and

   c. the public roadways used by vehicles traveling to and from the facility within a minimum radius of 2.5 miles from the facility.

4. Include the names and locations of industrial and other waste-generating facilities within 0.5 miles for a new on-site hazardous waste management facility and the approximate quantity of hazardous waste generated or received annually at those facilities. [30 TAC 305.50(a)(10)(B)&(C)]

5. Include the names and locations of industrial and other waste-generating facilities within 1.0 miles for a new commercial hazardous waste management facility and the approximate quantity of hazardous waste generated or received annually at those facilities. [30 TAC 305.50(a)(10)(B)&(C)]

6. For existing land disposal facility units provide documentation that the information required by 30 TAC 335.5 has been placed in the county deed records. If previously submitted, please reference the submittal by date and registration number.

7. If a surface impoundment or landfill (including post-closure) is to be permitted, provide exposure information to accompany this application and in accordance

   with 30 TAC 305.50(a)(8) and 40 CFR 270.10(j). This information will be considered separately from the TCEQ application completeness determination.

8. For a hazardous waste management facility requesting a capacity expansion of an existing hazardous waste management facility, please provide in Section
   VI.A.1.a the requested fault delineation information. [30 TAC 305.50(a)(4)(D)]

Section II – Facility Siting Criteria

Appendix II – Facility Siting Criteria

1.0 SITE INFORMATION – FORMER F-LINE OF LSAAP

The site for ESD is located on the former F-Line of the former Lone Star Army Ammunition Plant (LSAAP). Storage magazines ~~adjacent~~ proximate to the main facility will also be used – the earth covered magazines (ECMs) are located at LSAAP's former line V-13 and an above ground magazine (AGM) is located at LSAAP's Beech #10 location. The LSAAP previously operated under a RCRA permit (RCRA Permit for Industrial Solid Waste Management No. HW50292-001; EPA identification number TX7213821831) which was originally issued in 1992. Site specific information for the entire LSAAP (the region surrounding the site) has been extensively documented in the *U.S. Army BRAC 2005; Environmental Condition of Property Report, Lone Star Army Ammunition Plant, Texarkana, TX; Final, 20 November 2006* (ECP Report). The following excerpts of this document are included in Attachment II.1.

- Section 3.5 – Environmental Setting – Natural and Physical Environment
    - Section 3.5.1 – Climate
    - Section 3.5.2 – Topography
    - Section 3.5.3 – Surface Water Hydrology
        - Section 3.5.3.1 – Rivers and Streams
        - Section 3.5.3.2 – Ponds, Lakes, and Other Standing Water
        - Section 3.5.3.3 – Stormwater Runoff and Flood Potential
    - Section 3.5.4 – Geology
    - Section 3.5.5 – Hydrogeology
        - Section 3.5.5.1 – Groundwater Flow
        - Section 3.5.5.2 – Aquifers
        - Section 3.5.5.3 – Wells and Groundwater Quality
    - Section 3.5.6 – Demography and Land Use
- Section 3.6 – Biological and Cultural Resources Summary
    - Section 3.6.1 – Biological Resources (including wildlife, protected species, and wetlands)
        - Section 3.6.1.1 – Vegetation
        - Section 3.6.1.2 – Wildlife
        - Section 3.6.1.3 – Protected Species
        - Section 3.6.1.4 – Wetlands
        - Section 3.6.1.5 – Consultations
    - Section 3.6.2 – Cultural Resources
        - Section 3.6.2.1 – Historic Resources

        - Section 3.6.2.2 – Archaeological Sites
        - Section 3.6.2.3 – Buildings/Structures
        - Section 3.6.2.4 – Section 106 Consultation
- Figure 3-1 – Topographic Map
- Figure 3-2 – 100-Year Floodplain, Watersheds, and Drainage Areas
- Figure 3-3 – Geologic Units
- Figure 3-4 – Cistern Locations
- Figure 3-5 – Monitoring Well Locations
- Figure 3-6 – Vegetative Cover
- Figure 3-7 – Primary Wetlands
- Figure 3-8 – Cemetery Locations

2.0 ESD SITE SPECIFIC INFORMATION

The ECP Report discussed in Section 1.0 covers the entire property boundaries of the former LSAAP. The ESD site is located on a small portion of the former LSAAP property. This section provides additional information and clarification, where necessary, of the specific information for the ESD site.

2.1 Precipitation Patterns

Information on the climate and precipitation is covered in Section 3.5.1 of the ECP Report. Additional information on precipitation patterns and historical weather data is documented in Section 3.0 of *Appendix III.F – Emergency Response Plan*.

2.2 100-Year Floodplains

Section 3.5.3.3 of the ECP Report states that there are fifteen areas on LSAAP property that are within 100-year floodplains. The ESD site is not one of those fifteen areas and is not in a 100-year floodplain. More information, including a 100-year floodplain map, is provided in *Appendix II.F – Flooding*.

2.3 Watersheds, Basins, and Regions

Section 3.5.3.1 of the ECP Report describes the watersheds, basins, and regions. The ESD site falls into the northern third of the LSAAP property and therefore is in the Red River Watershed, the Red River Basin, and the Pecan-Waterhole Sub-Basin. The basin is in the Arkansas-White-Red Region and the Red Sulphur Sub-Region.

2.4 Wetlands

Section 3.6.1.4 of the ECP Report states that there are wetlands on the LSAAP property. The National Wetlands Inventory map from the U.S. Fish and Wildlife Service included in Attachment II.2 shows that the ESD site is not located in wetlands. The closest wetlands to the ESD site are to the east.

2.5 Aquifers

Section 3.5.5.2 of the ECP Report provides information about the aquifers located on the LSAAP property. The Carrizo-Wilcox aquifer is not located at the ESD site. A map showing the location of the ESD site in relation to the Carrizo-Wilcox aquifer is included in Attachment II.3. The ESD site is not located directly above the Nacatoch aquifer, but it is located above the Nacatoch aquifer's subcrop. The Nacatoch aquifer is a minor aquifer and is composed of sequences of sandstone separated by impermeable layers of mudstone or clay. The movement of groundwater in this aquifer is to the southeast and is slow because of the discontinuity of the sand beds and fine sand grain size. A map showing the location of the ESD site in relation to the Nacatoch aquifer and the Nacatoch aquifer's subcrop is included in Attachment II.3.

The ESD site is not on the recharge zone of a sole-source aquifer. Attachment II.3 includes a map of the sole-source aquifers in Texas.

2.6 Geology

Section 3.5.4 of the ECP Report describes the geologic units present in the near surface at LSAAP. The ESD site falls into the Tertiary age Midway Group. More information on the Midway Group can be found in Section 3.5.4 of the ECP Report and more information on the site's geology can be found in *Appendix VI.A – Geology and Topography*.

2.7 Land Use

As stated in Section 3.5.6 of the ECP Report, land use in the surrounding area consists of rural agriculture, grazing, and hardwood forest. The areas immediately surrounding the ESD site were previously part of the LSAAP and are currently owned by the TexAmericas Center, which is a large rural industrial center consisting of around 102,000 acres. Land use maps are included in *Attachment II.G.1 – Land Use Maps*.

3.0 ADDITIONAL SITE SPECIFIC INFORMATION

Additional site specific information not covered in the ECP Report is included in this section.

3.1 Public Drinking Water - Surface Water Intake

The figure in Attachment II.4 shows the location on the nearest surface water intake, which is approximately 12 miles from the facility. The location of the nearest surface water intake is Wright Patman Lake.

3.2 Soil Units - Unified Soil Classification

Attachment II.5 includes ~~a~~ maps that shows the United States Department of Agriculture, Natural Resources Conservation Service soil designations within the ESD facility boundaries. ~~The maps show that three different soil units exist within the facility boundaries.~~ The soil underneath where the HBC and Rocket Motor Ops Building will be located is classified as CL, ML, and CH. The

soil underneath where the ECMs are located is also classified as CL, ML, and CH. The soil underneath where the AGM is located is classified as CL, ML, SC, SM, and CH.

30 TAC §335.204(a)(5) states that a storage or processing facility may not be located in areas where soil units within 5 feet of the containment structure have a Unified Soil Classification of GW, GP, GM, GC, SW, SP, or SM unless one of the following is true:

- secondary containment is provided to preclude migration to groundwater or surface water from spills, leaks or discharges; or
- the soil unit is not sufficiently thick and laterally continuous to provide a significant pathway for waste migration.

The soil where the AGM located has the Unified Soil Classification code of SM, but secondary containment is provided to preclude migration of spills, leaks, or discharges to groundwater if they were to occur. The AGM is fully enclosed and has raised edges at the entrance locations such that no material would be able to reach the soil outside in the event of a spill (if one were to occur). It should be noted that the energetic materials stored will have no free liquids present. Therefore, there is no potential for liquid spills or leaks.

3.3 Critical Habitat of an Endangered Species of Plant or Animal

Information from the Texas Parks and Wildlife Department shows that there are no endangered species in Bowie County, Texas. The list of rare, threatened, and endangered species for Bowie County, Texas is included in Attachment II.6.

Table II

Table II contains the following: Table II.A, Table II.B, Table II.C, Table II.D, Table II.E and Flooding from Section II. F of the Part B Application

Table II.A - Requirements for Storage or Processing Facilities, Land Treatment Facilities, Waste Piles, Storage Surface Impoundments, and Landfills

Is the facility located or proposed to be located[1]:

In wetlands? [as applicable: 30 TAC 335.204(a)(2), (b)(2), (c)(2), (d)(2), and/or (e)(2)	No	No
If Yes: the TCEQ shall not issue a permit for a new hazardous waste management facility or areal expansion of an existing facility into wetlands, pursuant to 30 TAC 335.205(a)(1).		
In the critical habitat of an endangered species of plant or animal?[6] [as applicable: 30 TAC 335.204(a)(8), (b)(10), (c)(9), (d)(9), and/or (e)(11)]		No
If Yes: submit in Section V information demonstrating that design, construction, and operational features will prevent adverse effects on such critical habitat.		
On the recharge zone of a sole-source aquifer?2 [30 TAC 335.204(a)(3), (b)(3), (c)(3), (d)(3), and/or (e)(3)]		No
If Yes: then for storage and processing facilities (excluding storage surface impoundments), submit in Section V information demonstrating that secondary containment is provided to preclude migration to groundwater from spills, leaks, or discharges.		
In an area overlying a regional aquifer? [as applicable: 30 TAC 335.204(a)(4), (b)(4), (c)(4), (d)(4), and/or (e)(4)]		No
If Yes: submit site-specific information in Section V and/or Section VI demonstrating compliance with 30 TAC 335.205(a)(1).		
In areas where soil unit(s) are within five feet of the containment structure, or treatment zone, as applicable, that have a Unified Soil Classification of GW, GP, GM, GC, SW, SP, or SM, or a hydraulic conductivity greater than 10-5 cm/sec? [as applicable: 30 TAC 335.204(a)(5), (b)(5), (c)(5), (d)(5), and/or (e)(5)]	Main facility and ECM area:	No
	AGM area:	Yes (AGM area only). See Section II - Facility Siting Criteria, Section 3.2.
If Yes: provide additional information in Sections V and/or Section VI demonstrating compliance with 30 TAC 335.205(a)(1)		
In areas of direct drainage within one mile of a lake at its maximum conservation pool level, if the lake is used to supply public drinking water through a public water system?[6] [as applicable: 30 TAC 335.204 (a)(6), (b)(7), (c)(6), and/or (e)(8)].		No
If Yes: provide information in Section V demonstrating compliance with 30 TAC 335.205(a)(1).		

In areas of active geologic processes, including but not limited to erosion, submergence, subsidence, faulting, karst formation, flooding in alluvial flood wash zones, meandering river bank cuttings, or earthquakes?[6] [as applicable: 30 TAC 335.204(a)(7), (b)(8) ,(c)(7), (d)(7), and/ or (e)(9)]		No
Within 30 feet of the upthrown side or 50 feet of the downthrown side of the actual or inferred surface expression of a fault that has reasonably been shown to have caused displacement of shallow Quaternary sediments or of man-made structures?[6] [as applicable: 30 TAC 335.204(a)(9), (b)(12) ,(c)(11), (d)(11), and/or (e)(13)]	No	No
If Yes: specify in Section V the design, construction, and operational features that will prevent adverse effects resulting from any fault movement. If a fault is found to be present, the width and location of the actual or inferred surface expression of the fault, including both the identified zone of deformation and the combined uncertainties in locating a fault trace, must be determined by a qualified geologist or geotechnical engineer and reported in Section VI.		

Table II.B. - Additional Requirements for Land Treatment Facilities [30 TAC 335.204(b)]:

Is the land treatment facility located or proposed to be located:

Within 1000 feet of an established residence, church, school, day care center, surface water body used for a public drinking water supply, or dedicated public park which is in use at the time the notice of intent to file a permit application is filed with the commission, or which is in use at the time the permit application is filed with the commission?	N/A for entire Table II.B - This is not a Land Treatment Facility.
If Yes: the TCEQ shall not issue a permit for a new hazardous waste land treatment unit or an areal expansion of an existing land treatment unit, pursuant to 30 TAC 335.204(b)(6) and 335.205(a).	
Within 1000 feet of an area subject to active coastal shoreline erosion even though the area is protected by a barrier island or peninsula?	
If Yes: submit in Section V.F design, construction, and operational features which will prevent adverse effects resulting from storm surge and erosion or scouring by water.	
Within 5000 feet of a coastal shoreline subject to active shoreline erosion and which is unprotected by a barrier island or peninsula.	
If Yes: submit Section V.F design, construction and operational features, which will prevent adverse effects resulting from storm surge and erosion or scouring by water.	
On a barrier island or peninsula?	
If Yes: the TCEQ shall not issue a permit for a new hazardous waste land treatment unit or an areal expansion of an existing land treatment unit, pursuant to 30 TAC 335.204(b)(11) and 335.205(a)(1).	

Table II.C. - Additional Requirements for Waste Piles [30 TAC 335.204(c)]

Is the waste pile located or proposed to be located:

Within 1000 feet of an area subject to active coastal shoreline erosion even though the area is protected by a barrier island or peninsula?	N/A for entire Table II.C - There are no waste piles.
If Yes: submit in Section V.E design, construction, and operational features on the facility which will prevent adverse effects resulting from storm surge and erosion or scouring by water.	
Within 5000 feet of a coastal shoreline subject to active shoreline erosion and which is unprotected by a barrier island or peninsula.	
If Yes: submit Section V.E design, construction, and operational features which will prevent adverse effects resulting from storm surge and erosion or scouring by water.	
On a barrier island or peninsula?[6]	
If Yes: the TCEQ shall not issue a permit for a new hazardous waste pile or an areal expansion of an existing waste pile, pursuant to 30 TAC 335.204(c)(10) and 335.205(a)(1).	

Table II.D. - Additional Requirements for Storage Surface Impoundments [30 TAC 335.204(d)]

Is the land treatment facility located or proposed to be located:

Within 1000 feet of an area of active coastal shoreline erosion even though the area is protected by a barrier island or peninsula	N/A for entire Table II.D - This is not a Surface Impoundment.
If Yes: submit in Section V.D design, construction, and operational features of the facility which will prevent adverse effects resulting from storm surge and erosion or scouring by water.	
Within 5000 feet of a coastal shoreline subject to active shoreline erosion and which is unprotected by a barrier island or peninsula.	
If Yes: then submit in Section V.D design, construction, and operational features which will prevent adverse effects resulting from storm surge and erosion or scouring by water.	
On a barrier island or peninsula?[6]	
If Yes: the TCEQ shall not issue a permit for a new hazardous waste storage surface impoundment or an areal expansion of an existing storage surface impoundment, pursuant to 30 TAC 335.204(d)(10) and 335.205(a)(1).	

Table II.E. - Additional Requirements for Landfills (and Surface Impoundments Closed as Landfills with wastes in place)

Is the landfill located or proposed to be located:

Within 1000 feet of an established residence, church, school, day care center, surface water body used for a public drinking water supply, or dedicated public park which is in use at the time the notice of intent to file a permit application is filed with the commission, or which is in use at the time the permit application is filed with the commission?	N/A for entire Table II.E - There are no Landfills or Surface Impoundments..
If Yes: the TCEQ shall not issue a permit for a new hazardous waste landfill or an areal expansion of an existing landfill, pursuant to 30 TAC 335.204(e)(6) and 335.205(a)(1).	
(For commercial hazardous waste landfills) in the 100-year flood plain of a perennial stream that is delineated on a flood map adopted by the Federal Emergency Management Agency after September 1, 1985, as zone A1-99, VO, or V1-30?	
If Yes: the TCEQ shall not issue a permit for a new hazardous waste landfill or an areal expansion of an existing landfill, pursuant to 30 TAC 335.204(e)(7) and 335.205(a)(1).	
Within 1000 feet of an area subject to active coastal shoreline erosion even though the area is protected by a barrier island or peninsula?	
If Yes: then submit in Section V.G design, construction, and operational features which will prevent adverse effects resulting from storm surge and erosion or scouring by water.	
Within 5000 feet of a coastal shoreline subject to active shoreline erosion and which is unprotected by a barriers island or peninsula.	
If Yes: then submit in Section V.G design, construction, and operational features which will prevent adverse effects resulting from storm surge and erosion or scouring by water.	
On a barrier island or peninsula?	
If Yes: the TCEQ shall not issue a permit for a new hazardous waste landfill or an areal expansion of an existing landfill, pursuant to 30 TAC 335.204(e)(12) and 335.205(a)(1).	

Flooding (see Section II Instructions, Item F)

Is the facility within a 100-year flood plain?	No
Has a flood plain map been provided?	Yes
Has information about flooding levels and events, and other special flooding factors, been provided?[3]	N/A, not in 100-year floodplain
Do any flood protection devices exist at the facility (e.g., flood walls, dikes, etc.) designed to prevent washout from the 100-year flood?[3]	N/A, not in 100-year floodplain
If Yes: provide in Section V an engineering analysis to indicate the various hydrodynamic and hydrostatic forces expected to result at the facility as a consequence of a 100-year flood. [40 CFR 270.14(b)(11)(iv)(A)][4]	
If No: the applicant shall provide in Section V a plan for constructing flood protection devices and a schedule including specific time frames for completion. Provide engineering analyses to indicate the various hydrodynamic and hydrostatic forces expected to result at the facility as a consequence of a 100-year flood. [40 CFR 270.14(b)(11)(iv)(A)][5]	
If applicable, and in lieu of the flood protection devices from above, was a detailed description of the procedures to be followed to remove hazardous waste to safety before the facility is flooded provided?[3, 6]	
Additional Information Requirements (see Section II instructions, Item G): Submitted?	

1. Provide the source of information for all questions in the appendix.
2. Note: Land treatment facilities, waste piles, storage surface impoundments, and landfills may not be located on the recharge zone of a sole-source aquifer.
3. Only required to be submitted if the facility is subject to inundation as a result of a 100-year flood event.
4. Include structural or other engineering studies showing the design of operational units (e.g., tanks, incinerators) and flood protection devices (e.g., flood walls, dikes) at the facility and how these will prevent washout. [40 CFR 270.14(b)(11)(iv)(B)]
5. Include structural or other engineering studies showing the design of operational units (e.g., tanks, incinerators) and flood protection devices (e.g., flood walls, dikes) at the facility and how these will prevent washout. [40 CFR 270.14(b)(11)(iv)(B)]
6. The standards contained in §335.204(a)(6) - (9), (b)(7) - (12), (c)(6) - (11), (d)(6) - (11), and (e) (8) - (13) are not applicable to facilities that have submitted a notice of intent to file a permit application pursuant to §335.391 of this title (relating to Pre-Application Review) prior to May 3, 1988, or to facilities that have filed permit applications pursuant to §335.2(a) of this title which were submitted in accordance with Chapter 305 of this title and that were declared to be administratively complete pursuant to §281.3 of this title (relating to Initial Review) prior to May 3, 1988.[30 TAC 335.201(b)]

ATTACHMENT II.1

EXCERPTS FROM:

U.S. Army BRAC 2005; Environmental Condition of Property Report, Lone Star Army Ammunition Plant, Texarkana, TX; Final, 20 November 2006 **(ECP Report)**

U.S. Army BRAC 2005
Environmental Condition of Property Report
Lone Star Army Ammunition Plant
Texarkana, TX

Final
20 November 2006

FINAL

ENVIRONMENTAL CONDITION OF PROPERTY REPORT
LONE STAR ARMY AMMUNITION PLANT
20 November 2006

Prepared for:

United States Army
Contract W912QR-04-D-0018, Delivery Order 0012

Lone Star Army Ammunition Plant

Prepared by:

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Omaha, Nebraska 68154
16170064

3.4.7 Compressed Air

Production processes throughout the installation use compressed air to power equipment and reduce the risk of explosion. Large compressor buildings are situated on several production lines. The condensate from the compressors passes through oil/water separators before discharging to the sanitary sewer. Oil collected along the production lines accumulates in 55-gallon drums standing outside the buildings. Currently, full barrels are put in storage at Area M. Disposal of the oil drums collected at the load lines is discussed further in **Section 4.4** of this ECP Report. It is not known how this was handled in the past.

3.5 ENVIRONMENTAL SETTING – NATURAL AND PHYSICAL ENVIRONMENT

The following sections summarize the LSAAP climate, topography, surface water hydrology, groundwater hydrology, geology, and demographics.

3.5.1 Climate

The climate in the vicinity of LSAAP is characterized by mild winters and hot summers. The spring and autumn months are mild with cool nights and warm days. The high humidity in this area is typically caused by warm moist air from the Gulf of Mexico. (Flour Daniel, Inc. 1994) Temperatures average 81 degrees Fahrenheit (°F) during the summer and 44°F in the winter, with an average annual temperature of 63°F.

Precipitation averages about 51 inches per year with peak rainfall in November and December, and the driest months in July and August. Snowfall in the area is rare and usually very light, averaging one to two inches per year. Monthly precipitation and temperature parameters collected by the United States Weather Service for Texarkana, Texas are shown in **Table 3-4** below:

TABLE 3-4
SUMMARY OF TEXARKANA, TEXAS CLIMATE DATA

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average High	53°F	58°F	67°F	75°F	82°F	89°F	93°F	93°F	86°F	77°F	64°F	55°F
Average Low	31°F	34°F	42°F	50°F	60°F	68°F	72°F	71°F	64°F	52°F	41°F	33°F
Mean	42°F	46°F	55°F	63°F	71°F	79°F	83°F	82°F	75°F	65°F	53°F	44°F
Record High	81°F	90°F	89°F	95°F	98°F	101°F	105°F	106°F	108°F	95°F	86°F	80°F
Record Low	3°F	8°F	15°F	28°F	40°F	52°F	57°F	55°F	38°F	27°F	16°F	-6°F
Average Precipitation	3.91 inches	3.80 inches	4.46 inches	4.23 inches	4.97 inches	4.82 inches	3.62 inches	2.41 inches	3.77 inches	4.61 inches	5.69 inches	4.95 inches

Source: USWS 2006

Humidity is high with an annual average of approximately 65 percent. Severe thunderstorms are numerous in the spring and hurricanes in the Gulf of Mexico have usually dissipated by the time

they reach the area. No tornado has ever been recorded as touching down on the installation. (USATHAMA 1978)

Prevailing winds are northeasterly during the fall and winter months and south-southwesterly during the spring and summer. Average wind speed is 7.6 miles per hour. (USATHAMA 1978)

3.5.2 Topography

LSAAP is situated within the West Gulf Coastal Plain physiographic province (USATHAMA 1978). The topography at this site is generally characterized as flat to gently rolling hills. Elevations vary from a maximum elevation of approximately 450 feet above mean sea level (amsl) in the western half of this site to just under 300 feet amsl where the East Fork of Elliot Creek crosses the southern LSAAP property boundary. In general, the western half of LSAAP is higher in elevation than the eastern side. A topographic map of LSAAP is presented on **Figure 3-1**.

The major topographic feature within the installation is a drainage divide, separating LSAAP into five distinct drainage areas (Flour Daniel, Inc. 1994). This topographic ridge is presented on **Figure 3-2**, and its impact on surface water flow is discussed in **Section 3.5.3.1**.

Some of the creeks and drainage ditches have eroded valleys which may act as barriers to groundwater flow. Groundwater is encountered at elevations higher than surface water elevations at this site. Further information on groundwater flow is presented in **Section 3.5.5.1** (Developers International Services Corporation 1983).

3.5.3 Surface Water Hydrology

3.5.3.1 Rivers and Streams

As stated in **Section 3.5.2**, a topographic ridge running east-west across LSAAP controls surface water flow. The northern third of LSAAP falls in the Red River Watershed and the southern two-thirds fall in the Sulphur River Watershed (see **Figure 3-2**). Watersheds are very large areas and can be divided into more site-specific classifications called basins and regions. The northern third of LSAAP falls within the Red Little Basin, Pecan-Waterhole Sub-Basin. The southern two thirds are within the Big Cypress-Sulphur Basin, Lower Sulphur Sub-Basin. Both basins are in the Arkansas-White-Red Region and the Red Sulphur Sub-Region. **Table 3-5** summarizes this information.

TABLE 3-5
BASINS AND REGIONS

Relationship to Divide	Sub-Basin (Small)	Basin	Sub-Region	Region (Large)
North	Pecan-Waterhole	Red Little	Red Sulphur	Arkansas-White-Red
South	Lower Sulphur	Big Cypress-Sulphur		

Source: United States Geological Survey (USGS) 2006

Although LSAAP falls into two watersheds, there are five drainage areas associated with this site, as illustrated on **Figure 3-2**.

Areas north of the divide drain into several small intermittent streams which exit along the northern boundary of the installation. Four unnamed intermittent tributaries of Panther Creek exit the northern boundary of LSAAP and become perennial streams off installation property. Jones Creek and three unnamed tributaries of Jones Creek also exit the northern property boundary. The four creeks are classified as intermittent streams while on installation property. The streams eventually empty into perennial Barkman Creek (Flour Daniel, Inc. 1994).

Four intermittent tributaries of Aiken Creek exit LSAAP's eastern boundary. The tributaries are classified as perennial streams approximately 2.5 miles downstream LSAAP's eastern border at Aiken Creek. Aiken Creek eventually empties into Elliott Creek downstream of the Wright Patman Dam (Flour Daniel, Inc. 1994).

At the southeast corner of the installation, near the HEDG, an unnamed intermittent stream flows approximately two miles prior to leaving the installation boundary and emptying into Wright Pitman Lake (Flour Daniel, Inc. 1994).

West of this area, Elliott Creek is fed by several intermittent tributaries on LSAAP which drain the south-central portion of the installation. Elliot Creek is the only perennial stream on the installation property. Elliot Creek flows south for approximately 3 miles to the installation boundary, eventually emptying into Wright Patman Lake (Flour Daniel, Inc. 1994).

On the southwestern portion of the installation two unnamed intermittent tributaries of an unnamed perennial stream flow south before leaving LSAAP property and eventually emptying into Elliot Creek Reservoir (Flour Daniel, Inc. 1994).

Nettles Creek is an intermittent stream flowing south along the southwestern edge of LSAAP. Two intermittent unnamed tributaries of Nettles Creek empty into it immediately south of the installation boundary. At this point Nettles creek becomes perennial and flows southward to Elliot Creek Reservoir (Flour Daniel, Inc. 1994).

The western edge of LSAAP is drained by two unnamed intermittent streams which are tributaries of Caney Creek. These two streams empty into perennial Caney Creek 1.5 miles west of the installation boundary and flow southward to Caney Creek Reservoir. (Flour Daniel, Inc. 1994) IRP LSAAP-019 (Creeks, Streams, Drainage (AOC #1)) has received an approved no further action (NFA) from Texas Commission on Environmental Quality (TCEQ). Drainage ditches, creeks, and streams exit LSAAP at numerous locations. Sampling these locations at the installation boundary has not indicated a contamination problem in any of the six hydrologic units (USAEC 2006). Drainage ditches, creeks, and streams have not been sampled at or near areas of potential concern (e.g., load lines).

3.5.3.2 Ponds, Lakes, and Other Standing Water

No significant natural or man-made lakes or reservoirs are located on LSAAP. The largest surface water body on the installation is the former emergency water supply pond (Z-1) in the

south central portion of LSAAP. Three significant reservoirs are located in the vicinity of LSAAP. These include Elliot Creek Reservoir to the south, Caney Creek Reservoir to the west (on RRAD), and Wright Pitman Lake to the south (Flour Daniel, Inc. 1994).

Each of the production lines has or had several sumps used for the treatment of water used in the production of munitions. Areas G (IRP LSAAP-033) and O (IRP LSAAP-034) each had wastewater ponds that were closed in place. The entire installation is covered with drainage ditches that will retain runoff water for a while, but typically remain dry throughout the year. The HEDG is completely surrounded by a dike system that controls erosion and runoff. Runoff flows through a silt retention basin in the southwest corner of the bermed area before being discharged into an adjacent stream. The water is analyzed for pH and perchlorates before discharging to the adjacent stream basin. (DZI SSD 2006 and Altec 2003c)

3.5.3.3 Stormwater Runoff and Flood Potential

In general, runoff from rainfall follows the slope of the land into drainage ditches, then into creeks and streams leaving LSAAP and eventually emptying into either the Red or Sulphur Rivers. Fifteen areas on LSAAP property are within 100-year floodplains, as shown on **Figure 3-2**. One IRP site (IRP LSAAP-018 HEDG) is also within a 100-year floodplain.

There are 31 discharge locations at LSAAP. LSAAP has a TPDES Multi-Sector General Permit that requires a Stormwater Pollution Prevention Plan. The Plan identified 31 non-point source discharges requiring annual monitoring and quarterly inspection during sampling intervals and during site compliance evaluations. Additionally, there are six wastewater discharge outfalls. Three of the outfalls discharge to surface water. Information about the outfalls can be found in **Section 4.1.4**.

3.5.4 Geology

The LSAAP is situated within the West Gulf Coastal Plain physiographic province, characterized by geologic formations that thin landward and form belts parallel to the coast. Resistant formations leave ridges within the province and easily eroded formations leave valleys.

In general, there are three geologic units present in the near surface at LSAAP: the Tertiary age Wilcox and Midway Groups, and the Quaternary age alluvial deposits. The Midway Group is described as massive blocky clay that locally contains glauconitic sand. The Wilcox Group consists of irregularly bedded sands that are interbedded with clay, silty clay, lignitic clay and lignite. Both Groups are often described as "clay-shale" with the Wilcox Group being the coarser grained (silty clay-shale). The alluvial deposits vary from silty clays and clayey silts to sandy silts and silty sands and gravels and are present along the Red River and the Sulfur River and their tributaries. Alluvial deposits typically become coarser with depth. (Flour Daniel, Inc. 1994) The three units are summarized below and the aerial extent is presented on **Figure 3-3**.

- Recent alluvium: Light grey to reddish-brown, very fine to course sand interbedded with dark-colored clays and silts with a few gravels. (USATHAMA 1978)

- Wilcox group: Predominantly a reddish tan to brown sandy and silty clay-shale with siltstone and ironstone concretions. (USATHAMA 1978)
- Midway group: Calcareous clay and clay-shale, grey to bluish grey in color with reddish-brown iron stained lenses of sands and silts. (USATHAMA 1978)

Exposures of Tertiary age Midway and Wilcox Groups predominate in Bowie County in roughly east-west parallel outcrop bands with the Midway Group occurring in the central and northern section of the installation and the Wilcox Group occurring in the southern section of the installation. Gently rolling lowlands have developed on areas underlain by the Midway Group and more hilly terrain has developed on areas underlain by the Wilcox Group. The regional dip of the subsurface units is approximately 15 feet per mile. The east-west Luning-Mexia-Talco Fault system is in the vicinity of LSAAP; however, no displacement is believed to be in the Tertiary or Recent sediments. (USATHAMA 1978)

The Wilcox Group consists of mostly sands, silts, and clays that occur under sloping topography. Studies indicate that the Wilcox Group is as much as 700 feet thick where the entire unit occurs. The maximum thickness of the Wilcox Group at LSAAP is probably not more than 100 feet. (Flour Daniel, Inc. 1994)

The Midway Group consists of clay shale that is poorly bedded with thin discontinuous laminations of silt and fine silty sand (Developers International Services Corporation 1983). The Midway Group is weathered to a depth of about 42 feet. The weathered section of the formation is yellow brown jointed clay shale that is soft and moist and has iron oxide staining along joint planes. Crystalline gypsum is infrequently found lining joint planes near the base of the weathered zone. Below the weathered zone, the shale is dark gray and generally not jointed. The Midway Group represents the oldest and most laterally extensive unit to crop out at LSAAP. The erosion of Wilcox sediments has completely exposed the Upper Midway section. The Midway extends across the northern two-thirds of LSAAP and is characterized as a thick sequence of fine-grain marine sediments. The Midway Group is principally composed of massive clay, interbedded with minor amounts of silt and sand in varying proportions. The thickness of the Midway Group is difficult to determine, but is believed to be approximately 600 feet. (Flour Daniel, Inc. 1994)

There are two major surface soil units and one minor surface soil unit present at LSAAP. The major soil groups roughly correlate to the areas underlain by the Wilcox Group and the Midway Group. The Sawyer-Eylau-Woodtell Soils cover approximately 60 percent of LSAAP. These soils are generally clayey to silty loams with low permeability. The Rushton-McKamie Soils cover the remaining 40 percent of LSAAP. These soils are generally sandy loams with some clay and moderate to low permeability. The low permeability loam of the Annona-Alusa Soils is only present near the HEBG. (Flour Daniel, Inc. 1994)

3.5.5 Hydrogeology

The following sections describe the groundwater characteristics, aquifers, wells and background groundwater quality at LSAAP. Groundwater in the Midway Group is classified as Class III, and Class II in the Wilcox Group, as defined by the TCEQ.

3.5.5.1 Groundwater Flow

Shallow groundwater flow is along the topographic gradient at LSAAP (Developers International Services Corporation 1983). There is a groundwater divide that roughly coincides with the topographic divide (A.T. Kearney, Inc. 1988) as discussed in **Section 3.5.2**. Groundwater north of the divide flows to the north and groundwater south of the divide flows to the south. Local variations in flow direction could also occur. Groundwater levels range from near the surface along creek bottoms to depths of approximately 25 feet below land surface (bls) along ridge lines (Developers International Services Corporation 1983).

Due to the shallow water table, groundwater to surface water transition zones occur at many locations throughout LSAAP. In some locations, groundwater may travel a relatively short distance before discharging into a nearby surface water body, such as a creek or drainage ditch. This occurs most frequently during wet seasons when groundwater levels are near the surface. (Developers International Services Corporation 1983) No springs were identified during the VSI or disclosed in interviews. Seasonal fluctuations in the water table due to precipitation are relatively small due to impermeable soils and the well developed drainage systems (A.T. Kearney, Inc. 1988).

3.5.5.2 Aquifers

The uppermost aquifer located at this site is the Carrizo-Wilcox aquifer, and it is classified as a major aquifer. A major aquifer is one that supplies large quantities of water in large areas of the state. (TWDB 2006) Based on topography, groundwater from this aquifer can be encountered from zero to 25 feet below ground surface. At LSAAP, the hydraulic conductivity of this aquifer within the Wilcox Group was estimated to be 5.0 x 10-5 centimeters per second (cm/sec) at the HEBG (IRP LSAAP-016) and 2 x 10-6 cm/sec at the HEDG (IRP LSAAP-018). Groundwater flow in Quaternary deposits, such as stream beds and terrace deposits, is reported to be from 4 x 10-4 to 6 x 10-6 cm/sec. The hydraulic conductivity of the Midway Group is much lower (Flour Daniel, Inc. 1994). Water may not be present when drilling holes for monitoring wells in the Midway Group.

The Nacatoch sands underlie an estimated 10 percent of the northern portion of LSAAP (A.T. Kearney, Inc. 1988) below the Carrizo-Wilcox aquifer. This sand aquifer is known as the Nacatoch aquifer and it is classified as a minor aquifer (TWDB 2006). Movement of groundwater in this aquifer is to the southeast. The rate of movement is not known, but is presumed to be slow because of the discontinuity of the sand beds and fine sand grain size (A.T. Kearney, Inc. 1988). Wells drilled into the Nacatoch sands located north of LSAAP range from 276 to 455 feet bls (TWDB 2006).

3.5.5.3 Wells and Groundwater Quality

Currently, there are no production, domestic, municipal, or underground injection wells located at LSAAP. However, shallow groundwater may have been a potable water source for former homesteads at LSAAP. (A.T. Kearney, Inc. 1988) Fifty-six cistern locations are presented on **Figure 3-4**. Sixteen old wells and cisterns have been closed (USAEC 2006). In addition to old

wells and cisterns, there are over 200 groundwater monitoring wells at LSAAP (A.T. Kearney, Inc. 1988). Monitoring well locations are presented on **Figure 3-5**.

Groundwater quality is impaired at many site-specific locations throughout LSAAP and those are covered in more detail in other sections. Groundwater in the Carrizo-Wilcox aquifer at this site is characterized by high sodium bicarbonate content and low dissolved solids content. The water is "soft" throughout the formation. Groundwater in the Nacatoch sand has fresh to slightly saline waters. Generally, the water is highly alkaline, high in sodium bicarbonate and "soft." It is suitable for public use, industrial use and irrigation. (A.T. Kearney, Inc. 1988)

3.5.6 Demography and Land Use

LSAAP is located in northeastern Texas, approximately 12 miles west of Texarkana, Texas (population 35,746), in central Bowie County and Texarkana, Arkansas (30,006). The site lies in the heart of a four-state area consisting of Arkansas, Oklahoma, Louisiana, and Texas. Communities in the vicinity of the installation include Hooks (2,924) and Leary (565) to the north, and Redwater (883) and Maud (1,015) to the south and southwest, respectively. The town of New Boston (4,624) is also nearby. To the west is RRAD. (USCB 2006)

According to the United States Census Bureau, the estimated population of Bowie County in 2005 was 90,643 with more than 35,000 in Texarkana, Texas. An estimated population of 5,360 lives within one mile of LSAAP. Approximately 370 persons are employed at LSAAP (Staubach 2006).

LSAAP has a total land area of 15,546 acres, of which 1,089 acres are classified as improved ground; 2,288 acres are semi-improved ground; and 12,169 acres are unimproved grounds. Land use in the surrounding area consists of rural agriculture, grazing, and hardwood forest. (Altec 2002b)

3.6 BIOLOGICAL AND CULTURAL RESOURCES SUMMARY

3.6.1 Biological Resources

A natural resource management plan is in effect and is currently undergoing revision.

3.6.1.1 Vegetation

LSAAP is located in an oak-pine, broadleaf, deciduous, and needle green-evergreen forest comprised of primarily loblolly-short-leafed pine, pine-hardwood, and mixed hardwood associations. Loblolly-short-leafed pine associations occur primarily on gravel ridges, slopes, and areas previously cleared, cultivated, or machine planted. The pine-hardwood association occurs on ridges, slopes, and bottomlands cultivated prior to the development of LSAAP. The mixed hardwood association occurs in undisturbed bottomlands of creeks and drains and in areas that are not well drained. (Tetra Tech EM, Inc. 2006)

Dominant tree species include red maple, black hickory, southern hackberry, persimmon, sweet-gum, short-leafed pine, loblolly pine, southern red oak, and post oak. Common shrub species found at LSAAP include the American beauty berry, hawthorne, sumac, blackberry, and tree huckleberry. Common grass species include longleaf uniola, purple top, little bluestem, and broomsedge. Most grasses are located along roadsides, utility easements, demolition grounds, production areas, training areas, and food plots. Maintained areas surrounding the buildings in the developed areas are also grassed (Tetra Tech EM, Inc. 2006). Vegetative cover for LSAAP is shown on **Figure 3-6**.

3.6.1.2 Wildlife

Several species of mammals are common on LSAAP, including white-tail deer, gray squirrel, fox squirrel, raccoon, bobcat, skunk, and armadillo. Common reptiles found at LSAAP include the cottonmouth, copperhead, diamondback rattlesnake, box turtle, and snapping turtle. Amphibians include the Texas salamander, siren, great plain narrow-mouthed toad, and bullfrog. (Tetra Tech EM, Inc. 2006)

There are also over 400 species of birds that may frequent LSAAP. Migratory waterfowl passing over the Mississippi Valley migration route use LSAAP as a temporary refuge. Game birds found on site include the mourning dove, wild turkey, and bobwhite quail. Other birds that have been recorded to use LSAAP include the eastern bluebird and green heron and several raptor species forage on the property, including American kestrel, red-tailed hawk, and red-shouldered hawk (Tetra Tech EM, Inc. 2006).

3.6.1.3 Protected Species

No federally-listed or state-listed threatened and endangered plant species are known to occur at LSAAP. The alligator snapping turtle (*Macroclemys temminckii*), a state-listed threatened species, was the only observed federally- or state-listed species during a planning level survey in 2000 at the installations (Tetra Tech EM, Inc. 2006). The INRMP lists the American alligator (*Alligator mississippiensis*) as a federally-listed threatened species known to occur at LSAAP. However, the American alligator was delisted in 1987, although the legal trade of alligator skins is still regulated by the United States Fish and Wildlife Service (USFWS) (USFWS 2006). There are no other state- or federally-listed threatened and endangered species known to be present on LSAAP.

The only other federally listed species that may occur in the area are the threatened bald eagle (*Haliaeetus leucocephalus*), endangered interior least tern (*Sterna antillarum*), red-cockaded woodpecker (*Picoides borealis*), and threatened Louisiana black bear (*Ursus americanus*). Other state-listed bird species that may migrate through the area include the endangered American peregrine falcon (*Falco peregrinus anatum*) and the threatened arctic peregrine falcon (*Falco peregrinus tundruis*) (Tetra Tech EM, Inc. 2006). None of these species are likely to inhabit LSAAP due to the lack of quality habitat found on the installation; however, no surveys have been completed for these species or their habitats. **Appendix K** provides a listing of the threatened and endangered species observed or potentially occurring in Bowie County (Tetra Tech EM, Inc. 2006).

3.6.1.4 Wetlands

A wetlands inventory survey was performed at LSAAP by the USFWS in 1997 and 1998. The wetlands survey found that there are approximately 570 acres of wetlands and deepwater habitats on LSAAP (**Figure 3-7** Tetra Tech EM, Inc. 2006). Forested wetlands comprise about 97 percent of the wetlands at LSAAP with deciduous forested wetlands being the most common habitat type. Approximately one percent of the wetlands are emergent and one percent are considered ponds. There are no shrub/emergent wetlands or ponds at LSAAP (Tetra Tech EM, Inc. 2006). **Table 3-6** lists wetland acreages by habitat type for LSAAP. No work has been conducted to delineate jurisdictional wetlands from the total. In the survey conducted at LSAAP, it was determined that no wetland restrictions apply to the main installation or the ranges. Project-specific field delineations, consistent with current USACE protocols for determining the presence of jurisdictional wetlands, must be conducted prior to implementing activities that could potentially impact wetlands.

TABLE 3-6
WETLAND ACREAGE SUMMARY FOR LSAAP

Wetland Type	Acreage
Aquatic Bed	0
Emergent	4.6
Deciduous Scrub-Shrub	0
Evergreen Scrub-Shrub	3.3
Mixed Shrub/Emergent	0
Deciduous Forested	485.5
Evergreen Forested	61.1
Mixed Forested	7.3
Forested – Cypress	0
Forested – Dead	0
Unconsolidated Bottom/Shore (ponds)	7.9
Total	**569.7**

Source: Tetra Tech EM, Inc. 2006

3.6.1.5 Consultations (Sec 7 Formal or Informal)

Under provisions of Section 7 of the Endangered Species Act, a federal agency that permits, licenses, funds, or otherwise authorizes activities must consult with the USFWS when appropriate, to ensure that its actions will not jeopardize the continued existence of a listed threatened or endangered species or a designated critical habitat. Threatened and endangered species are not known to occur at LSAAP, and formal Section 7 consultation with the USFWS has not been performed. The draft INRMP is prepared in coordination with the USACE, the USFWS, and the Texas Parks and Wildlife Department (TPWD). The draft document is then submitted to these agencies and the public for review and comment. Comments received are used to develop the final version of the INRMP.

In addition, the USFWS, TPWD, and LSAAP maintain a cooperative agreement in regards to fish and wildlife resource management. This agreement states the responsibilities of each agency in carrying out the implementation of the INRMP and sets a framework for future cooperation.

3.6.2 Cultural Resources

A current Integrated Cultural Resources Management Plan (ICRMP), prepared in 2002, is maintained at LSAAP. Between the years of 1980 through 1993, approximately 52 percent of LSAAP acreage was surveyed for cultural resources. (USACE, Tierra Environmental Services, Inc. and Earth Tech 2002)

3.6.2.1 Historic Resources

A National Environmental Policy Act (NEPA) questionnaire lists 53 sites eligible for the National Register of Historic Places (NRHP). There has been one recorded violation of the Archaeological Resources Protection Act.

3.6.2.2 Archaeological Sites

Several archaeological investigations have been conducted within LSAAP, including intensive and point surveys. The earliest survey was conducted in 1980, while the most recent investigation was completed in 1993. Nearly 200 archaeological sites and 27 localities have been recorded during that time period. These consist of single component historic or prehistoric resources, as well as multi-component resources. Additional study for determination of eligibility for the NRHP is required for the remaining 38 sites that have not yet been evaluated. Within the boundary of LSAAP, there are currently several individual archaeological sites that are potentially eligible for inclusion in the NRHP. The majority of cultural resource sites, however, have been determined to be ineligible for inclusion in the National Register. (USACE, Tierra Environmental Services, Inc. and Earth Tech 2002)

The only paleontological resources identified within the boundary of LSAAP are scattered concentrations of petrified wood located within Wilcox Formation. These resources have not been evaluated for their paleontological significance.

Further, Executive Order 13007 (24 May 1996) directs each executive branch to (1) accommodate access to and ceremonial use of Indian sacred sites by Indian practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites. Agency heads also are directed to report actions and activities related to sacred sites on their property.

LSAAP currently does not have any known sacred sites on the installation. However, no focused studies have been undertaken at LSAAP for the identification and evaluation of traditional cultural properties. Because of the rich Native American history in the region, there is potential that some of the already recorded archaeological sites would also be considered traditional cultural properties or would contain traditional cultural properties elements, and that other traditional cultural properties are present. (USACE, Tierra Environmental Services, Inc., and Earth Tech 2002)

Any cultural materials collected during archaeological inventory on LSAAP must be curated in compliance with 36 CFR Part 79 (Curation of Federally Owned and Administered Archaeological Collections), and a curation agreement developed with the selected repository. LSAAP may enter into a contract, an MOA, Curation Agreement, or interagency agreement with a curation facility (USACE, Tierra Environmental Services, Inc., and Earth Tech 2002). The agreement will ensure that artifacts are properly preserved in accordance with the Curation standards. The Curation Agreement has not been developed to date.

3.6.2.3 Buildings/Structures

According to the Final ICRMP of 2002, there were 1,160 buildings at LSAAP, 609 of which were constructed during the WWII period (1942-1944). Most of the remaining 600 or so buildings were constructed during the Cold War historic years (1946-1989), although some are of very recent construction (1990 to the present), or consist solely of infrastructure elements (USACE, Tierra Environmental Services, Inc., and Earth Tech 2002). LSAAP includes approximately 946 permanent and semi-permanent buildings, 38 magazines, and 200 storage igloos (LSAAP RPA).

Of the buildings assessed during the 1983 historic properties survey, no Category I, II, or III buildings were identified. Four buildings have since been recognized as eligible for nomination to the NRHP. These are Buildings E-1, E-16, E-17, and Z-1. Building E-1 was constructed in 1942 and is eligible for NRHP under Criteria A and C as a good example of a warehouse associated with LSAAP and its development in support of the WWII effort. Building E-16 was constructed in 1942 and is eligible for NRHP under Criterion A and C as a well-preserved example of an inert warehouse used during WWII. Building E-17 was constructed in 1942 and is eligible for the NRHP under Criterion C as a well-preserved example of a propellant charge building used during WWII. Finally, Building Z-1, which also includes a concrete pond, is eligible for listing in the NRHP also under Criterion C. Buildings E-1, E-16, E-17, and Z-1 are all also eligible under Criterion A for their associations with the development of the installation. All four buildings retain integrity of setting, location, design, materials, workmanship, feeling, and association. (USACE, Tierra Environmental Services, Inc., and Earth Tech 2002)

LSAAP also has few or no WWII-era buildings subject to the Programmatic Memorandum of Agreement (MOA) among the DOD, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation officers (SHPOs) regarding the Demolition of WWII Temporary Buildings, effective June 7, 1986, as amended. The Army has completed all mitigation required prior to the transfer or demolition of WWII temporary buildings (1939-1946) so no further SHPO consultation is required on that class of buildings.

Nine cemeteries are located within LSAAP, covering approximately 256,474 square feet. They are the Elliot Plot Cemetery (576 square feet), the Antioch Cemetery (55,296 square feet), the Mullins Cemetery (7,104 square feet), the Tiller Cemetery (28,656 square feet), the Reed Cemetery (11,232 square feet), the Bob Lane Cemetery (65,500 square feet), the Red Springs Cemetery (45,510 square feet), the Piney Grove Cemetery (41,976 square feet; formerly Red Springs Colored Cemetery), and the Willis W. Langford Cemetery (624 square feet). (Tetra Tech EM, Inc. 2006) The LSAAP cemetery locations (9) are presented on **Figure 3-8**. Tiller

family members, after a recent visit to the Tiller Cemetery (east of Area W), have voiced a concern to LSAAP personnel regarding routine maintenance levels and possible unknown "slave" burials to the south of the cemetery outside boundary fencing near Uncle Grady's burial site. Future consultation and investigations are currently being addressed by LSAAP.

3.6.2.4 Section 106 Consultation

The government Cultural Resources Manager (CRM) manages the cultural resources at LSAAP. Natural resources managers consult and coordinate with the CRM any time an activity or project is planned that might have the potential to impact historic or cultural resources. To comply with the National Historic Preservation Act (NHPA) (Section 106) and the Archaeological Resources Protection Act, the CRM contacts the Texas SHPO to determine further necessary action. Potential actions may require a Phase I archaeological survey, and if potential NRHP eligible sites are found, further excavation work (Phase II and / or Phase III) may be required. If historic structures are involved, the Texas SHPO must approve any proposed modifications or demolition; mitigation efforts may be required (Tetra Tech EM, Inc. 2006). On LSAAP, all site selections, site plans, and construction requests are approved by the LSAAP historic preservation officer prior to implementing any actions that could alter the condition of cultural resources.

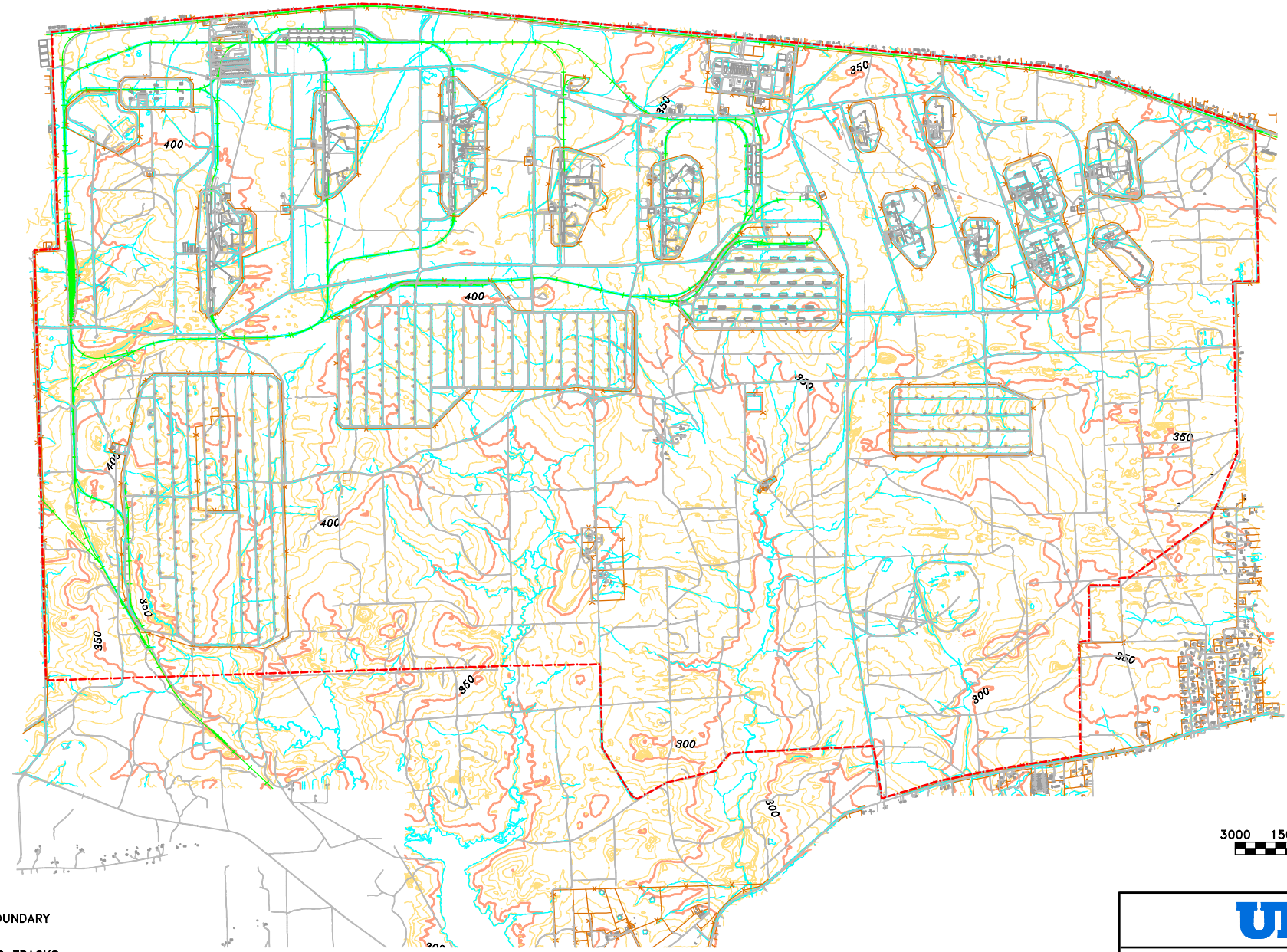
In May 2002, LSAAP contacted the Texas Historical Commission (THC) in reference to the process of completing a NEPA evaluation of LSAAP. The purpose was to assess whether normal operation activities at LSAAP by the Facility Use Contractor would result in significant adverse environmental impacts that cannot be mitigated below the level of significance. In a response letter dated 16 May 2002, the THC reviewed under Section 106 of the NHPA that the proposed undertaking of normal operations will have 'no-effect' on National Register-listed or eligible resources. Correspondence is presented in **Appendix L**.

3.7 SITE MAPS

The 1942 Prack and Prack as-built drawings for LSAAP areas are located in Building I-5, Room 310, West Vault, Drawers S-8 through S-15.

Historic maps have been scanned and are available in **Appendix C**. A limited Geographic Information System (GIS) is available through RRAD and USAEC is developing a LSAAP GIS database.

All supporting maps are provided in **Appendix F** of this ECP. The maps include installation layout by area, including installation roads, buildings, building numbers, railroads, and fences.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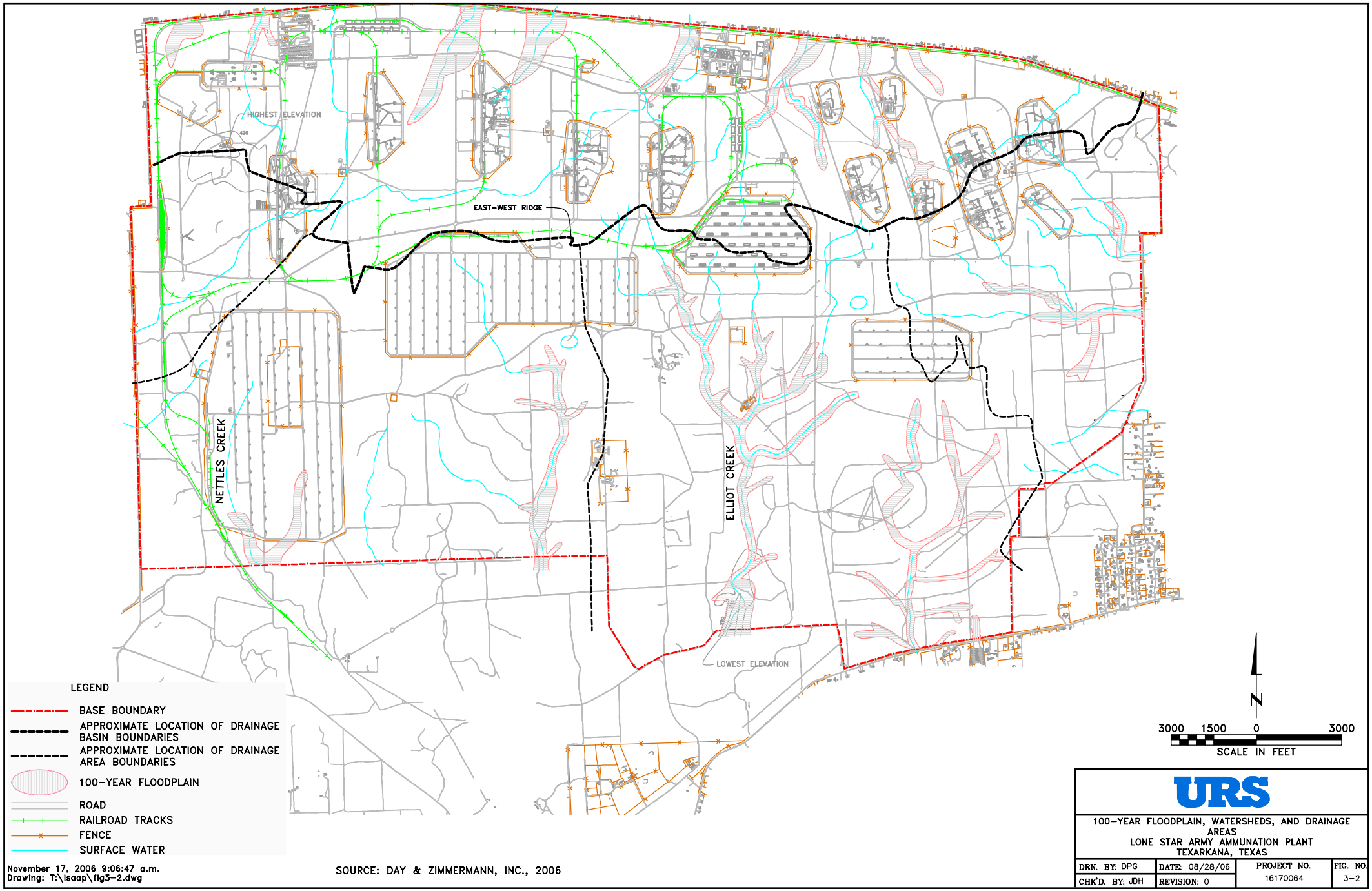
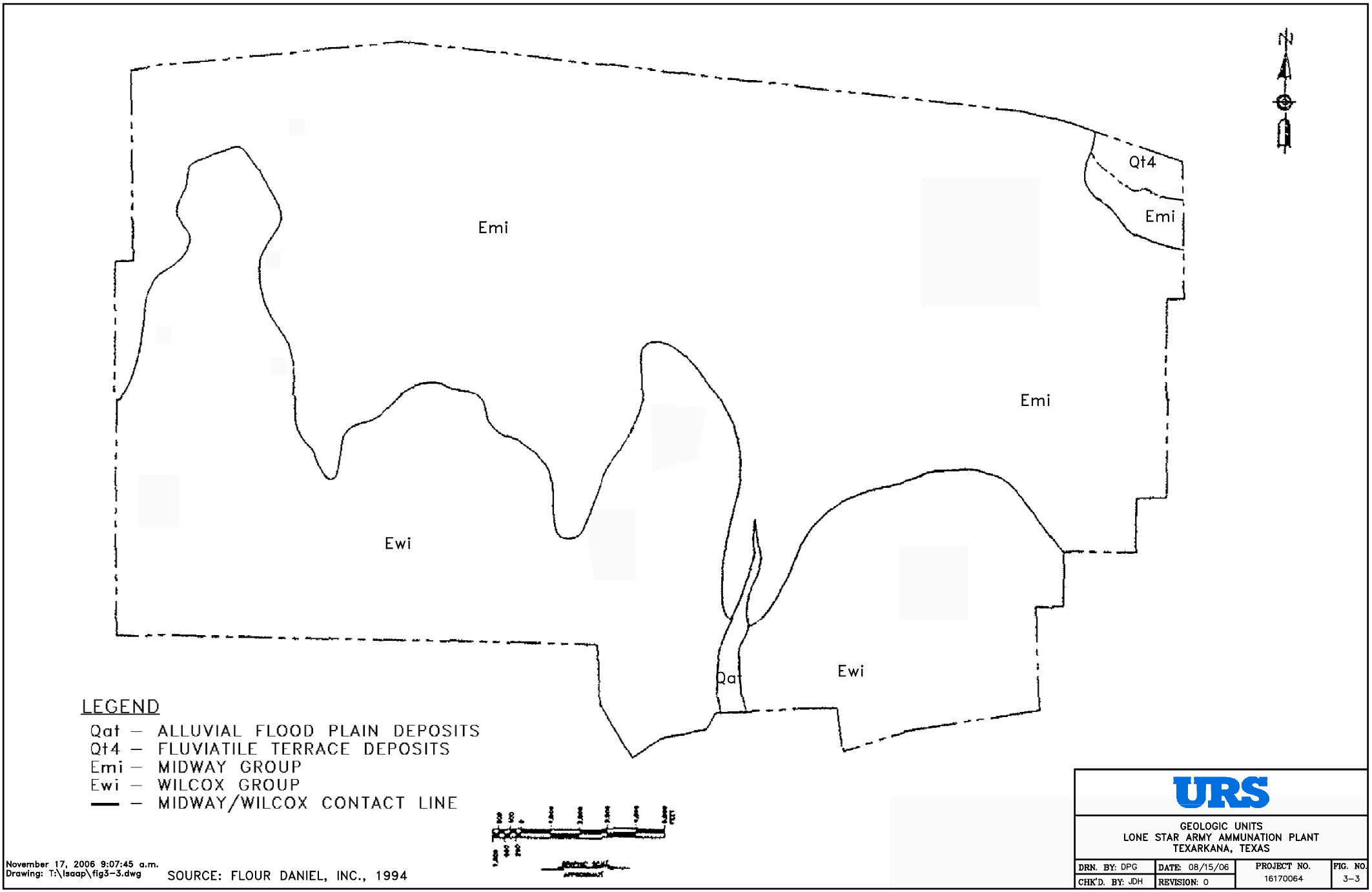
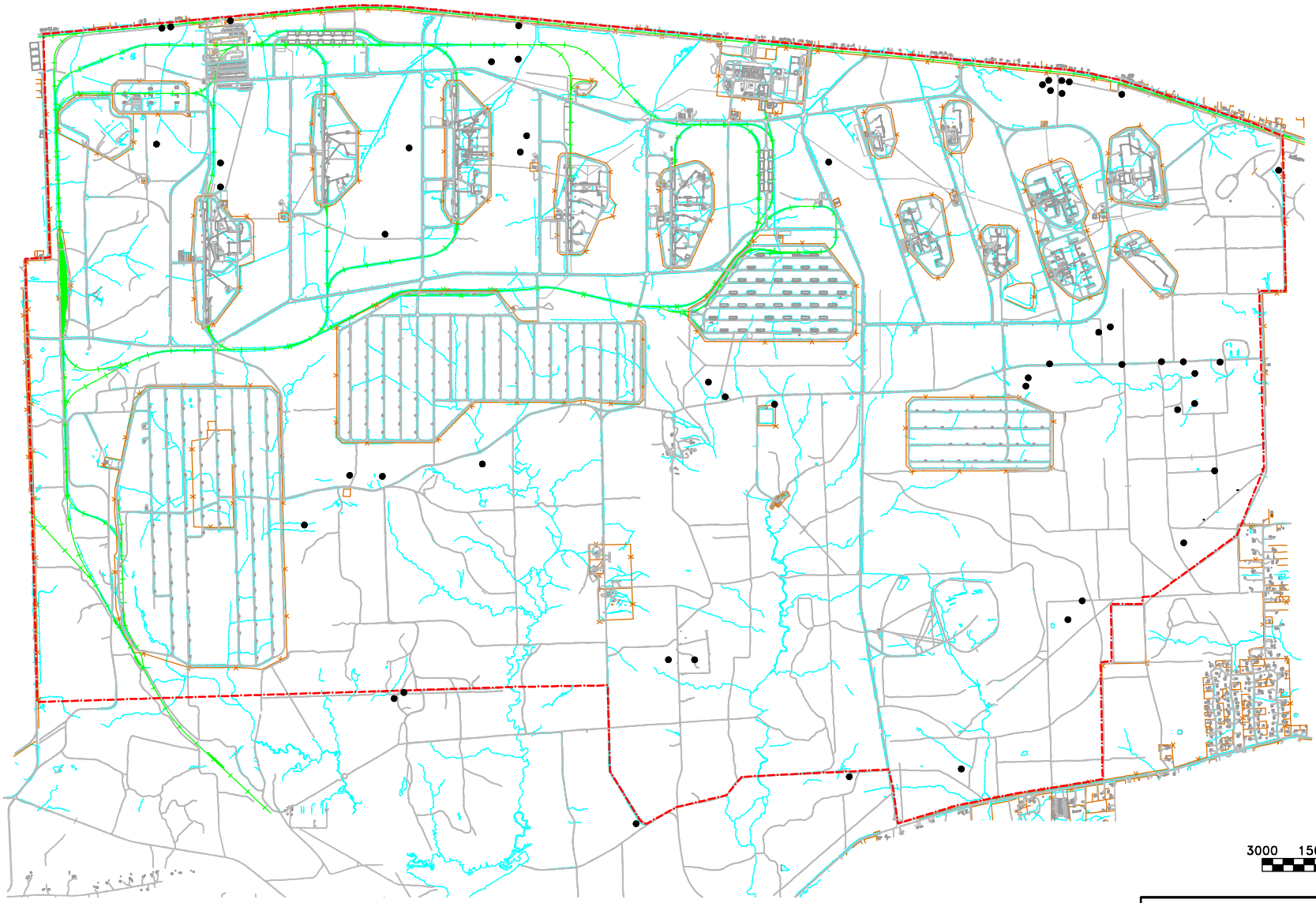
3000 1500 0 3000
SCALE IN FEET
LEGEND
BASE BOUNDARY
ROAD
RAILROAD TRACKS
FENCE
SURFACE WATER
November 17, 2006 9:04:56 a.m.
Drawing: T:\lsaap\fig3-1.dwg
SOURCE: DAY & ZIMMERMANN, INC., 2006
URS
TOPOGRAPHIC MAP
LONE STAR ARMY AMMUNATION PLANT
TEXARKANA, TEXAS
DRN. BY: DPG
DATE: 06/21/06
PROJECT NO. 16170064
FIG. NO. 3-1
CHK'D. BY: JDH
REVISION: 0


HIGHEST ELEVATION
EAST–WEST RIDGE
NETTLES CREEK
ELLIOT CREEK
LOWEST ELEVATION
LEGEND
BASE BOUNDARY
APPROXIMATE LOCATION OF DRAINAGE BASIN BOUNDARIES
APPROXIMATE LOCATION OF DRAINAGE AREA BOUNDARIES
100–YEAR FLOODPLAIN
ROAD
RAILROAD TRACKS
FENCE
SURFACE WATER
N
3000 1500 0 3000
SCALE IN FEET
November 17, 2006 9:06:47 a.m.
Drawing: T:\lsaap\fig3–2.dwg
SOURCE: DAY & ZIMMERMANN, INC., 2006
URS
100–YEAR FLOODPLAIN, WATERSHEDS, AND DRAINAGE AREAS
LONE STAR ARMY AMMUNATION PLANT
TEXARKANA, TEXAS
DRN. BY: DPG
DATE: 08/28/06
PROJECT NO. 16170064
FIG. NO. 3–2
CHK'D. BY: JDH
REVISION: 0


Qt4
Emi
Emi
Emi
Ewi
Qal
Ewi
LEGEND
Qal — ALLUVIAL FLOOD PLAIN DEPOSITS
Qt4 — FLUVIATILE TERRACE DEPOSITS
Emi — MIDWAY GROUP
Ewi — WILCOX GROUP
— — MIDWAY/WILCOX CONTACT LINE
November 17, 2006 9:07:45 a.m.
Drawing: T:\lsaap\fig3-3.dwg
SOURCE: FLOUR DANIEL, INC., 1994
URS
GEOLOGIC UNITS
LONE STAR ARMY AMMUNATION PLANT
TEXARKANA, TEXAS
DRN. BY: DPG
DATE: 08/15/06
PROJECT NO. 16170064
FIG. NO. 3-3
CHK'D. BY: JDH
REVISION: 0



LEGEND

- BASE BOUNDARY
- CISTERN LOCATIONS
- ROAD
- RAILROAD TRACKS
- FENCE
- SURFACE WATER

N

3000 1500 0 3000

SCALE IN FEET

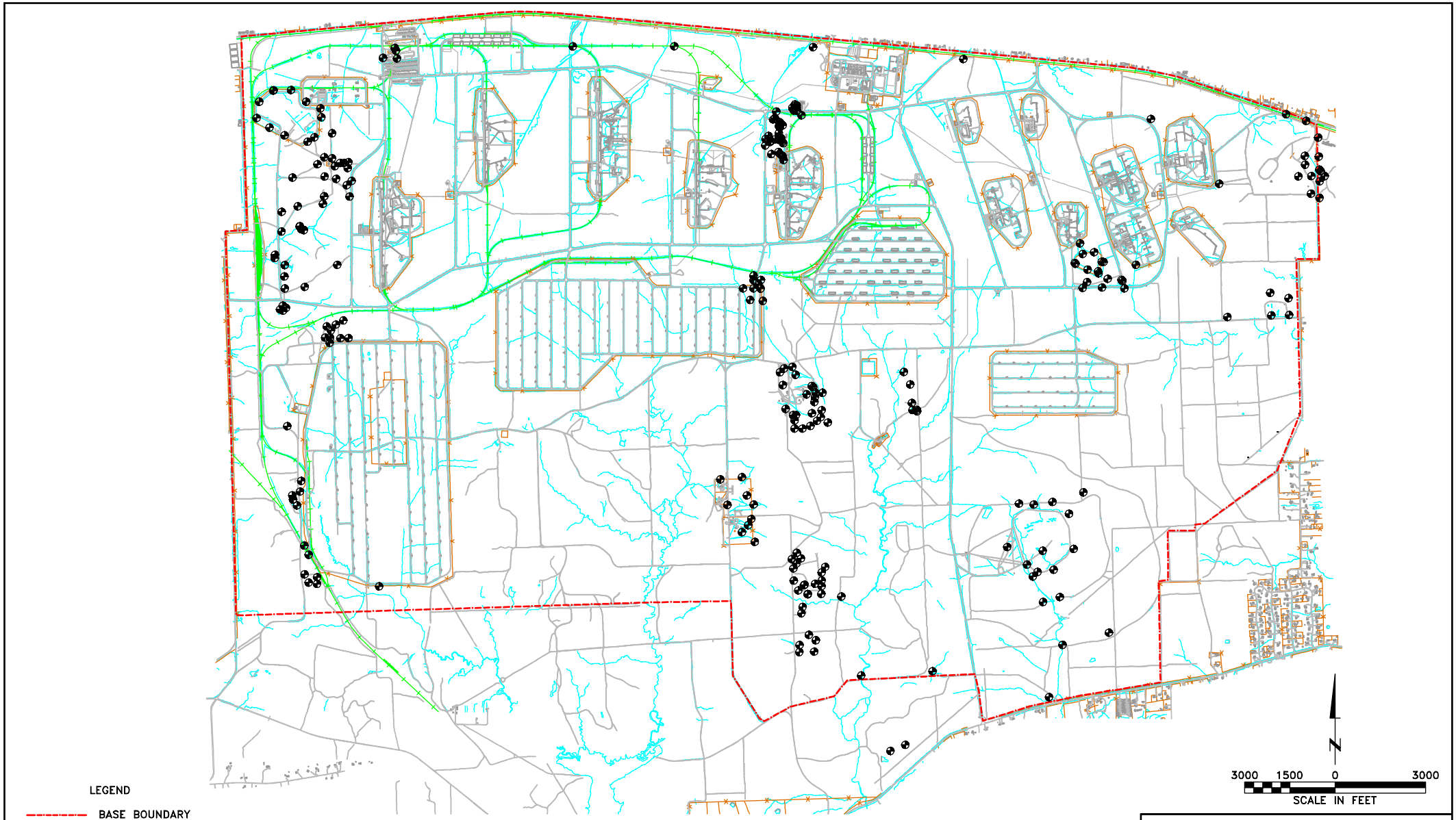
November 17, 2006 9:09:53 a.m.
Drawing: T:\lsaap\fig3-4.dwg

SOURCE: DAY & ZIMMERMANN, INC., 2006

URS

CISTERN LOCATIONS
LONE STAR ARMY AMMUNITION PLANT
TEXARKANA, TEXAS

DRN. BY: DPG	DATE: 06/21/06	PROJECT NO. 16170064	FIG. NO. 3-4
CHK'D. BY: JDH	REVISION: 0		


LEGEND
BASE BOUNDARY
MONITORING WELL LOCATION
ROAD
RAILROAD TRACKS
FENCE
SURFACE WATER
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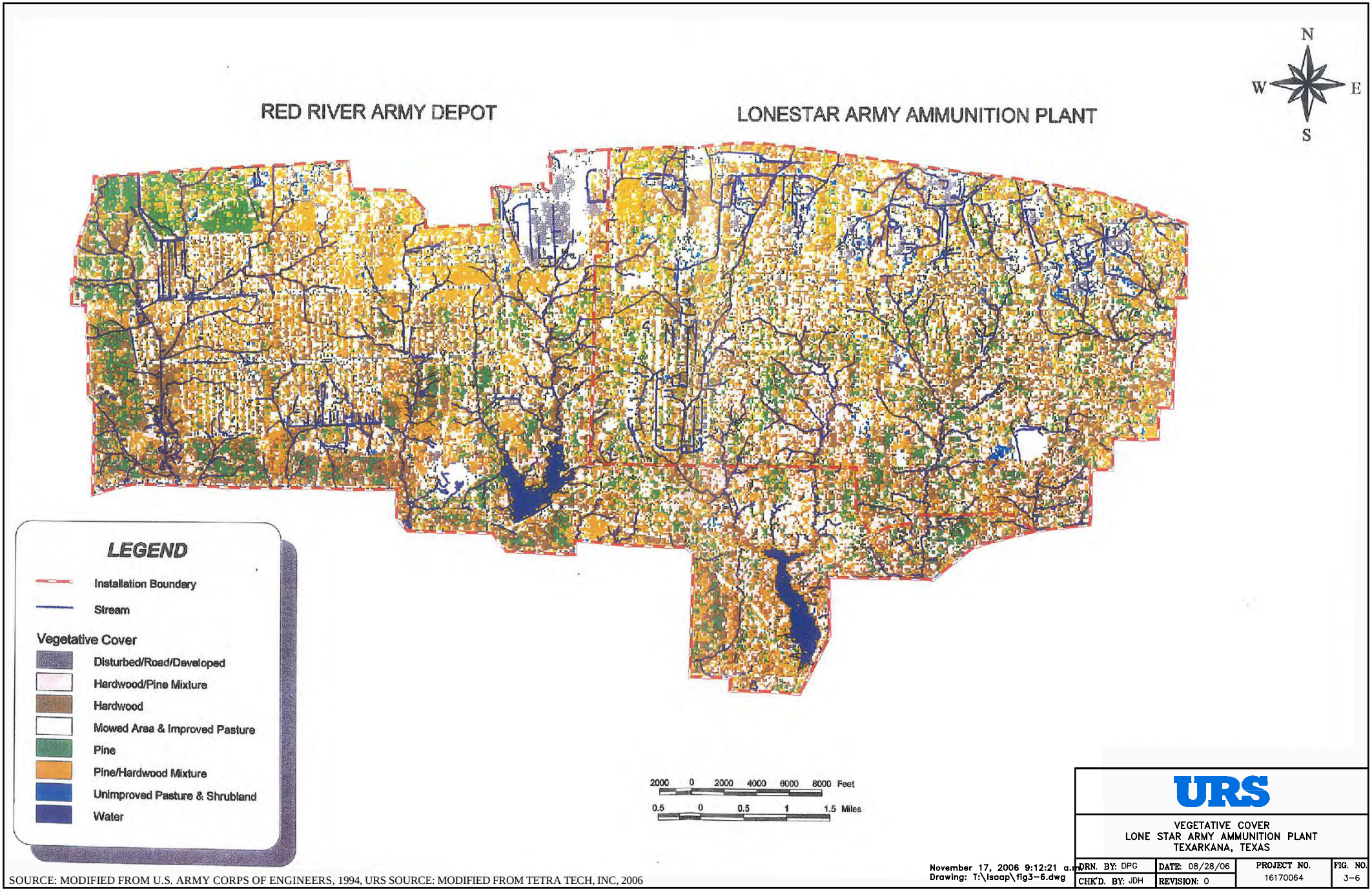
Drawing: T:\lsaap\fig3-5.dwg
SOURCE: DAY & ZIMMERMANN, INC., 2006
N
3000 1500 0 3000
SCALE IN FEET
URS
MONITORING WELL LOCATIONS
LONE STAR ARMY AMMUNITION PLANT
TEXARKANA, TEXAS
DRN. BY: DPG
DATE: 06/29/06
PROJECT NO. 16170064
FIG. NO. 3-5
CHK'D. BY: JDH
REVISION: 0



SOURCE: MODIFIED FROM U.S. ARMY CORPS OF ENGINEERS, 1994, URS SOURCE: MODIFIED FROM TETRA TECH, INC, 2006

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Drawing: T:\lsaap\fig3-6.dwg

URS

VEGETATIVE COVER
LONE STAR ARMY AMMUNITION PLANT
TEXARKANA, TEXAS

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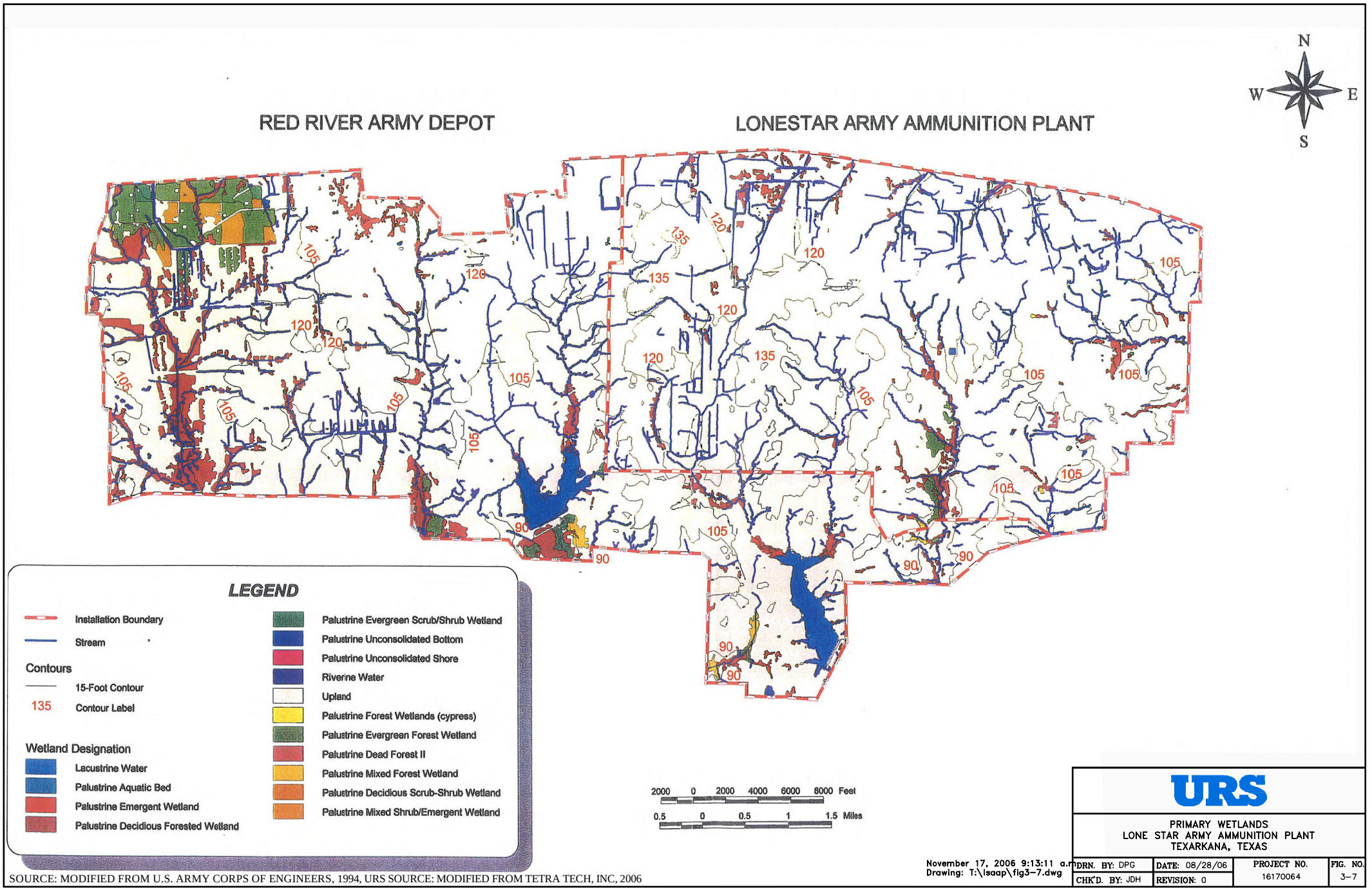
CHK'D. BY: JDH	REVISION: 0	16170064	3-6



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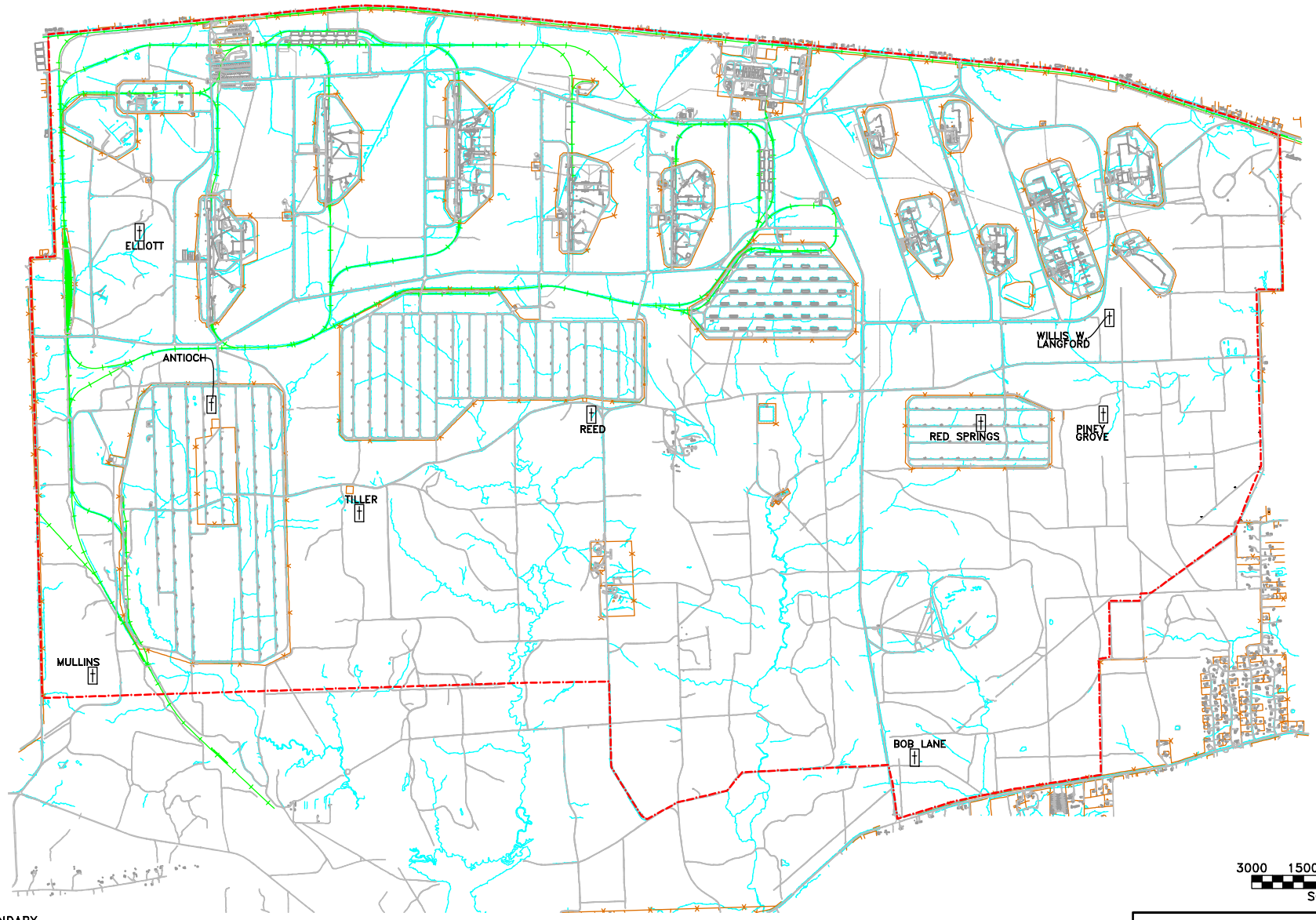
November 17, 2006 9:13:11 a.m.
Drawing: T:\lsaap\fig3-7.dwg

URS

PRIMARY WETLANDS
LONE STAR ARMY AMMUNITION PLANT
TEXARKANA, TEXAS

DRN. BY: DPG	DATE: 08/28/06	PROJECT NO. 16170064	FIG. NO. 3-7
CHK'D. BY: JDH	REVISION: 0		



LEGEND

- BASE BOUNDARY
- CEMETERY
- ROAD
- RAILROAD TRACKS
- FENCE
- SURFACE WATER

SOURCE: PRACK AND PRACK 1942

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Drawing: T:\lsaap\fig3-8.dwg

URS

CEMETERY LOCATIONS
LONE STAR ARMY AMMUNITION PLANT
TEXARKANA, TEXAS

DRN. BY: DPG	DATE: 06/29/06	PROJECT NO. 16170064	FIG. NO. 3-8
CHK'D. BY: JDH	REVISION: 0		

ATTACHMENT II.2

WETLANDS INFORMATION

U.S. Fish and Wildlife Service
National Wetlands Inventory

National Wetlands Inventory

December 15, 2022

Wetlands

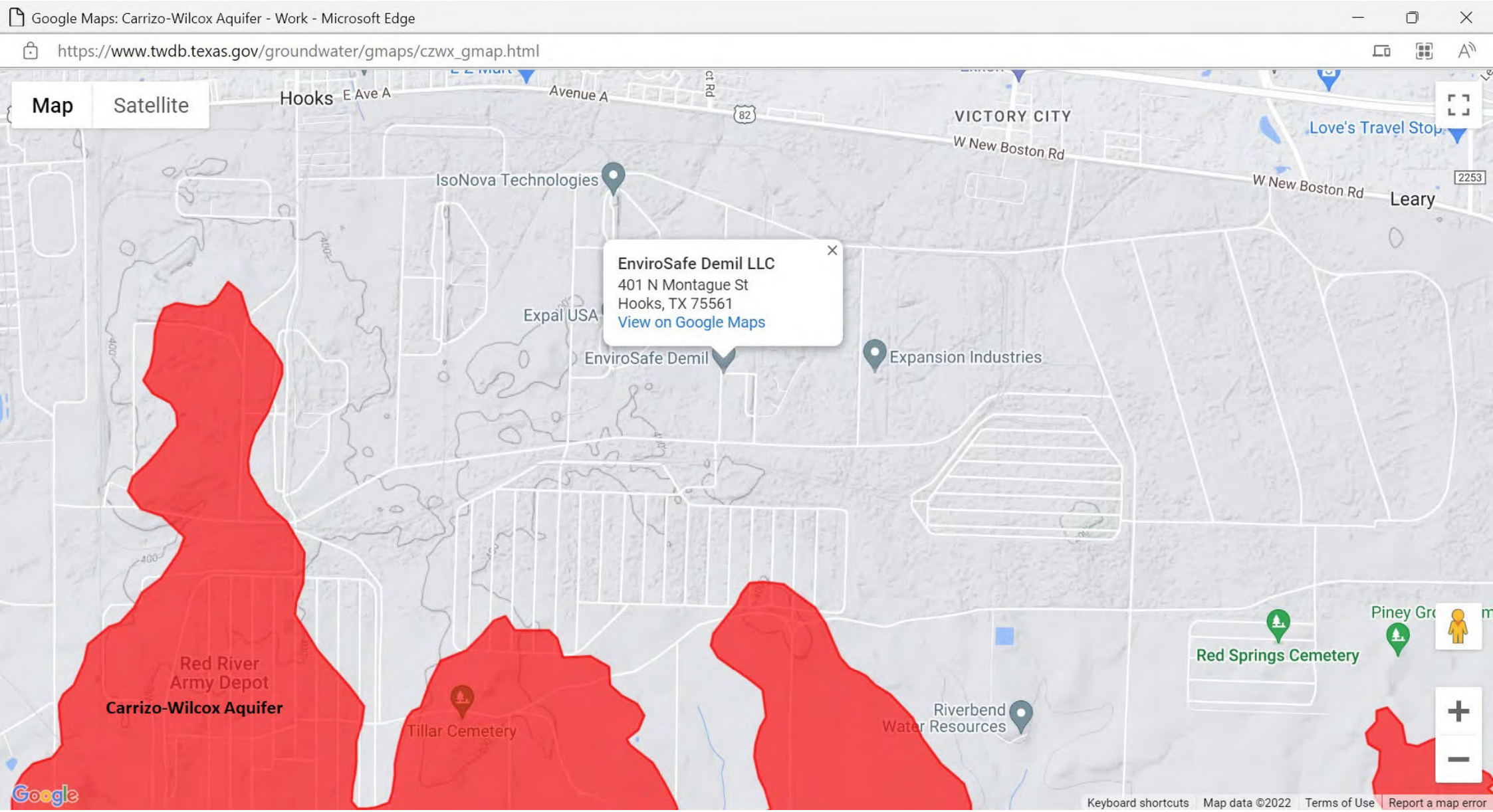
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

ATTACHMENT II.3

AQUIFER INFORMATION


Google Maps: Carrizo-Wilcox Aquifer - Work - Microsoft Edge
https://www.twdb.texas.gov/groundwater/gmaps/czwx_gmap.html
Map
Satellite
Hooks
E Ave A
Avenue A
82
VICTORY CITY
W New Boston Rd
Love's Travel Stop
2253
Leary
IsoNova Technologies
EnviroSafe Demil LLC
401 N Montague St
Hooks, TX 75561
View on Google Maps
Expal USA
EnviroSafe Demil
Expansion Industries
Red River
Army Depot
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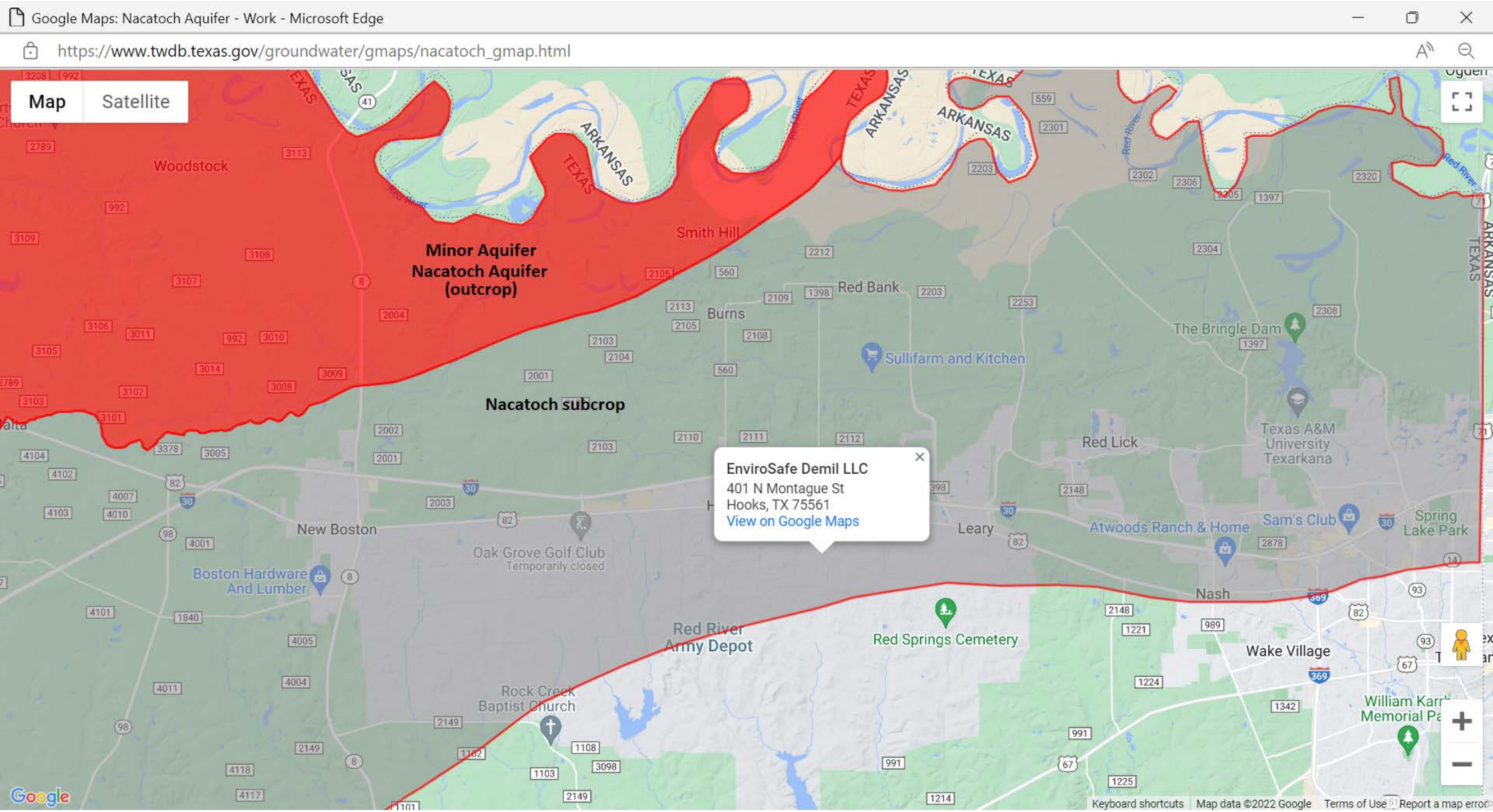
Tillar Cemetery
Riverbend
Water Resources
Red Springs Cemetery
Google
Keyboard shortcuts
Map data ©2022
Terms of Use
Report a map error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https://www.twdb.texas.gov/groundwater/gmaps/nacatoch_gmap.html
Map
Satellite
Minor Aquifer
Nacatoch Aquifer
(outcrop)
Nacatoch subcrop
EnviroSafe Demil LLC
401 N Montague St
Hooks, TX 75561
View on Google Maps
Woodstock
Smith Hill
Red Bank
Burns
Sullifarm and Kitchen
The Bringle Dam
Texas A&M University Texarkana
Red Lick
Leary
New Boston
Oak Grove Golf Club
Temporarily closed
Boston Hardware And Lumber
Atwoods Ranch & Home
Sam's Club
Spring Lake Park
Nash
Red River Army Depot
Red Springs Cemetery
Wake Village
Rock Creek Baptist Church
ARKANSAS
TEXAS
Red River
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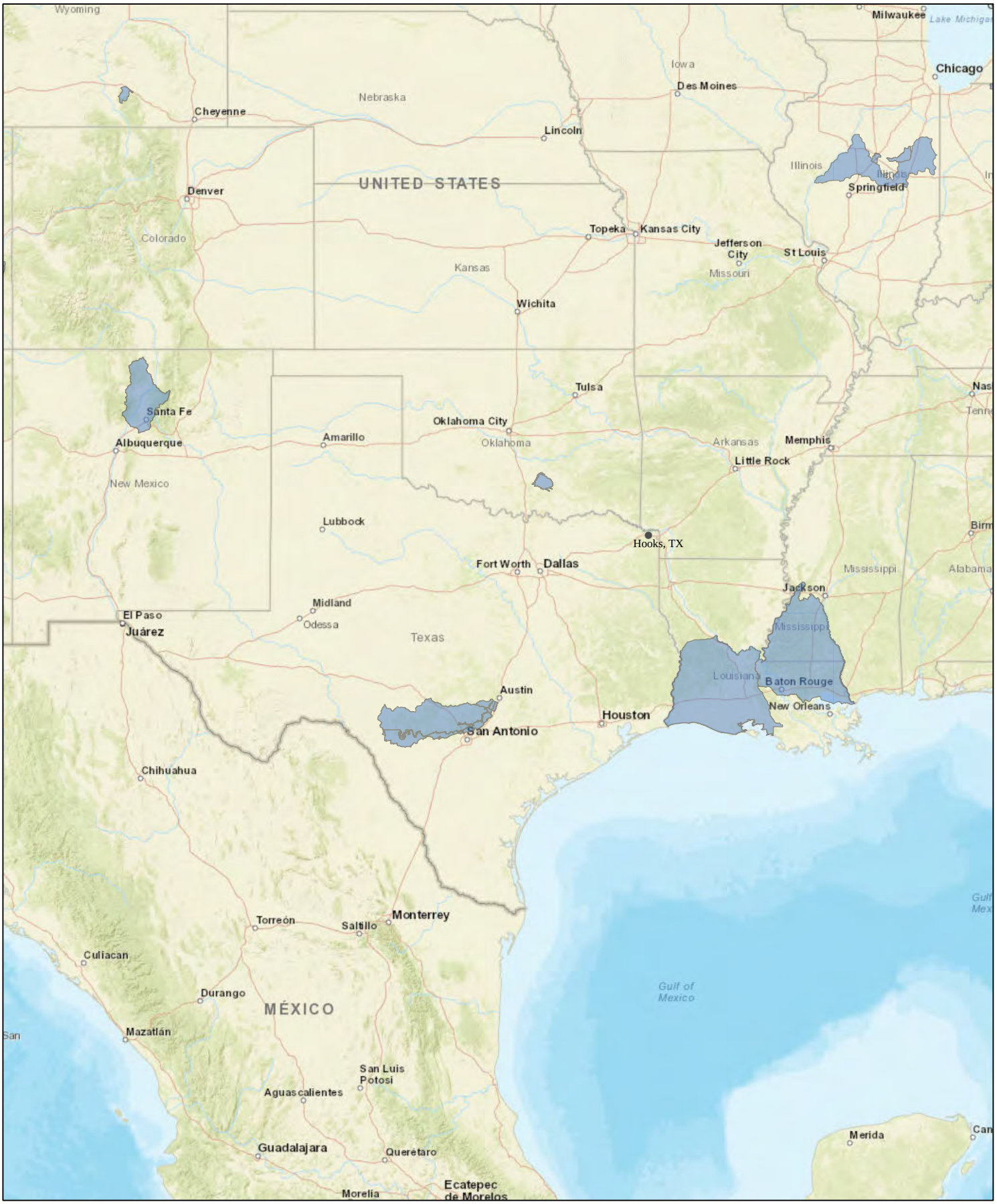

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Sole_Source_Aquifers

1:9,244,649

0 90 180 360 mi

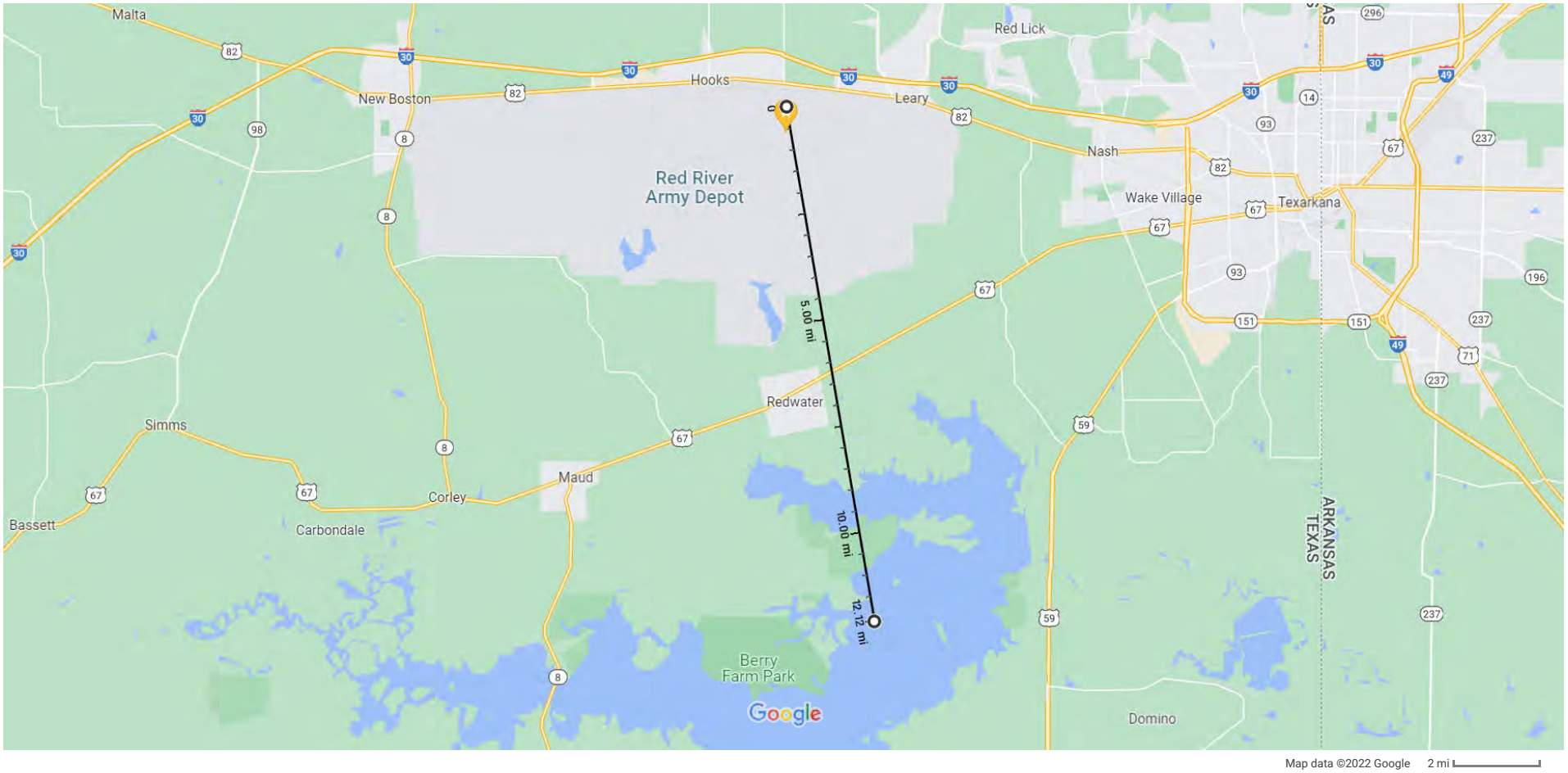
0 145 290 580 km

Esri, HERE, Garmin, NGA, USGS, NPS

Sole-Source Aquifers

ATTACHMENT II.4

SURFACE WATER INTAKE

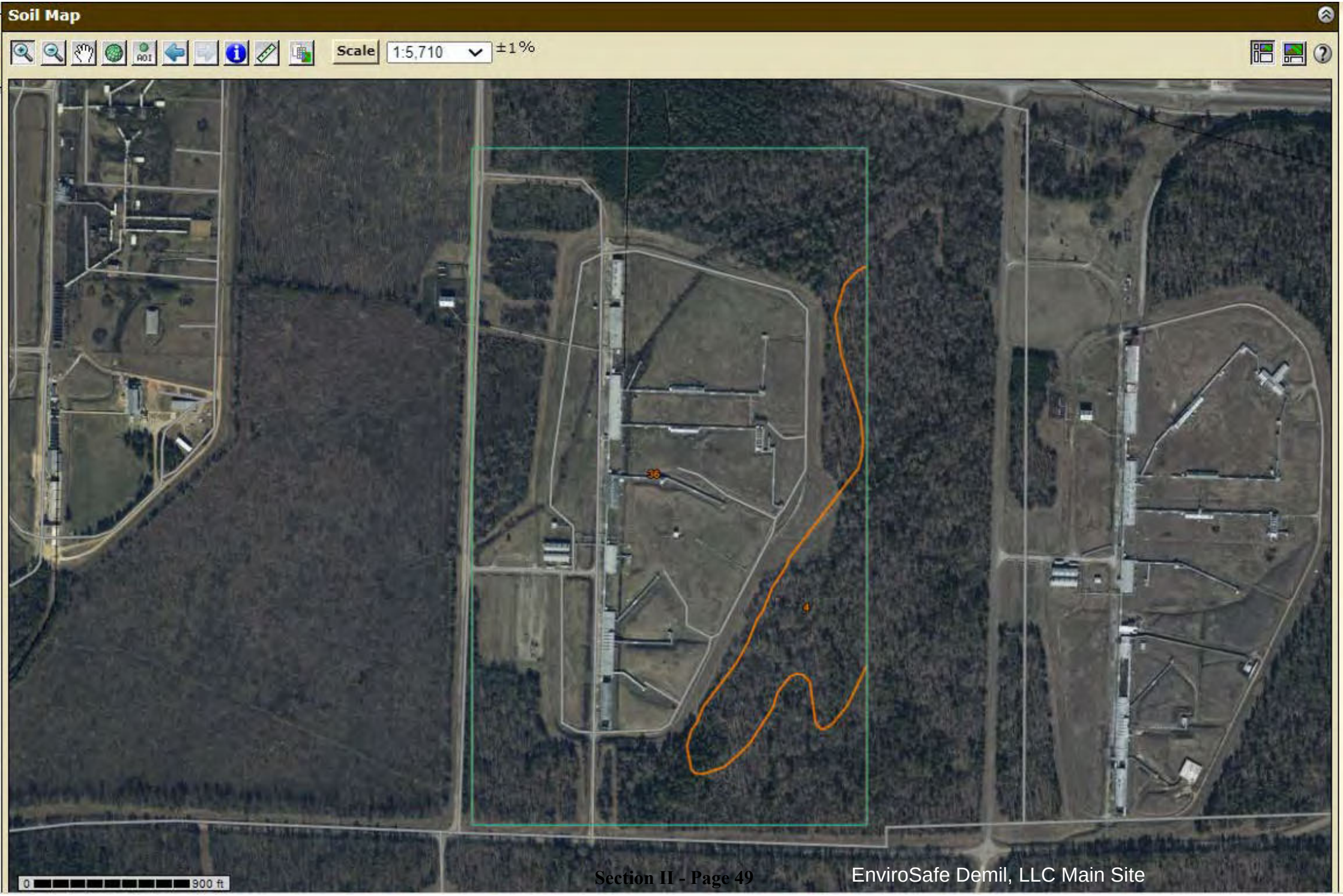


Measure distance
Total distance: 12.12 mi (19.50 km)

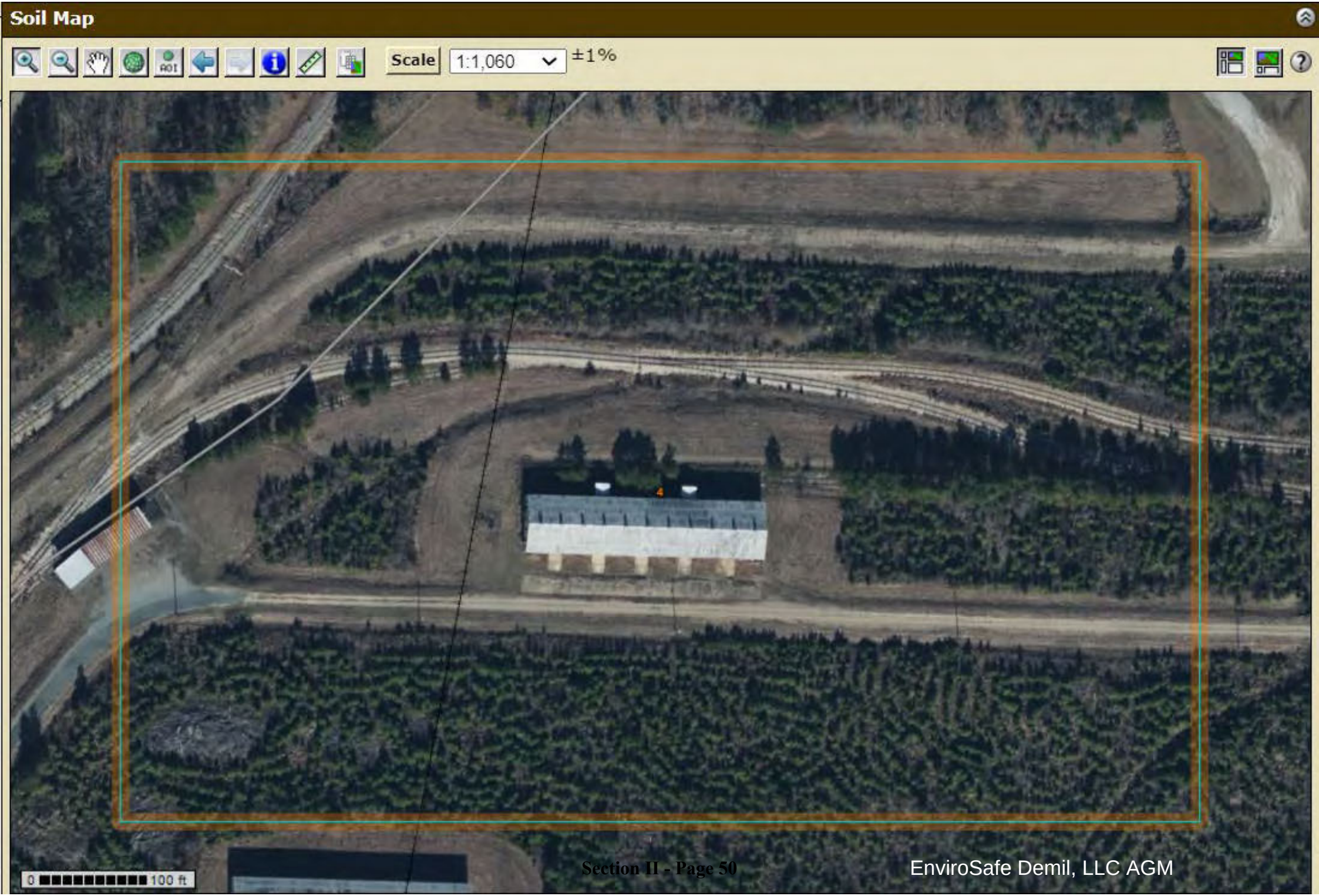
Drinking Water Surface Water Intakes
Wright Patman Lake

ATTACHMENT II.5

SOIL UNIT INFORMATION



EnviroSafe Demil, LLC Main Site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Scale
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±1%
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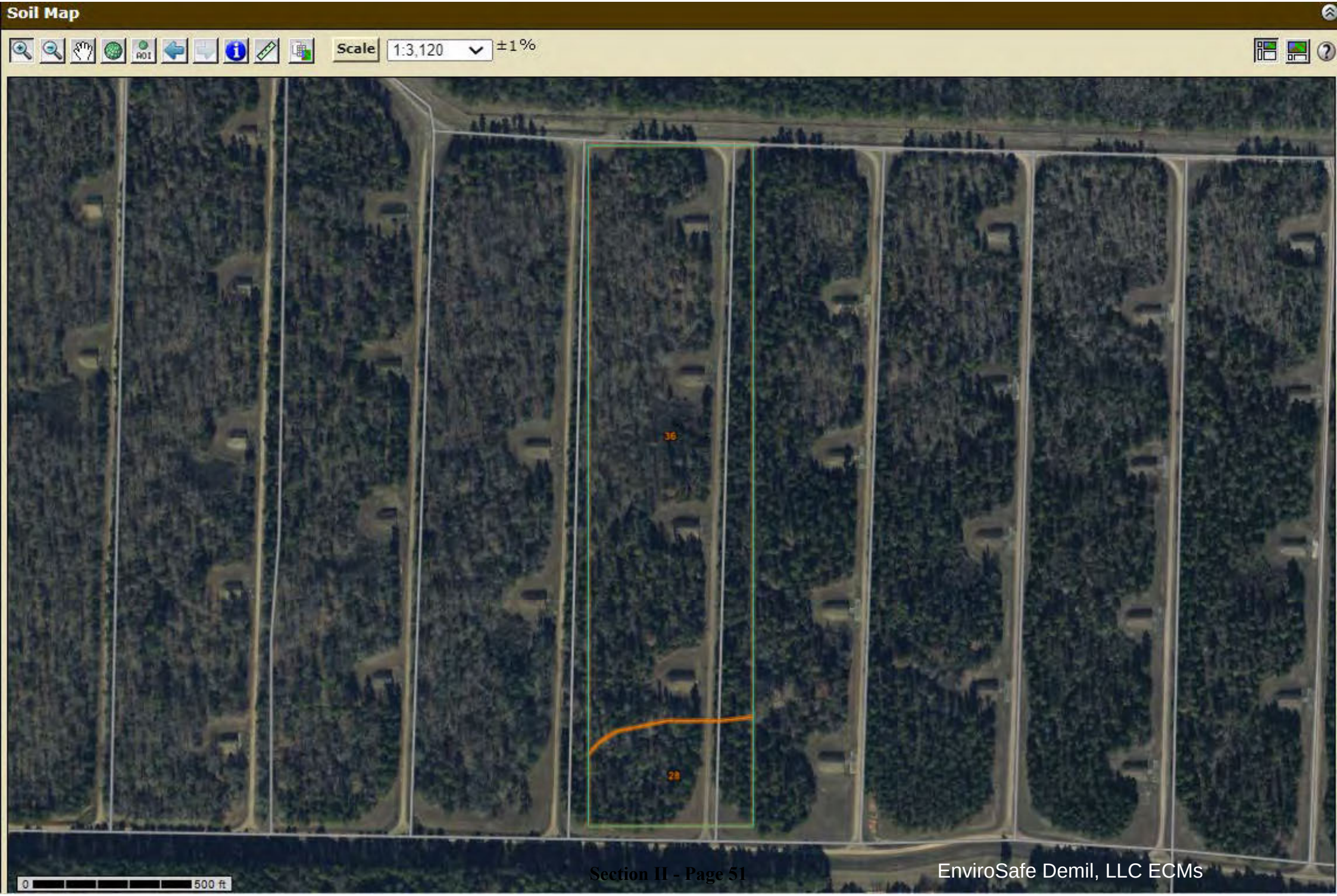
100 ft


Soil Map
Scale
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±1%
36
28
0
500 ft

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties–Bowie County, Texas														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
4—Annona loam, 1 to 3 percent slopes														
Annona	85	D	0-12	Loam	CL-ML, SC-SM, ML, SM	A-4	0- 0- 0	0- 0- 0	95-98-100	95-98-100	75-88-100	45-60-75	16-23-30	NP-4 -7
			12-45	Clay loam, clay	CH	A-7	0- 0- 0	0- 0- 0	95-98-100	95-98-100	90-95-100	75-85-95	51-61-70	30-38-45
			45-80	Clay, clay loam	CH, CL	A-7	0- 0- 0	0- 0- 0	95-98-100	95-98-100	90-95-100	75-85-95	41-53-65	25-35-45

Engineering Properties–Bowie County, Texas														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
28—Ruston fine sandy loam, 3 to 8 percent slopes														
Ruston	85	B	0-4	Fine sandy loam	CL, SC, SM	A-2-4, A-4, A-6	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	83-92-100	35-47-56	0-24 -34	NP-9 -13
			4-9	Fine sandy loam	CL, SC, SM	A-4, A-6	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	83-92-100	38-47-56	0-22 -31	NP-9 -13
			9-46	Sandy clay loam	CL, SC	A-2-6, A-6, A-7-6	0- 0- 0	0- 0- 0	100-100 -100	86-94-100	75-89-100	35-46-58	27-36 -44	12-18-24
			46-55	Fine sandy loam	SC-SM, SC	A-2-4, A-4, A-6	0- 0- 0	0- 0- 0	100-100 -100	86-94-100	75-87-98	31-38-46	20-25 -31	6-9 -13
			55-80	Sandy clay loam	CL, SC	A-2-4, A-6, A-7-6	0- 0- 0	0- 0- 0	100-100 -100	86-93-100	72-89-100	33-46-61	25-36 -45	9-18-25
36—Sawyer silt loam, 0 to 3 percent slopes														
Sawyer, affr 25-30	80	C	0-6	Silt loam	CL-ML, CL, ML	A-4	0- 0- 0	0- 0- 0	100-100 -100	95-98-100	85-90-95	50-70-90	25-28 -30	3-7 -10
			6-26	Silt loam, silty clay loam, loam	CL	A-6	0- 0- 0	0- 0- 0	100-100 -100	95-98-100	85-90-95	60-78-95	30-35 -40	10-15-20
			26-80	Clay, silty clay, silty clay loam	CH, CL	A-7	0- 0- 0	0- 0- 0	100-100 -100	95-98-100	90-95-100	75-85-95	45-53 -60	20-28-35

Data Source Information

Soil Survey Area: Bowie County, Texas
Survey Area Data: Version 20, Aug 24, 2022

ATTACHMENT II.6

CRITICAL HABITAT
OF AN ENDANGERED SPECIES OF PLANT OR ANIMAL

Supplemental Information
Critical Habitat of an Endangered Species of Plant or Animal
30 TAC 335.204(a)(8), (b)(10), (c)(9), (d)(9), and/or (e)(11)

Source:
Texas Parks and Wildlife Department
Rare, Threated, and Endangered Species of Texas by County
Last Updated: July 12, 2022
https://tpwd.texas.gov/gis/rtest/

Information from the above Texas Parks and Wildlife Department source indicates that there are no endangered species in Bowie County. The list of rare, threatened, and endangered species for Bowie County is shown below.

Bowie County
Rare, Threatened, and Endangered Species

Taxonomic Name	Scientific Name	Common Name	Federal Protection/ Listing Status	State Protection/ Listing Status	NatureServe Global Conservation Status Rank	NatureServe Texas Conservation Status Rank
Amphibians	Lithobates areolatus areolatus	southern crawfish frog			G4T4	S3
Amphibians	Pseudacris streckeri	Strecker's chorus frog			G5	S3
Birds	Plegadis chihi	white-faced ibis		T	G5	S4B
Birds	Elanoides forficatus	swallow-tailed kite		T	G5	S2B
Birds	Mycteria americana	wood stork		T	G4	SHB,S2N
Birds	Haliaeetus leucocephalus	bald eagle			G5	S3B,S3N
Birds	Charadrius melodus	piping plover	LT	T	G3	S2N
Birds	Leucophaeus pipixcan	Franklin's gull			G5	S2N
Birds	Anthus spragueii	Sprague's pipit			G3G4	S3N
Birds	Peucaea aestivalis	Bachman's sparrow		T	G3	S1B
Fish	Notropis atrocaudalis	blackspot shiner			G4	S3
Fish	Notropis bairdi	Red River shiner			G4	S3
Fish	Notropis maculatus	taillight shiner			G5	S1
Fish	Notropis potteri	chub shiner		T	G4	S2
Fish	Notropis chalybaeus	ironcolor shiner			G4	S3
Fish	Notropis shumardi	silverband shiner			G5	S4
Fish	Scaphirhynchus platorynchus	shovelnose sturgeon	SAT	T	G4	S2
Fish	Polyodon spathula	paddlefish		T	G4	S3
Fish	Hybognathus nuchalis	Mississippi silvery minnow			G5	S4
Fish	Hiodon alosoides	goldeye			G5	S3
Fish	Campostoma spadiceum	highland stoneroller			G4G5	SNR
Fish	Percina maculata	blackside darter		T	G5	S1
Fish	Etheostoma radiosum	orangebelly darter			G4	S3
Fish	Macrhybopsis storeriana	silver chub			G5	S3

Bowie County
Rare, Threatened, and Endangered Species (continued)

Taxonomic Name	Scientific Name	Common Name	Federal Protection/ Listing Status	State Protection/ Listing Status	NatureServe Global Conservation Status Rank	NatureServe Texas Conservation Status Rank
Fish	Erimyzon claviformis	western creek chubsucker		T	G5	S2S3
Insects	Bombus pensylvanicus	American bumblebee			G3G4	SNR
Mammals	Puma concolor	mountain lion			G5	S2S3
Mammals	Spilogale putorius	eastern spotted skunk			G4	S1S3
Mammals	Mustela frenata	long-tailed weasel			G5	S5
Mammals	Sylvilagus aquaticus	swamp rabbit			G5	S5
Mammals	Ursus americanus	black bear		T	G5	S3
Mammals	Ondatra zibethicus	muskrat			G5	S5
Mammals	Myotis austroriparius	southeastern myotis bat			G4	S3?
Mammals	Perimyotis subflavus	tricolored bat			G3G4	S2
Mammals	Lasiurus cinereus	hoary bat			G3G4	S4
Mammals	Lasiurus borealis	eastern red bat			G3G4	S4
Mammals	Eptesicus fuscus	big brown bat			G5	S5
Plants	Thalictrum arkansanum	Arkansas meadow-rue			G2Q	S2
Plants	Crataegus viridis var. glabriuscula	Sutherland hawthorn			G5T3T4	S3
Plants	Quercus arkansana	Arkansas oak			G3	S1
Reptiles	Macrochelys temminckii	alligator snapping turtle		T	G3	S2
Reptiles	Crotalus horridus	timber (canebrake) rattlesnake			G4	S4
Reptiles	Sistrurus miliarius	pygmy rattlesnake			G5	S2S3
Reptiles	Terrapene carolina	eastern box turtle			G5	S3
Reptiles	Ophisaurus attenuatus	slender glass lizard			G5	S3
Reptiles	Phrynosoma cornutum	Texas horned lizard		T	G4G5	S3
Reptiles	Plestiodon septentrionalis	prairie skink			G5	S2

Notes:
LE or LT: Federally Listed Endangered or Threatened
PE or PT: Federally Proposed Endangered or Threatened
SAE or SAT: Federally Listed Endangered or Threatened by Similarity of Appearance
C: Federal Candidate for Listing
DL or PDL: Federally Delisted or Proposed for Delisting
E or T: State Listed Endangered or Threatened
NT: Not tracked or no longer tracked by the State

Section II – Facility Siting Criteria

Appendix II.A – Requirements for Storage or Processing Facilities, Land Treatment Facilities, Waste Piles, Storage Surface Impoundments and Landfills

Table II.A - Requirements for Storage or Processing Facilities, Land Treatment Facilities, Waste Piles, Storage Surface Impoundments and Landfills is included as part of Table II. The location of information for the answers to the questions in Table II.A can be found below.

Wetlands
Section 2.4 of Appendix II – Facility Siting Criteria
Attachment II.2 – Wetlands Information

Critical Habitat of an Endangered Species of Plant or Animal
Section ~~2.9~~3.3 of Appendix II – Facility Siting Criteria
Attachment II.~~5~~ 6 – Critical Habitat of an Endangered Species of Plant or Animal

Sole-Source Aquifer
Section 2.5 of Appendix II – Facility Siting Criteria
Attachment II.3 – Additional Aquifer Information

Regional Aquifer
Section 2.5 of Appendix II – Facility Siting Criteria
Attachment II.3 – Additional Aquifer Information

Unified Soil Classification
Section 3.2 of Appendix II – Facility Siting Criteria
Attachment II.5 – Soil Unit Information

Public Drinking Water from Lake
Section 3.1 of Appendix II – Facility Siting Criteria
Attachment II.4 – Surface Water Intake

Active Geologic Processes
Section 2.6 of Appendix II – Facility Siting Criteria
Appendix VI.A – Geology and Topography
Attachment VI.A.1 – Geologic Information
Attachment VI.A.2 – Fault Information
Attachment VI.A.3 – Earthquake Information

Faults
Appendix VI.A – Geology and Topography
Attachment VI.A.2 – Fault Information

Section II – Facility Siting Criteria

Appendix II.B – Appendix II.E

Appendix II.B – Additional Requirements for Land Treatment Facilities
Not Applicable
ESD has no land treatment facilities.

Appendix II.C – Additional Requirements for Waste Piles
Not Applicable
ESD has no waste piles.

Appendix II.D – Additional Requirements for Storage Surface Impoundments
Not Applicable
ESD has no storage surface impoundments.

Appendix II.E – Additional Requirements for Landfills (and Surface Impoundments Closed as Landfills with Wastes in Place)
Not Applicable
ESD has no landfills or surface impoundments closed as landfills with wastes in place.

Section II - Facility Siting Criteria

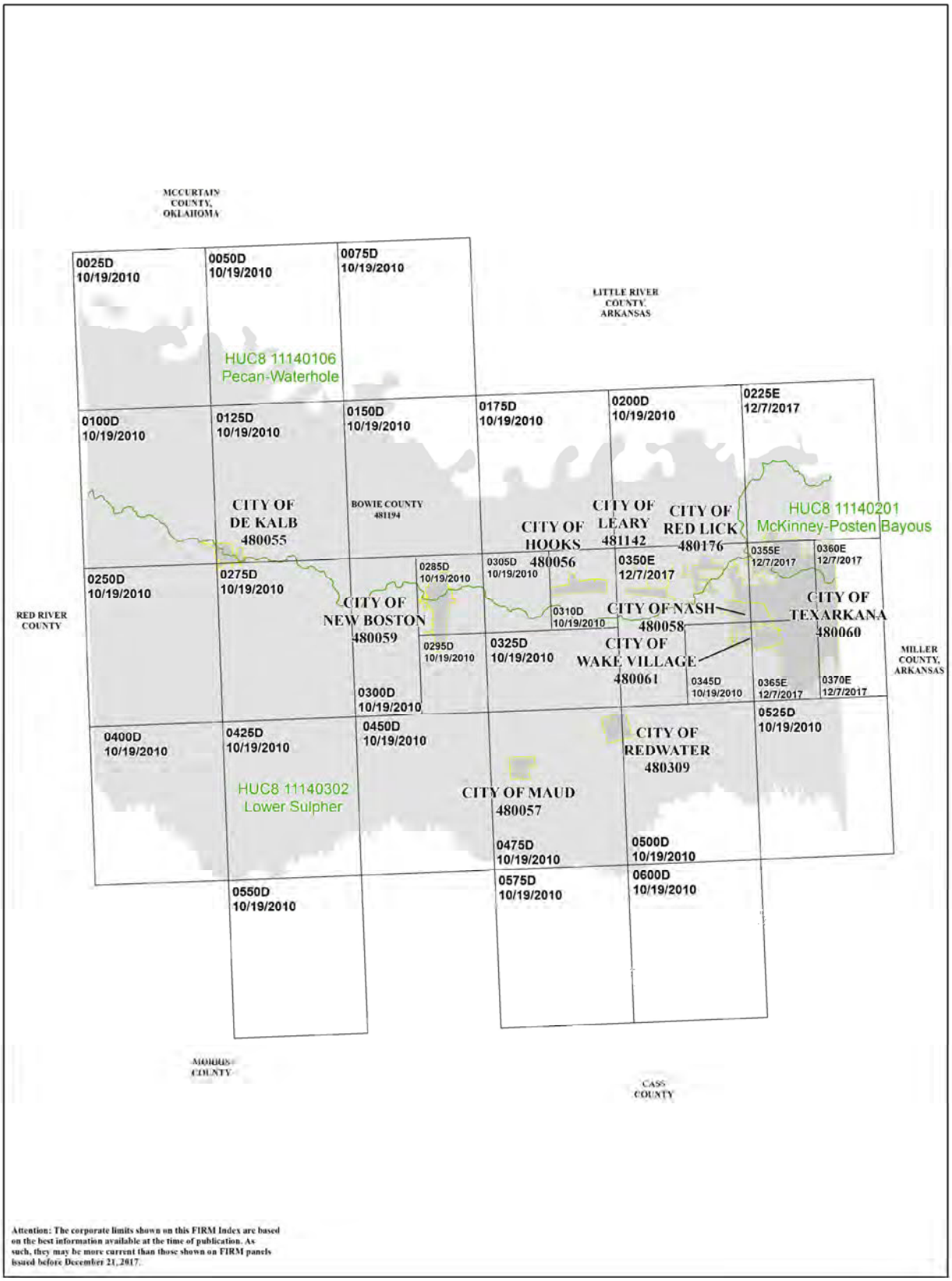
Appendix II.F - Flooding

EnviroSafe Demil, LLC (ESD) is not within a 100-year floodplain. Floodplain maps are provided in this appendix.

The facility's boundaries are near the intersection of the floodplain map panels and the facility lies on three different panels. The first two pages in this appendix show the overall layout of the floodplain maps. The remainder of the appendix is divided into three sections, one for each area of the facility. The table below shows which section each area of the facility is covered in and which panels are associated with each area of the facility.

Appendix Section	Facility Area	FIRM Panel Number
Section II.F.1	Main ESD site: HBC and Rocket Motor Ops Building	310 of 600 (0310D)
Section II.F.2	Above Ground Magazine (AGM) storage	350 of 600 (0350D)
Section II.F.3	Earth Covered Magazines (ECMs) storage	310 of 600 (0310D) 325 of 600 (0325D)

Each section includes an unaltered copy of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) map. The next pages in each section show the FEMA FIRM map with the facility boundaries shown. The last pages in each section show a closer view of the facility area on a FIRMETTE map. All facility areas are in Zone X, Area of Minimal Flood Hazard.



Attention: The corporate limits shown on this FIRM Index are based on the best information available at the time of publication. As such, they may be more current than those shown on FIRM panels issued before December 21, 2017.

1 inch = 27,083 feet 1:325,000

0 7,500 15,000 30,000 45,000 60,000 feet

Map Projection:
State Plane Texas North Central FIPS 4202
North American Datum 1983

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP INDEX

BOWIE COUNTY, TEXAS and Incorporated Areas

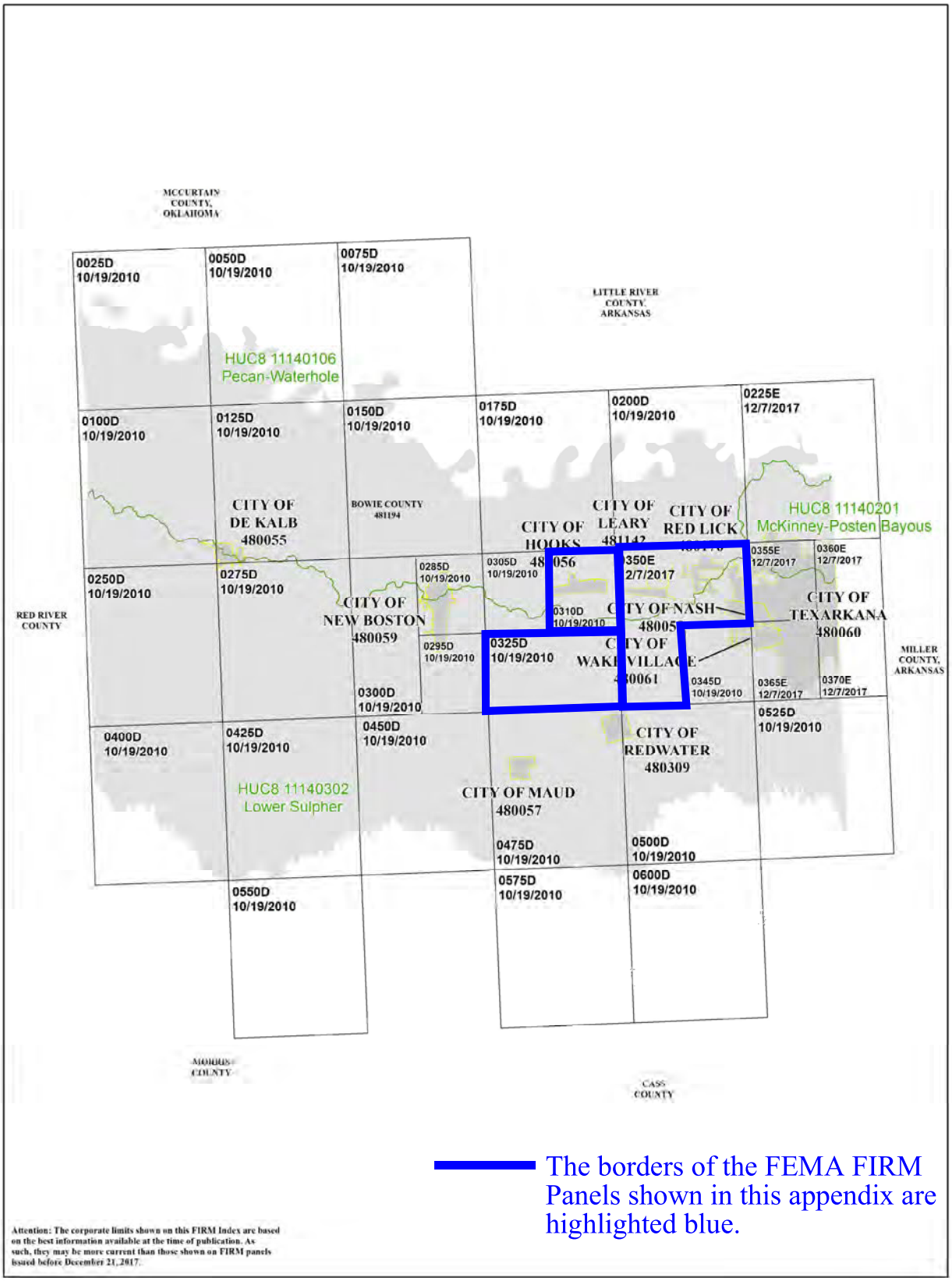
PANELS PRINTED:

0025, 0050, 0075, 0100, 0125, 0150, 0175, 0200, 0225, 250, 0275, 0285, 0295, 0300, 0305, 0310, 0325, 0345, 0350, 0355, 0360, 0365, 0370, 0400, 0425, 0450, 0475, 0500, 0525, 0550, 0575, 0600

FEMA

MAP NUMBER
48037CIND0B

MAP REVISED
DECEMBER 21, 2017


MCCURTAIN COUNTY, OKLAHOMA
LITTLE RIVER COUNTY, ARKANSAS
RED RIVER COUNTY
MILLER COUNTY, ARKANSAS
MORRIS COUNTY
CASS COUNTY
0025D 10/19/2010
0050D 10/19/2010
0075D 10/19/2010
HUC8 11140106 Pecan-Waterhole
0100D 10/19/2010
0125D 10/19/2010
0150D 10/19/2010
0175D 10/19/2010
0200D 10/19/2010
0225E 12/7/2017
CITY OF DE KALB 480055
BOWIE COUNTY 481194
CITY OF HOOKS
CITY OF LEARY 481142
CITY OF RED LICK
HUC8 11140201 McKinney-Posten Bayous
0250D 10/19/2010
0275D 10/19/2010
0285D 10/19/2010
0305D 10/19/2010
0310D 10/19/2010
0350E 12/7/2017
0355E 12/7/2017
0360E 12/7/2017
CITY OF NEW BOSTON 480059
CITY OF NASH 480058
CITY OF TEXARKANA 480060
0295D 10/19/2010
0325D 10/19/2010
CITY OF WAKE VILLAGE 480061
0345D 10/19/2010
0365E 12/7/2017
0370E 12/7/2017
0300D 10/19/2010
0400D 10/19/2010
0425D 10/19/2010
0450D 10/19/2010
0525D 10/19/2010
CITY OF REDWATER 480309
HUC8 11140302 Lower Sulphur
CITY OF MAUD 480057
0475D 10/19/2010
0500D 10/19/2010
0550D 10/19/2010
0575D 10/19/2010
0600D 10/19/2010
The borders of the FEMA FIRM Panels shown in this appendix are highlighted blue.
Attention: The corporate limits shown on this FIRM Index are based on the best information available at the time of publication. As such, they may be more current than those shown on FIRM panels issued before December 21, 2017.
1 inch = 27,083 feet
1:325,000
0 7,500 15,000 30,000 45,000 60,000 feet
Map Projection:
State Plane Texas North Central FIPS 4202
North American Datum 1983
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV
SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP INDEX
BOWIE COUNTY, TEXAS and Incorporated Areas
PANELS PRINTED:
0025, 0050, 0075, 0100, 0125, 0150, 0175, 0200, 0225, 250, 0275, 0285, 0295, 0300, 0305, 0310, 0325, 0345, 0350, 0355, 0360, 0365, 0370, 0400, 0425, 0450, 0475, 0500, 0525, 0550, 0575, 0600
FEMA
MAP NUMBER
48037CIND0B
MAP REVISED
DECEMBER 21, 2017

APPENDIX II.F - FLOODING

SECTION II.F.1

MAIN ESD SITE:
HBC AND ROCKET MOTOR OPS BUILDING

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Texas State Plane north central zone (FIPSZONE 4202). The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC- 3, #9202
1315 East- West Highway
Silver Spring, MD 20910- 3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information for this study was provided in digital format by Bowie County. This data was created in State Plane NAD 83 coordinates, U.S. Survey Feet and was produced at scales 1:1,200 (1"=100"); 1:4,800 (1"=400'). Aerial photography of the area was captured during November 2004.

This map reflects more detailed and up- to- date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

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Contact the **FEMA Map Service Center** at 1- 900- 358- 9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report,* and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1- 800- 358- 9620 and its website at http://www.msc.fema.gov/.

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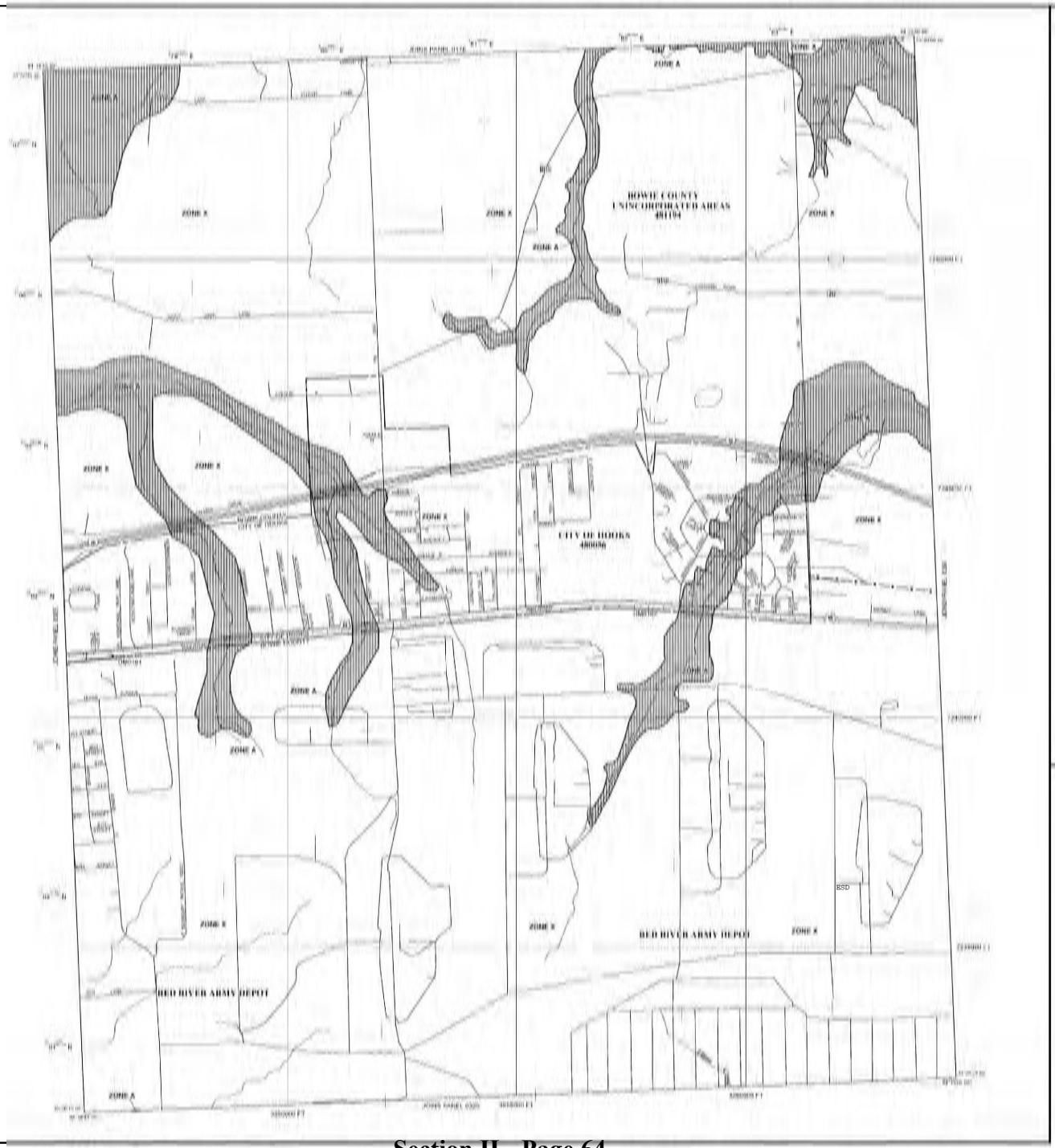

LEGEND

PANEL 0310D

FIRM

FLOOD INSURANCE RATE MAP

BOWIE COUNTY,
TEXAS
AND INCORPORATED AREAS

PANEL 310 OF 600

MAP NUMBER
48037C0310D
EFFECTIVE DATE
OCTOBER 19, 2010

Federal Emergency Management Agency

NOTES TO USERS

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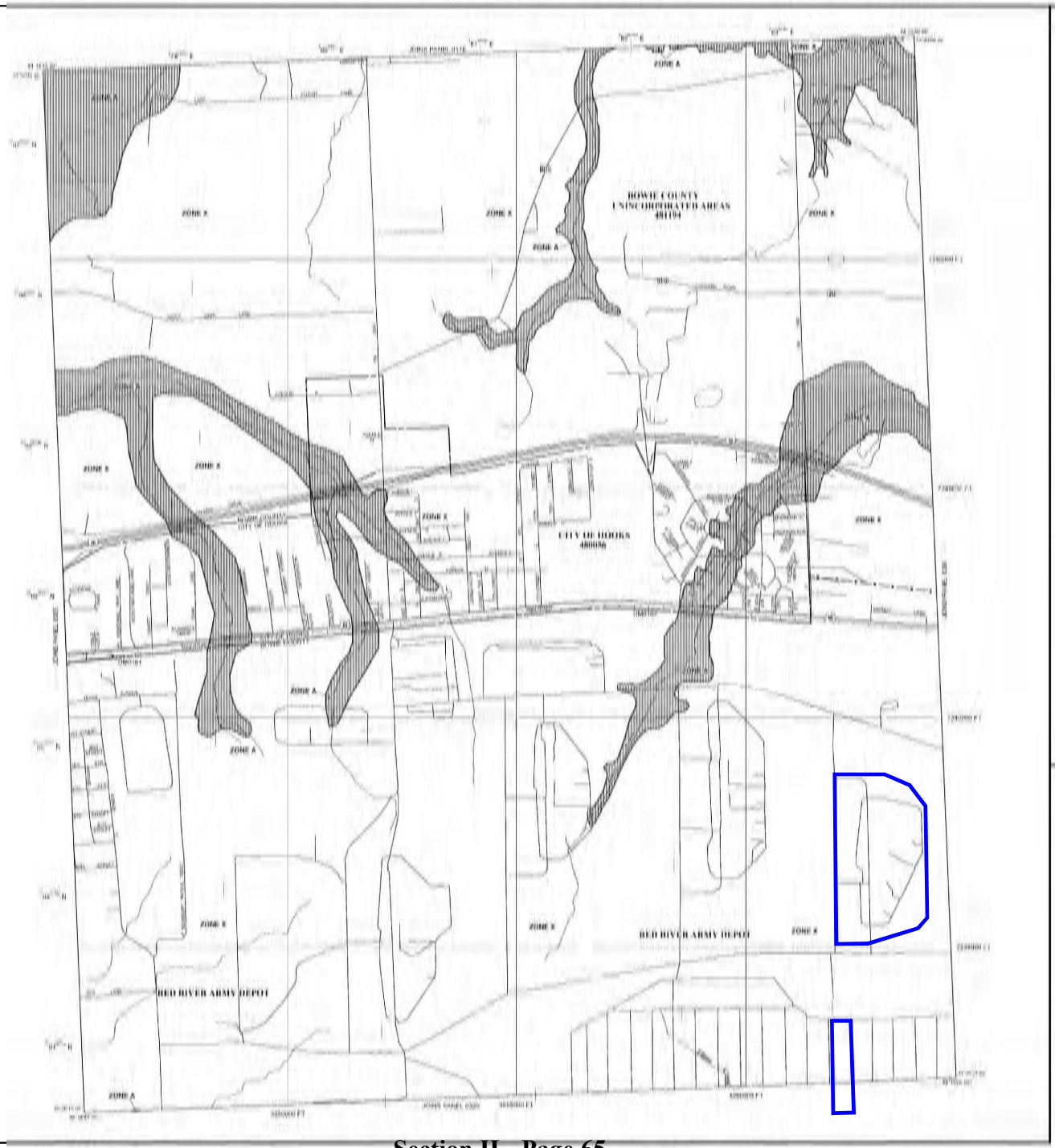


LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, A1-99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A — No Base Flood Elevations determined.

ZONE AE — Base Flood Elevations determined.

ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 — Area of the 1% annual chance flood to be protected by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from the annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- (A) — Cross section line
- (23) ——— (23) — Transect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- Flood depth and velocity in feet and feet per second
- Boundary dividing Special Flood Hazard Areas of different flood depths or flood velocities.
- Flood velocity value where uniform within zone; elevation in feet*

MAP REPOSITORY
Refer to listing of repositories on the Community Map History table located in the Publication Information section of this Publication.

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
October 19, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
For the initial countywide FIRM, the Effective Date of this panel is the same as the Effective Date of the countywide FIRM. For subsequent revisions to this panel, see the Publication Info section.

For communities with multiple revision dates or communities mapping dates on the Community Map History table located in the Publication Information section of this Publication.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

PANEL 0310D

FIRM
FLOOD INSURANCE RATE MAP
BOWIE COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 310 OF 600
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BOWIE COUNTY	481194	0310	D
HOOKS, CITY OF	480056	0310	D

MAP NUMBER
48037C0310D
EFFECTIVE DATE
OCTOBER 19, 2010

Federal Emergency Management Agency

National Flood Hazard Layer FIRMette

FEMA

94°15'46"W 33°27'9"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

94°15'9"W 33°26'39"N

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/4/2022 at 6:11 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

APPENDIX II.F - FLOODING

SECTION II.F.2

ABOVE GROUND MAGAZINE (AGM) STORAGE

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Texas State Plane north central zone (FIPSZONE 4202). The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC- 3, #9202
1315 East- West Highway
Silver Spring, MD 20910- 3282

To obtain current **elevation,** description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information for this study was provided in digital format by Bowie County. This data was created in State Plane NAD 83 coordinates, U.S. Survey Feet and was produced at scales 1:1,200 (1"=100'); 1:4,800 (1"=400'). Aerial photography of the area was captured during November 2004.

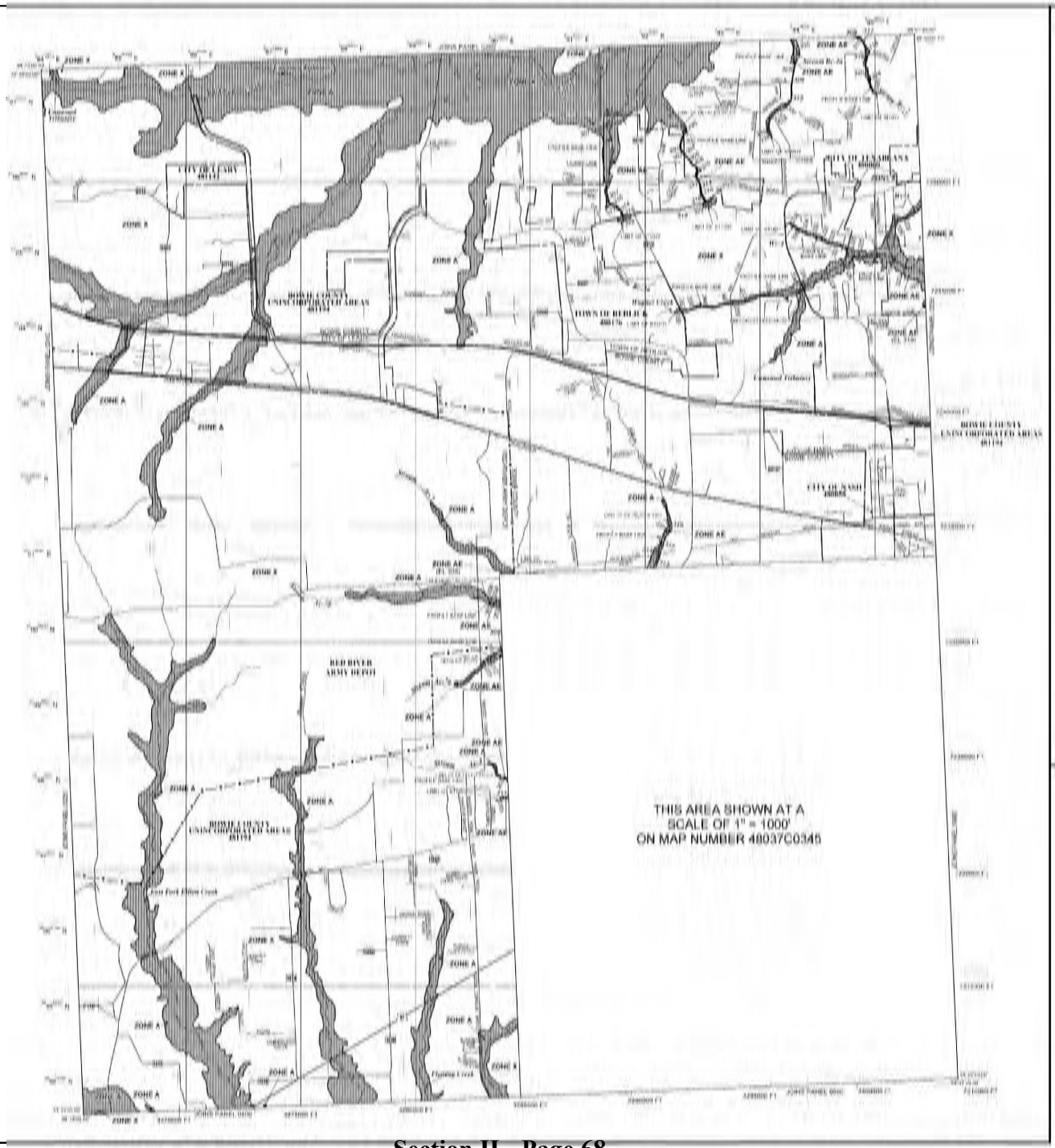
This map reflects more detailed and up- to- date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de- annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1- 800- 358- 9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a *Flood Insurance Study report,* and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1- 800- 358- 9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1- 877- FEMA MAP** (1- 877- 336- 2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, V, A99, AE, AO, AH, VE, and V1-V30. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A — No Base Flood Elevations determined.

ZONE AE — Base Flood Elevations determined.

ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 — Area to be protected from the 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance flooding
- 0.2% annual chance flooding
- Zone A (no BFE)
- Zone VE, Zone V (with BFE)
- Limit of Moderate Wave Action (LiMWA)
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- (A) — Cross section line
- (23) ——— (23) — Transect line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

- 39°07'30", 94°37'30" — Geographic coordinates
- 4275000 FT — Grid values: State Plane coordinate system (FIPSZONE 4202), Transverse Mercator projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River mile

MAP REPOSITORY
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
For communities/panels where zones are to be converted from Zone A to Zone AE, the Flood Insurance Study date for this panel is the effective date of the conversion.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
0 500 1000 2000 METERS

PANEL 0350D

FIRM
FLOOD INSURANCE RATE MAP
BOWIE COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 350 OF 600
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BOWIE COUNTY	480176	0350	D
TEXARKANA	480177	0350	D

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
48037C0350D
EFFECTIVE DATE
OCTOBER 16, 2012

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Texas State Plane north central zone (FIPSZONE 4202). The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC- 3, #9202
1315 East- West Highway
Silver Spring, MD 20910- 3282

To obtain current **elevation,** description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information for this study was provided in digital format by Bowie County. This data was created in State Plane NAD 83 coordinates, U.S. Survey Feet and was produced at scales 1:1,200 (1"=100'); 1:4,800 (1"=400'). Aerial photography of the area was captured during November 2004.

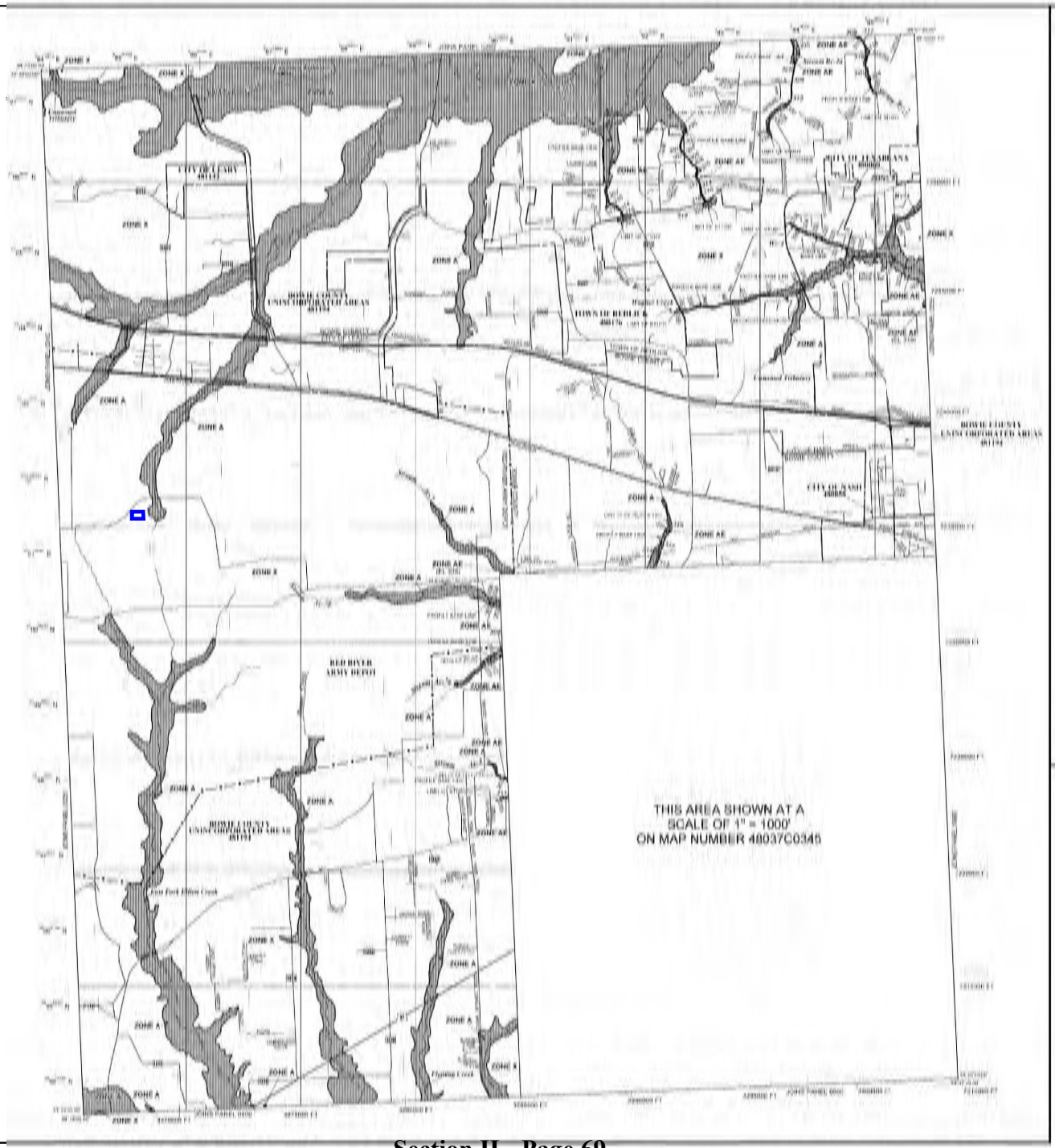
This map reflects more detailed and up- to- date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de- annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1- 800- 358- 9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a *Flood Insurance Study report,* and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1- 800- 358- 9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1- 877- FEMA MAP** (1- 877- 336- 2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, A1-A30, AR, V1-V30, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A — No Base Flood Elevations determined.

ZONE AE — Base Flood Elevations determined.

ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 — Area to be protected from the 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- (A) — Cross section line
- (23) — Transect line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

- 1000-meter Universal Transverse Mercator grid ticks
- 5000-foot grid ticks: Texas State Plane north central zone (FIPSZONE 4202)
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River mile

MAP REPOSITORY
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For communities/areas where initial Flood Insurance Rate Map has not been printed, the initial effective date for the entire community is:

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
0 500 1000 2000 FEET
0 150 300 600 METERS

PANEL 0350D

FIRM
FLOOD INSURANCE RATE MAP
BOWIE COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 350 OF 600

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BOWIE COUNTY	480176	0350	D
TEXARKANA	480177	0350	D

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
48037C0350D
EFFECTIVE DATE
OCTOBER 16, 2012

Federal Emergency Management Agency

National Flood Hazard Layer FIRMette

FEMA

94°14'35"W 33°27'1"N

94°13'57"W 33°26'31"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/20/2022 at 3:59 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

APPENDIX II.F - FLOODING

SECTION II.F.3

EARTH COVERED MAGAZINES (ECMs) STORAGE

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Texas State Plane north central zone (FIPSZONE 4202). The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC- 3, #9202
1315 East- West Highway
Silver Spring, MD 20910- 3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information for this study was provided in digital format by Bowie County. This data was created in State Plane NAD 83 coordinates, U.S. Survey Feet and was produced at scales 1:1,200 (1"=100"); 1:4,800 (1"=400'). Aerial photography of the area was captured during November 2004.

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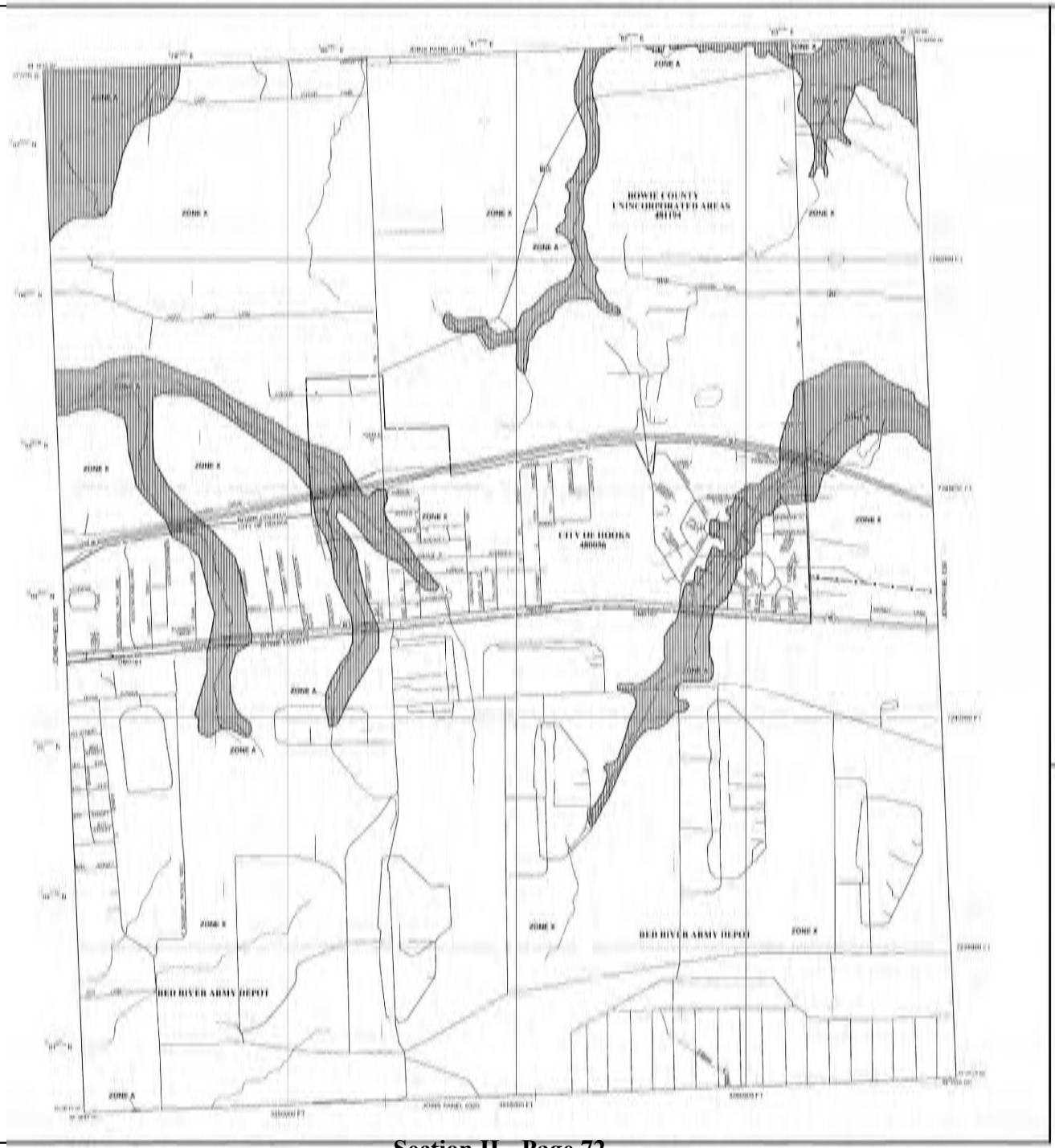

LEGEND

PANEL 0310D

FIRM

FLOOD INSURANCE RATE MAP

BOWIE COUNTY,
TEXAS
AND INCORPORATED AREAS

PANEL 310 OF 600

MAP NUMBER
48037C0310D
EFFECTIVE DATE
OCTOBER 19, 2010

Federal Emergency Management Agency

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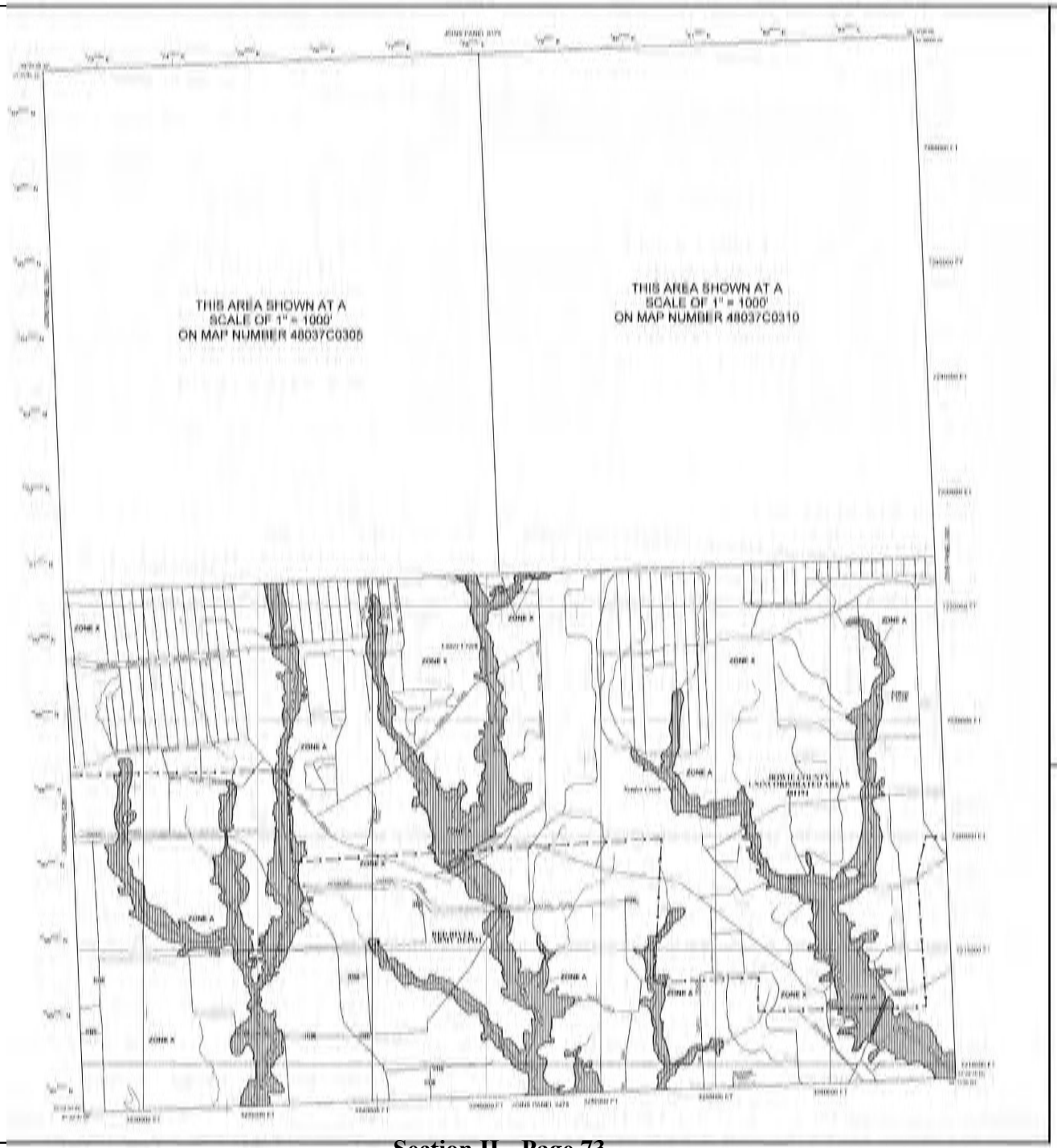

LEGEND

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

OTHER AREAS

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

MAP SCALE 1" = 1000'

PANEL 0325D

FIRM

FLOOD INSURANCE RATE MAP

BOWIE COUNTY,
TEXAS
AND INCORPORATED AREAS

PANEL 325 OF 600

MAP NUMBER
48037C0325D
EFFECTIVE DATE
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Federal Emergency Management Agency

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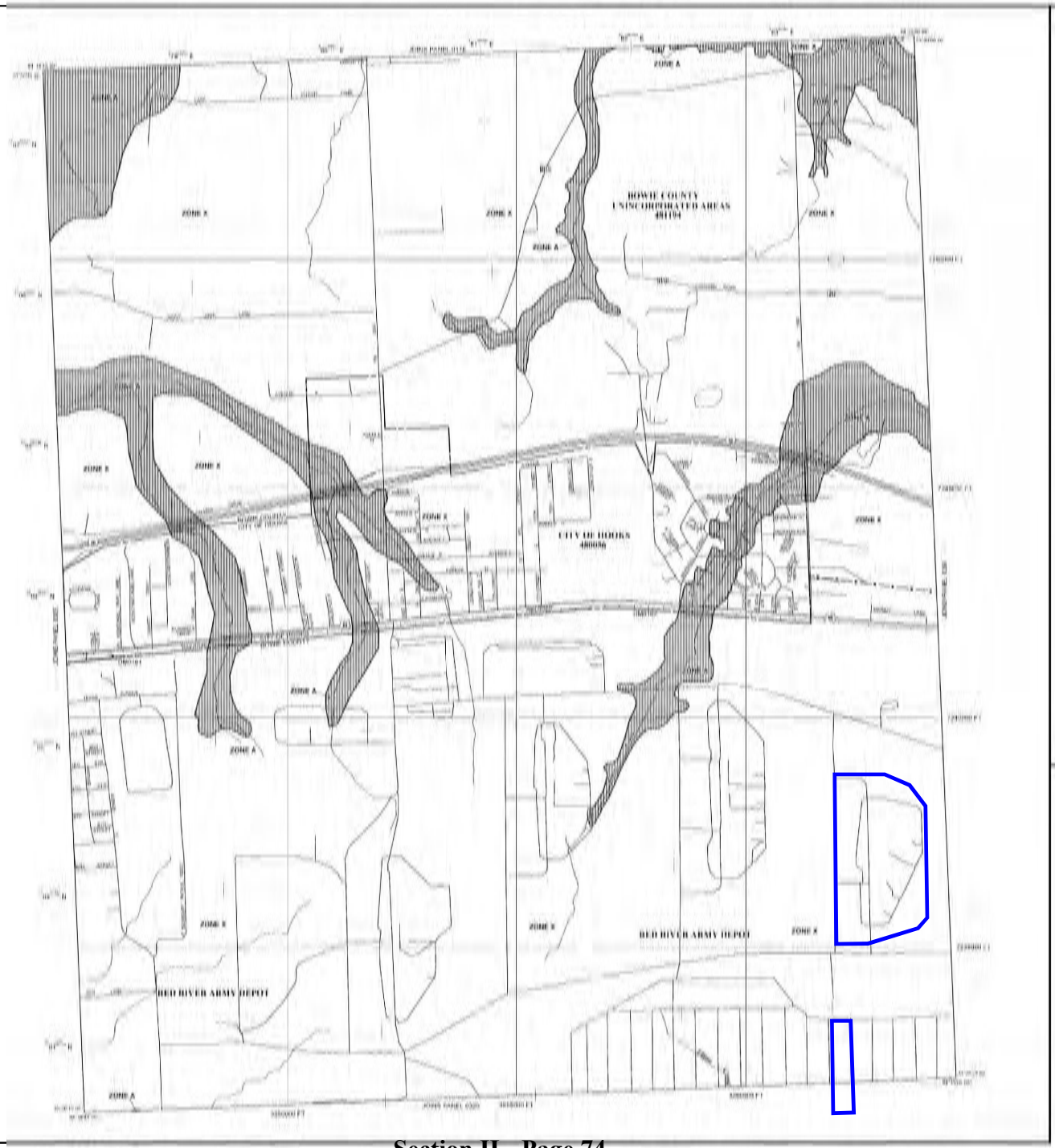

LEGEND

PANEL 0310D

FIRM

FLOOD INSURANCE RATE MAP

BOWIE COUNTY,
TEXAS
AND INCORPORATED AREAS

PANEL 310 OF 600

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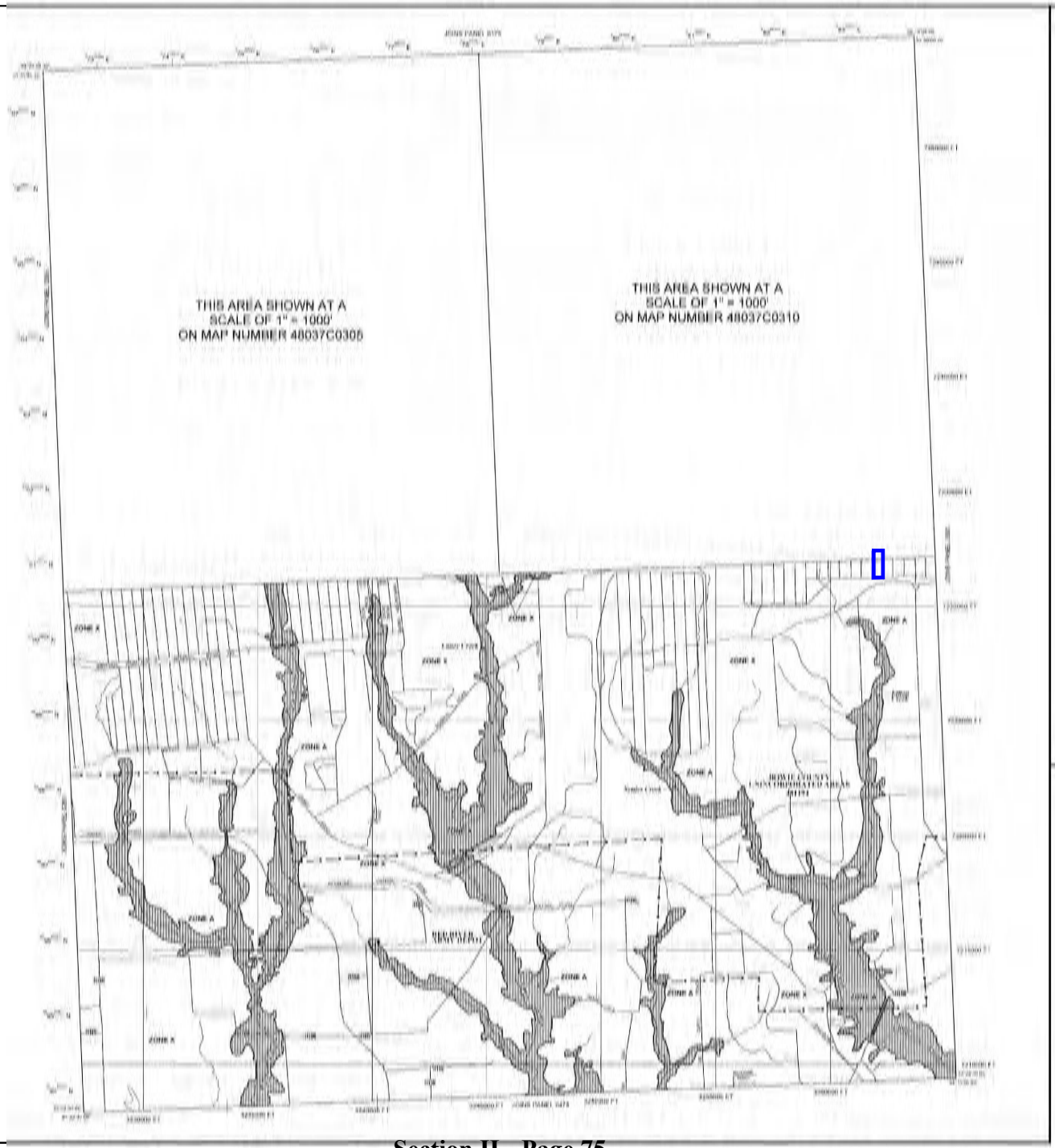

LEGEND

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OTHER AREAS

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MAP SCALE 1" = 1000'

PANEL 0325D

FIRM

FLOOD INSURANCE RATE MAP

BOWIE COUNTY,
TEXAS
AND INCORPORATED AREAS

PANEL 325 OF 600

MAP NUMBER
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Federal Emergency Management Agency

National Flood Hazard Layer FIRMette

FEMA

94°15'48"W 33°26'37"N

94°15'10"W 33°26'7"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/20/2022 at 4:06 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Section II - Facility Siting Criteria

Appendix II.G - Additional Information Requirements

1. For a new hazardous waste management facility, include a map of relevant local land-use plans and descriptions of the major routes of travel in the vicinity of the facility to be used for the transportation of hazardous waste to and from the facility covering at least a five (5)-mile radius from the boundaries of the facility. [30 TAC 305.50(a)(10)(A)&(D)]

   Land use maps are included in *Attachment II.G.1 – Land Use Maps*. The first map shows the land use for the areas surrounding ESD (greater than a 5 mile radius from the facility boundary). The second map shows a closer view of the land use in the immediate vicinity of ESD.

   Interstate 30 and US-82 are major routes of travel that are within 5 miles of the facility. These are the main routes used to transport energetic materials to the facility or transport hazardous waste away from the facility. A map is included in Attachment C of the Part A Application Form.

   Descriptions of the major routes of travel are provided in Section II.A.2 of the Part A Application Form.

2. For a new commercial hazardous waste management facility as defined in 30 TAC 335.202 or the subsequent areal expansion of such a facility or unit of that facility, indicate on the map the nearest established residence, church, school, day care center, surface water body used for a public drinking water supply, and dedicated public park.

   The places listed below are shown on maps in *Attachment II.G.2 – Nearest Places*. All distances listed below are straight line measurements.

   a. Nearest residence: **1.12 miles***
      13500 W New Boston Road
      Hooks, Texas 75561
   b. Church: **1.24 miles***
      First Assembly of God
      2307 Avenue A
      Hooks, Texas 75561
   c. School: **1.53 miles***
      Hooks Elementary School
      401 Precinct Road
      Hooks, Texas 75561
   d. Day care Center: **2.21 miles***
      Kinder Elite Academy

900 W Ave A,
Hooks, Texas 75561

e. Water for public drinking: **6.96 miles***
Wright Patman Lake

f. Public park: **3.21 miles***
Hooks City Park

***All distances are straight line measurements.**

3. For new commercial hazardous waste management facilities, submit the following: [30 TAC 305.50(a)(12)(A)]

   a. the average number, gross weight, type, and size of vehicles used to transport hazardous waste;

      It is expected that rocket motors and munitions will be delivered by approximately 5-10 tractor trailers per week. The tractor trailers will be of various sizes rated to transport rocket motors and munitions. The maximum gross weight per tractor trailer is 80,000 pounds, including the load of the munitions.

   b. the major highways nearest the facility irrespective of distance; and

      The major highways nearest the facility are: US-82, US-67, and TX-8. The nearest interstate is I-30.

   c. the public roadways used by vehicles traveling to and from the facility within a minimum radius of 2.5 miles from the facility.

      A combination of the following roadways (within a minimum radius of 2.5 miles from the facility) are possible to reach the facility: I-30, US-82, N Montague Street (now Demil Way), Oak Street, ~~Pine~~ Cypress Street, Freedom Way, Cass Street, East Ave (US-82), W New Boston Rd (US-82), Bowie Parkway.

4. Include the names and locations of industrial and other waste-generating facilities within 0.5 miles for a new on-site hazardous waste management facility and the approximate quantity of hazardous waste generated or received annually at those facilities. [30 TAC 305.50(a)(10)(B)&(C)]

   Name: Expal Texarkana (Site ID TXR000083437)
   Location: 690 N Ellis, Hooks, TX 75561
   According to the EPA RCRA website (List of Permitted Sites | US Environmental Protection Agency (epa.gov) <https://rcrapublic.epa.gov/rcrainfoweb/action/modules/pm/pmindex>), the only site in Hooks, Texas with a RCRA operating permit is Expal Texarkana.

   Information from their 2019 Biennial Report shows that 744.6 tons of waste

was received; 401.7 tons of waste was generated and 339.8 tons of waste was managed, leaving 62 tons of waste that was shipped (source: RCRAINFO Search | US EPA <https://enviro.epa.gov/enviro/rcrainfoquery_3.facility_information?pgm_sys_id=TXR000083437>).

Name: Red River Army Depot (Site ID TX3213820738)
Location: 100 James Carlow Drive, Texarkana, TX 75507
Red River Army Depot's mailing address is in Texarkana, but the physical location is closer to ESD's location.

Information from their 2019 Biennial Report shows that 859.2 tons of waste was generated and 860.7 tons of waste that was shipped (source: https://www.epa.gov/enviro/br-search).

5. Include the names and locations of industrial and other waste-generating facilities within 1.0 miles for a new commercial hazardous waste management facility and the approximate quantity of hazardous waste generated or received annually at those facilities. [30 TAC 305.50(a)(10)(B)&(C)]

See Information in Item #4.

6. For existing land disposal facility units provide documentation that the information required by 30 TAC 335.5 has been placed in the county deed records. If previously submitted, please reference the submittal by date and registration number.

Not Applicable. There are no land disposal units.

7. If a surface impoundment or landfill (including post-closure) is to be permitted, provide exposure information to accompany this application and in accordance with 30 TAC 305.50(a)(8) and 40 CFR 270.10(j). This information will be considered separately from the TCEQ application completeness determination.

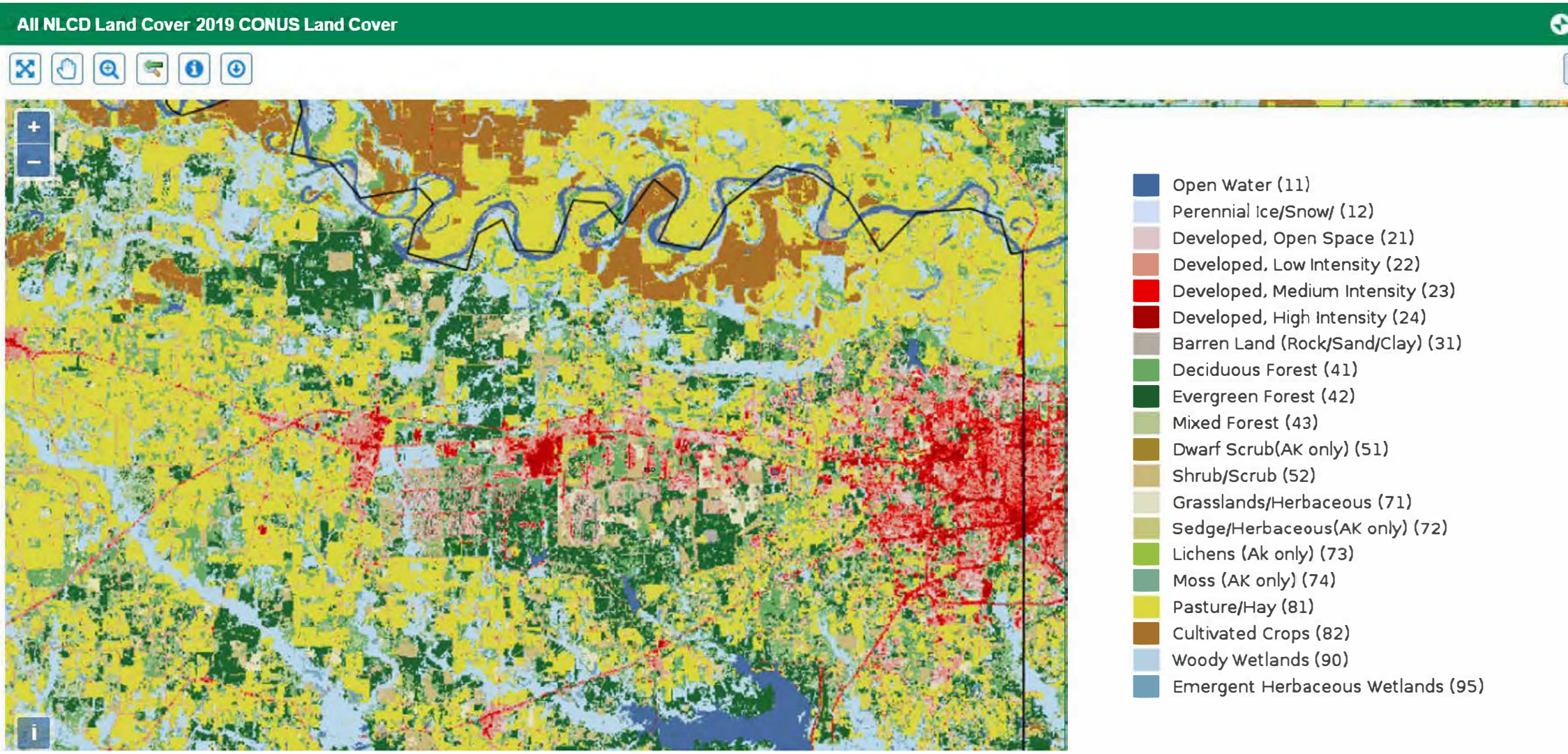
Not Applicable. There are no surface impoundments or landfills.

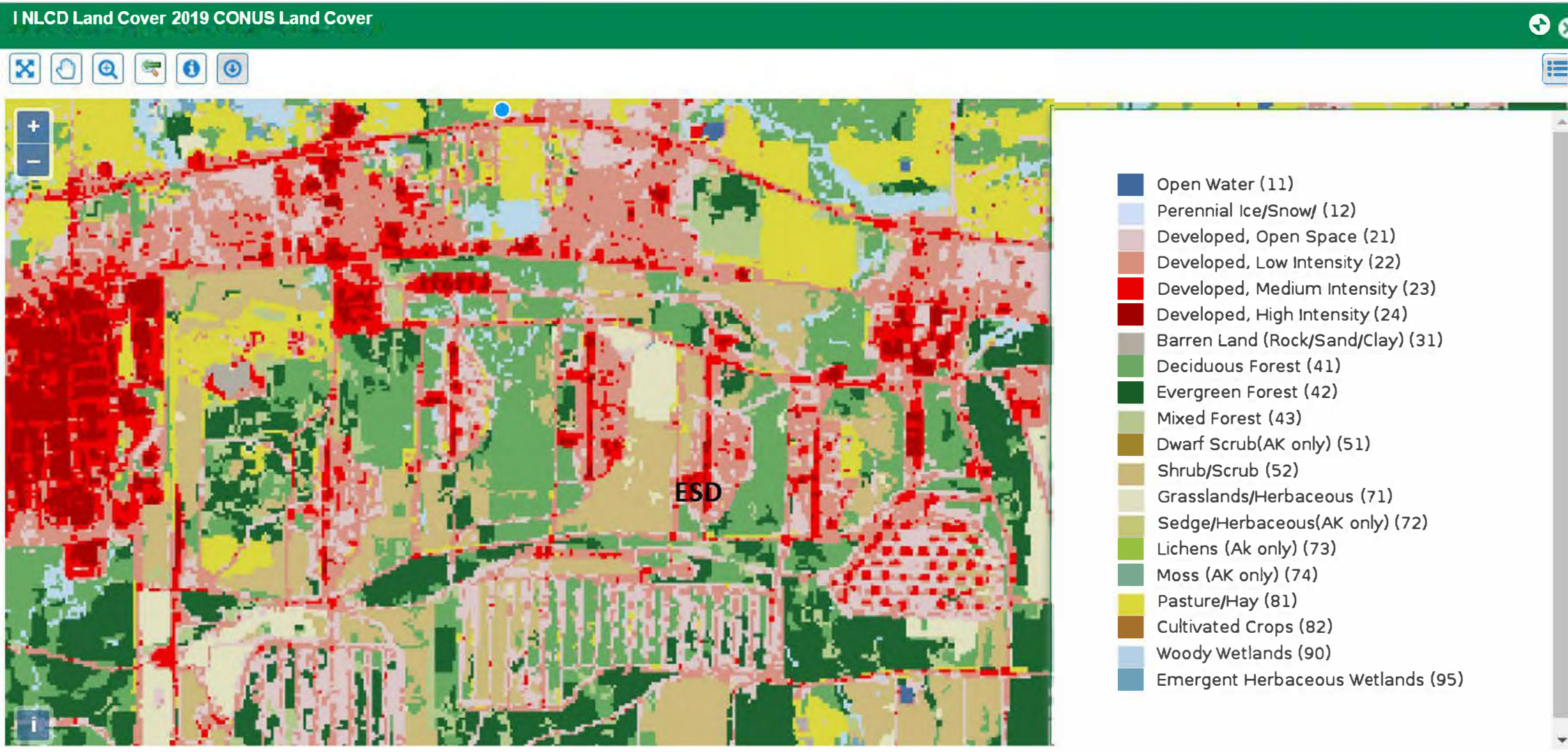
8. For a hazardous waste management facility requesting a capacity expansion of an existing hazardous waste management facility, please provide in Section VI.A.1.a the requested fault delineation information. [30 TAC 305.50(a)(4)(D)]

Based on the above statement (taken from the Part B Application with Screening Tool document), this is Not Applicable because ESD is a new facility. However, a regulatory reference is missing in the Part B Application with Screening Tool document. 30 TAC 305.50(a)(10)(E) also requires that a new hazardous waste management facility provide the information required by 30 TAC 305.50(a)(4)(D). Therefore, this information is included in Appendix VI.A – Geology and Topography.

ATTACHMENT II.G.1

LAND USE MAPS


All NLCD Land Cover 2019 CONUS Land Cover
Open Water (11)
Perennial Ice/Snow/ (12)
Developed, Open Space (21)
Developed, Low Intensity (22)
Developed, Medium Intensity (23)
Developed, High Intensity (24)
Barren Land (Rock/Sand/Clay) (31)
Deciduous Forest (41)
Evergreen Forest (42)
Mixed Forest (43)
Dwarf Scrub(AK only) (51)
Shrub/Scrub (52)
Grasslands/Herbaceous (71)
Sedge/Herbaceous(AK only) (72)
Lichens (Ak only) (73)
Moss (AK only) (74)
Pasture/Hay (81)
Cultivated Crops (82)
Woody Wetlands (90)
Emergent Herbaceous Wetlands (95)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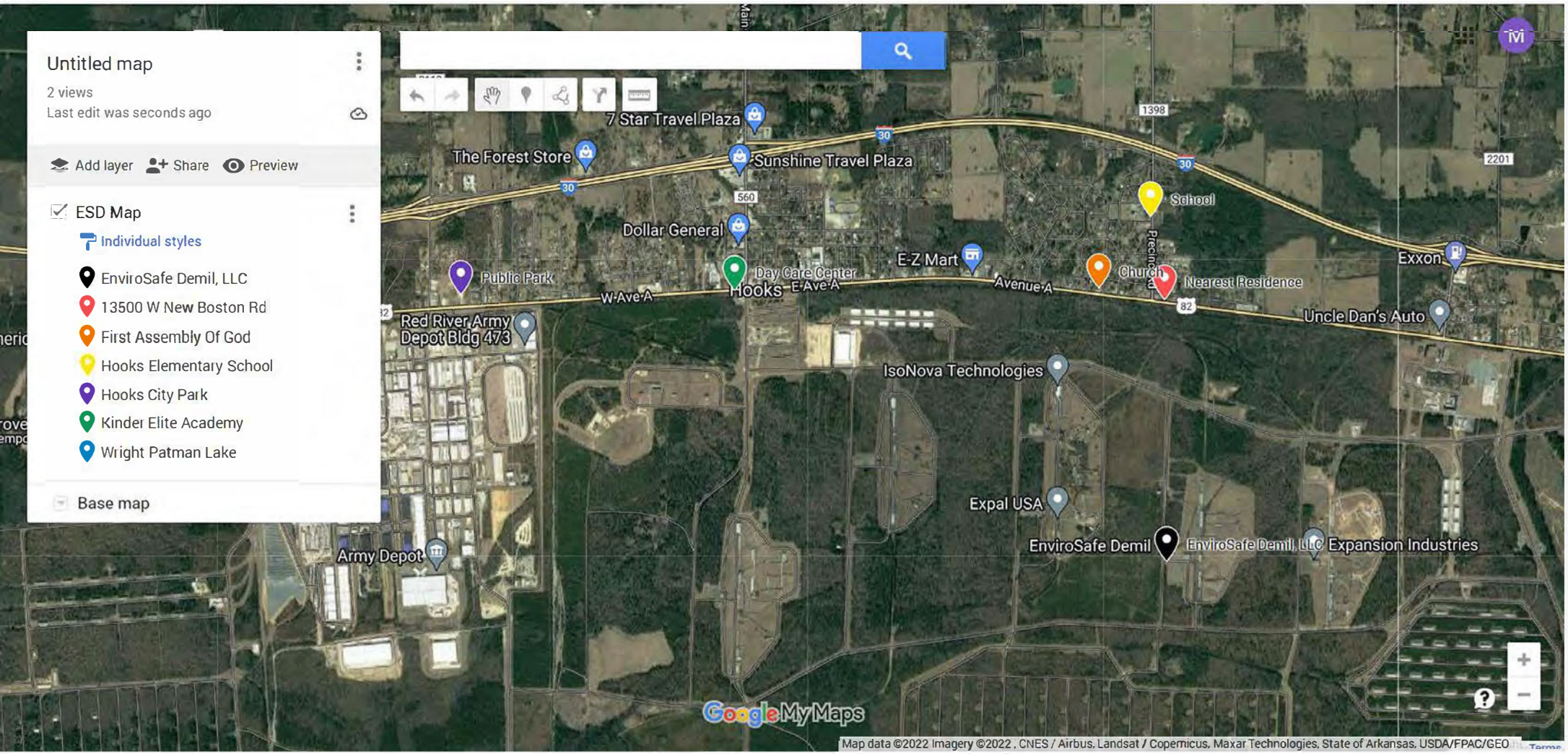
ATTACHMENT II.G.2

NEAREST PLACES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13500 W New Boston Rd
First Assembly Of God
Hooks Elementary School
Hooks City Park
Kinder Elite Academy
Wright Patman Lake
Base map
7 Star Travel Plaza
The Forest Store
Sunshine Travel Plaza
Dollar General
Public Park
Day Care Center
Hooks
E-Z Mart
School
Church
Nearest Residence
Exxon
Uncle Dan's Auto
Red River Army Depot Bldg 473
IsoNova Technologies
Expal USA
EnviroSafe Demil
EnviroSafe Demil, LLC
Expansion Industries
Army Depot
W Ave A
E Ave A
Avenue A
1398
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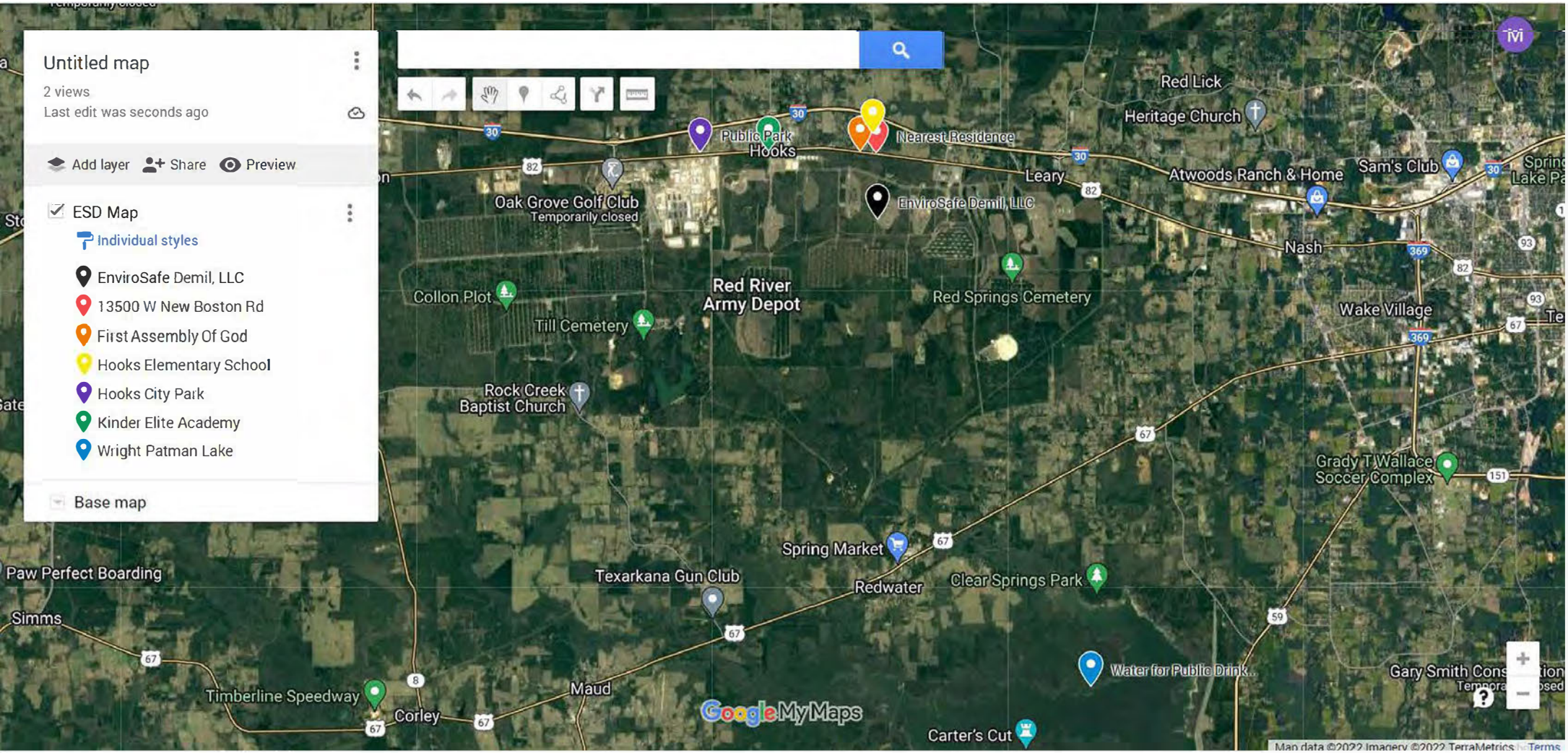
Google My Maps
Map data ©2022 Imagery ©2022 , CNES / Airbus, Landsat / Copernicus, Maxar Technologies, State of Arkansas, USDA/FPAC/GEO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EnviroSafe Demil, LLC
13500 W New Boston Rd
First Assembly Of God
Hooks Elementary School
Hooks City Park
Kinder Elite Academy
Wright Patman Lake
Base map
Red Lick
Heritage Church
Public Park
Hooks
Nearest Residence
Leary
Atwoods Ranch & Home
Sam's Club
Oak Grove Golf Club
Temporarily closed
EnviroSafe Demil, LLC
Nash
Collon Plot
Red River
Army Depot
Red Springs Cemetery
Till Cemetery
Wake Village
Rock Creek
Baptist Church
Grady T Wallace
Soccer Complex
Spring Market
Paw Perfect Boarding
Texarkana Gun Club
Redwater
Clear Springs Park
Simms
Water for Public Drink...
Timberline Speedway
Corley
Maud
Carter's Cut
Google My Maps
Map data ©2022 Imagery ©2022 TerraMetrics Terms

III. Facility Management

Provide all Part B responsive information in Appendix III. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

A. Compliance History and Applicant Experience

1. Provide listings of all solid waste management sites in Texas owned, operated, or controlled by the applicant as required by 30 TAC 305.50(a)(2).

2. For a new commercial hazardous waste management facility, provide a summary of the applicant's experience in hazardous waste management as required by 30 TAC 305.50(a)(12)(F).

Information is included in Appendix III.A – Compliance History and Applicant Experience.

B. Personnel Training Plan

Provide an outline of the facility training plan which includes all the information required by 40 CFR 264.16. Indicate which training will be repeated annually.

Information is included in Appendix III.B – Personnel Training Plan.

C. Security

Describe how the facility complies with the security requirements of 40 CFR 264.14 or submit a justification demonstrating the reasons for requesting a waiver of these requirements.

Information is included in Appendix III.C – Security.

D. Inspection Schedule

Describe summary of inspection schedule and Table III.D in Appendix III.D in accordance with instructions below.

Information addressing the following items is included in Appendix III.D – Inspection Schedule and in Table III.D – Inspection Schedule.

Provide an inspection schedule summary for the facility which reflects the requirements of 40 CFR 264.15(b), 264.33 and, where applicable, the specific requirements in 40 CFR 264.174, 264.193(i), 264.195, 264.226, 264.254, 264.273, 264.303, 264.347, 264.552, 264.574, 264.602, 264.1033(f), 264.1034, 264.1052, 264.1053(e), 264.1057, 264.1058, 264.1063, 264.1084, 264.1085, 264.1086, 264.1088, 264.1101(c)(4) and 270.14(b)(5). The inspection schedule should reflect the requirements described below. The schedule should encompass each type of hazardous waste management (HWM) unit (i.e., facility component) and its inspection requirements. For incorporation into a permit, complete Table III.D. - Inspection Schedule for all units to be permitted.

The owner or operator must inspect the facility for malfunctions and deterioration, operator errors, and discharges which may be causing or may lead to the release of hazardous waste constituents to the environment or which may pose a threat to human health. The owner or operator must conduct these inspections often enough to identify problems in time to correct them before they harm human health or the environment.

The owner or operator must develop and follow a written schedule for inspecting other basic elements such as monitoring equipment, safety and emergency equipment, security devices, the presence of liquids in leak detection systems, where installed, and operating and structural equipment (such as dikes and sump pumps) that are important to preventing, detecting, or responding to environmental or human health hazards.

If the owner or operator of a facility which contains a waste pile wishes to pursue an exemption from the groundwater monitoring requirements for that waste management unit, the inspection schedule must include examination of the base for cracking,

deterioration, or other conditions that may result in leaks. The frequency of inspection must be based on the potential for the liner (base) to crack or otherwise deteriorate under the conditions of operation (e.g., waste type, rainfall, loading rates, and subsurface stability).

N/A – the facility will not operate a waste pile.

E. Contingency Plan (Not Applicable to Permits for Post-Closure Care Only)

Information addressing the requirements below is included in Appendix IIII.E – Contingency Plan. Table III.E.1, III.E.2, and III.E.3 are also included.

If the owner or operator has already prepared a Spill Prevention, Control, and Countermeasures (SPCC) Plan or some other emergency or contingency plan, he need only amend that plan to incorporate hazardous waste management provisions that are sufficient to comply with the requirements of this section. Provide a Contingency Plan which includes all the information required by 40 CFR Part 264 Subparts C and D, except for 40 CFR 264.56(d)(1) and 30 TAC 335.153(2). This plan must also include a drawing of the facility which shows the location of all emergency equipment. In addition, complete the following tables to summarize information expressed in more detail in the plan.

1. Arrangements with Local Authorities

   Complete Table III.E.1. - Arrangements With Local Authorities to indicate arrangements (if made) with local authorities to familiarize local fire and police departments, local hospitals, equipment suppliers, and local and State emergency response teams with the layout of the facility, properties of hazardous waste handled at the facility and associated hazards, places where facility personnel would normally be working, entrances to and roads inside the facility, and possible evacuation routes. Provide documentation of the attempts and any arrangements made with local authorities and emergency response teams.

2. Emergency Coordinator's List

   For inclusion into a permit, list in Table III.E.2. - Emergency Coordinators the persons qualified to act as emergency coordinator. List the alternates in the order in which they will assume responsibility.

3. Emergency Equipment List

   For inclusion into a permit, list in Table III.E.3. - Emergency Equipment all types of emergency equipment at the facility [such as fire-extinguishing systems, spill- control equipment, communications and alarm systems (internal and external), and decontamination equipment], if this equipment is

required. Briefly outline the equipment capabilities.

4. Waiver from Preparedness and Prevention Requirements

   If the owner or operator wishes to request a waiver from any of the preparedness and prevention requirements, he must submit a justification demonstrating the reasons for requesting the waiver, as discussed below.

F. Emergency Response Plan

Information addressing the requirements below is included in Appendix III.F – Emergency Response Plan.

For a new commercial hazardous waste management facility, the application shall contain evidence sufficient to demonstrate that emergency response capabilities are available or will be available before the facility first receives waste. An emergency response plan must be provided which satisfies the requirements of 30 TAC 305.50(a) (12)(C) and (D). This plan must show that the proposed facility has sufficient emergency response capabilities for managing a reasonable worst-case emergency condition associated with the operation of the facility. (For financial assurance requirements associated with the emergency response activities, please see Section

VIII.C.3.)

1. Practice Drills

   In addition to the contingency plan required under 40 Code of Federal Regulations Part 270.14(b)(7), provisions specifying procedures and timing of practice facility evacuation drills are required. Provide a description and a frequency for facility evacuation drills.

2. If a private corporation, municipality or county group will provide emergency response actions at the proposed facility, include a copy of the contract for this type of agreement with this application or state that documentation will be submitted before the facility accepts wastes.

3. Historical weather data for the area should be documented and submitted. Information regarding how emergency response operations may be affected by weather conditions should be included. (Local rainfall extremes, average rainfall amounts, average wind speeds and directions, potential for major weather events such as hurricanes, tornados, icy conditions, flash flooding etc., should be addressed.)

4. A definition of a worst-case emergency for the proposed facility should be described in the application. This worst-case emergency should take into account the possible complications involved with a facility emergency compounded by adverse weather conditions. It should also detail spills, fires, explosions, etc. This worst case scenario should be developed with the help of local governmental entities where possible. Emergency planning should include both unexpected emergencies and emergencies occurring as a result of a predictable event such as a flood or hurricane. For areas which are prone to hurricanes and flash flooding, the worst case which allows for a realistic situation should be used. For example, response teams should be well versed in reacting to events such as a 100-year flood.

5. A training program for personnel who will respond to these types of emergencies must be provided and must include the requirements described

in OSHA Federal Register 1910 and EPA Federal Register 311, the Texas Hazard Communication Act, SARA Title III 302, 304, 311, 312, and 313. If emergency response actions are contracted out, the contracted employees must be properly trained and documentation of this training must be maintained on-site. All responders to emergencies at the proposed facility must be involved in training and drills at the facility in order to be thoroughly familiar with the facility and its operations.

6. The application must include a description and identification of first-responders (i.e. all pertinent facility personnel, local responders, and contractors). The duties of the facility employee who is to be the on-scene coordinator (OSC) must be described. Additional information must be provided detailing the OSC's role in the emergency response activities. This person must have the authority to commit the resources needed to carry out the Emergency Response Plan. His duties must be thoroughly described so that it is clear whether he will remain in control once the emergency response team arrives or whether he will relinquish control to another incident commander upon that person's arrival on the scene. Additionally, there must be a qualified OSC on-site or on call 24 hours a day. The name, address and phone numbers (home and work) of the OSC(s) must be listed in the Emergency Response Plan. Where more than one person is listed, one must be named as the primary OSC and others must be listed in the order

   in which they will assume responsibility as alternates.

7. Local or regional emergency medical services or hospitals which have experience in hazardous materials training must be identified in the application. The names, addresses and phone numbers of the hospitals or medical centers should be listed here and updated as necessary. Additionally, maps showing the quickest routes to the medical services must be provided. A description of decontamination procedures for injured personnel prior to transport to medical services must also be provided. The decontamination and transport of injured people to appropriate medical centers must be included in the emergency evacuation training and drills.

8. A pre-disaster plan which includes training drills must be included in the application. This plan should include a schedule for staging evacuations of the facility and for emergency response training drills. At least two evacuations and two emergency response drills should occur annually. The plan should also include additional drills for responding to "predictable" emergencies such as floods and hurricanes. The plan must include the following (or must reference applicable sections of the Contingency Plan): a description of arrangements already in place with local authorities; emergency phone numbers; internal communication or alarm systems and proper alarm codes; a list of all types of emergency equipment at the facility, including a physical description and the capabilities of each item on the list, and the location of each item (a map would be useful here); a description of decontamination equipment; an evacuation plan including signals, evacuation routes and alternate evacuation routes; listing of pertinent first responder emergency phone numbers, and codes for other types of communication devices; and a description of actions that will be performed in the event that a "predictable" emergency occurs.

9. Describe the mechanism which will be used to notify first responders and appropriate local governmental entities that an emergency has occurred. Also describe the mechanism which will be used to notify all applicable

governmental agencies when an incident occurs (i.e., TCEQ, Texas Parks and Wildlife, General Land Office, TCEQ Office of Air Quality, Texas Department of Health, and the Texas Railroad Commission).

10. Evidence must be provided that shows coordination with the Local Emergency Planning Committee (LEPC) and any local comprehensive emergency management plan. The applicants should be able to show compliance with SARA Title III.

11. Any medical response capabilities proposed for the facility property must be detailed in the application.

Section III - Facility Management

Appendix III.A – Compliance History and Applicant Experience

30 TAC 305.50(a)(2) and 30 TAC 305.50(a)(12)(F)

30 TAC 305.50(a)(2)

EnviroSafe Demil, LLC (ESD) does not own, operate, or control any other solid waste management sites in Texas.

30 TAC 305.50(a)(12)(F)

ESD has been in the business of demilitarization since 2018 and is experienced in the clean and safe disposal of military and industrial explosives. The company is managed by a team of highly experienced defense industry and explosive handling experts. The proprietary units are specifically designed to deactivate the energetics in an environmentally responsible manner.

Through ESD's proprietary system of processing the materials, the potential for fires, explosions, detonations, or releases, including run-off to the soil, groundwater, surface water, and emissions to the atmosphere is minimized. Energetic materials destined for on-site processing are transported in sealed explosion-proof containers from the point of generation (off-site) to the ESD facility. Once at the ESD facility, the materials are safely stored until they are ready to be processed.

The facility has developed Standard Operating Procedures to include specific instructions for the handling and transporting of energetic materials. Appropriate controls and processes are in place to ensure no accidental fires, explosions, detonations, or releases occur.

Section III - Facility Management

Appendix III.B – Personnel Training Plan

40 CFR §270.14(b)(12) and 40 CFR §264.16

EnviroSafe Demil, LLC (ESD) has a training program for operations personnel responsible for energetic material management and emergency response responsibilities. An outline of the personnel training plan of the facility, which includes all the information required by 40 CFR §264.16, is included below.

1.0 INTRODUCTION

Personnel training provisions under RCRA are specified by 40 CFR §270.14(b)(12) and 40 CFR §264.16. The facility's personnel training program is described in this document.

1.1 Facility Personnel Trained

All personnel who may come into contact with hazardous materials are trained in basic firefighting response, emergency communication procedures, emergency equipment locations, and plant evacuation procedures. Additional job-specific training is given to applicable operations personnel responsible for energetic material management and emergency response.

1.2 Timing of Training

Applicable facility personnel must successfully complete the introductory training program within six months after the date of their employment (or assignment to a new position). In accordance with 40 CFR §264.16(b), new facility personnel are not to work alone until they have been thoroughly trained.

An annual review of the initial training is also conducted for all applicable facility personnel.

1.3 Method of Training

Both classroom and on-the-job training are given as specified in 40 CFR §264.16(a). The training may utilize training methods such as: handouts, presentations, and hands-on demonstrations.

1.4 Training Responsibilities

As specified by 40 CFR §264.16(a)(2), the training program is directed by a person trained in hazardous waste management procedures. It includes instruction that teaches facility personnel

hazardous waste management procedures relevant to their position (including contingency plan implementation).

1.5 Content of Training

As specified by 40 CFR §264.16(a)(3) and further described in Section 1.5.1 through Section 1.5.6 of this plan, the training program is designed to ensure that facility personnel are able to respond effectively to emergencies. The training program familiarizes personnel with emergency procedures, emergency equipment, and emergency systems, including:

i. Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment;
ii. Key parameters for automatic waste feed cut-off systems;
iii. Communications or alarm systems;
iv. Response to fires or explosions;
v. Response to ground-water contamination incidents; and
vi. Shutdown of operations.

1.5.1 Use, Inspection, Repair, and Replacement of Emergency Equipment

All in-plant personnel who may come into contact with hazardous materials are trained on using plant emergency response equipment. Employees are trained to ensure that emergency equipment is inspected, repaired, and replaced if necessary. Emergency equipment is inventoried regularly while inspecting for badly worn, broken, or missing equipment.

1.5.2 Key Automatic Waste Feed Cut-Off Parameters

No automatic waste feed cut-off (AWFCO) parameters apply to the Hybrid Burn Chamber (HBC) since it is batch fed by the operator. However, there are HBC and APCS sensors that will not allow a batch to be processed until the correct conditions are met within the HBC and APCS. Operators are trained on this automatic interlock system.

1.5.3 Communications Systems or Alarm Systems

All new employees who may come into contact with hazardous materials are given a plant tour and shown the emergency equipment locations, including communication systems, eyewash stations, emergency showers, fire extinguishers, etc. The locations of all emergency equipment, including communication systems, are illustrated on the Emergency Equipment Maps that are posted throughout the facility. These maps will be reviewed during introductory and annual training with applicable employees.

1.5.4 Responses to Fires and Explosions

Basic firefighting training is given to employees with those responsibilities on an annual basis. This basic training qualifies employees to implement first responses to small localized fires. Any large fires will require that the local fire department be contacted. If an accidental detonation or explosion occurs, all employees in the affected area are trained to evacuate immediately to the designated evacuation area.

1.5.5 Response to Groundwater Contamination Incidents

There is minimal chance of a groundwater contamination incident at this facility because of the type of the materials handled, the small size of containers handled, and the design of the equipment where the materials are processed.

If a small-scale spill occurs, facility personnel will respond. Training will be given on the location of spill response equipment, how to use the spill response equipment, who to notify in the event of a spill, and appropriate disposal methods.

1.5.6 Shutdown Operations

Introductory training will explain any manual shutdown operations. Any situations that might result in operating problems will be discussed. Procedures for a safe shutdown during emergencies will be addressed with particular emphasis on methods to minimize the chance of materials becoming involved in any fire or explosion.

Continuing training will focus on the identification of any problems with current shutdown procedures. Any manual shutdown situations resulting from actual emergencies or drills will be analyzed. Any issues and/or non-standard events that occur related to shutdown activities will be discussed, as well as ways to improve shutdown operations. Strategies for improvement will be made where inadequate shutdown procedures are identified.

1.6 Designing Training to Meet Actual Job Tasks

In addition to the content covered in Section 1.5, the following items will be discussed during training as it relates to specific job tasks:

i. Explanation of proper emergency procedures for storage areas or material handling areas.
ii. Identification of specific hazards, procedures, and cautions that may apply in addition to normal plant emergency procedures.

iii. Specific contents of the Contingency Plan (included as *Appendix III.E – Contingency Plan*) and the Emergency Response Plan (included as *Appendix III.F – Emergency Response Plan*) as they relate to the storage areas, material handling area, or processing unit.
iv. Proper use of PPE designed for use in the storage areas or material handling areas.
v. Explanation of responsibilities for each job function as it relates to compliance with RCRA regulations.

1.7 Recordkeeping of Training

In accordance with 40 CFR §264.16(d), the following documents and records are maintained at the facility:

1. The job title for each position at the facility related to hazardous waste management and the name of the employee filling each job;
2. A written job description for each position which includes the requisite skill, education, or other qualifications, and duties of employees assigned to each position;
3. A written description of the type and amount of both introductory and continuing training that will be given to each person filling a position referenced in item number 1;
4. Records that document that the training or job experience required has been given to, and completed by, facility personnel.

Personnel training records are maintained at the facility. All training records for current personnel will be maintained on-site until the closure of the facility. Records will document who was given training and who completed training. Training records of employees who leave the facility will be retained on site for at least three years after their termination.

Section III - Facility Management

Appendix III.C – Security

40 CFR §264.14

EnviroSafe Demil, LLC (ESD) has developed site security procedures to ensure compliance with 40 CFR §264.14. ESD prevents unknowing entry and minimizes the possibility of unauthorized entry of persons or livestock onto the active portion of the facility through the active and passive security controls discussed in the following paragraphs.

ESD maintains a six-foot high fence with triple strand barbed wire in good repair around the active portion of the facility. Entry and exit through the fence are strictly controlled through key card access and an automatic gate opener that requires a security code. Additionally, the entry point and facilities are under 24-hour surveillance camera monitoring.

"Danger-Unauthorized Personnel Keep Out" signs legible from a distance of 25 feet are posted on or near the entrance, all gates, and at least one sign is placed along each straight fence run.

Section III - Facility Management

Appendix III.D – Inspection Schedule

40 CFR §264.15(b), §264.33 and, where applicable, the specific requirements in 40 CFR §264.174, §264.193(i), §264.195, §264.226, §264.254, §264.273, §264.303, §264.347, §264.552, §264.574, §264.602, §264.1033(f), §264.1034, §264.1052, §264.1053(e), §264.1057, §264.1058, §264.1063, §264.1084, §264.1085, §264.1086, §264.1088, §264.1101(c)(4) and §270.14(b)(5)

1.0 INSPECTION REQUIREMENTS

Inspections of the facilities and equipment will be conducted to prevent malfunctions and deterioration, operator errors, and discharges that may cause or lead to the release of hazardous waste constituents to the environment or a threat to human health. The frequency of inspections listed in this document were selected based on the requirements in the applicable regulations or based on the timeframe determined to be adequate to identify problems in time to correct them before they harm human health or the environment, whichever was shorter.

Any deterioration or malfunction of equipment or structures discovered during an inspection will be remedied on a schedule to ensure that the problem does not lead to an environment or human health hazard as required by 40 CFR §264.15(c).

Table 1 contains a regulatory checklist of the inspection requirements listed in TCEQ's Part B Application.

2.0 SCHEDULE AND TYPES OF EQUIPMENT INSPECTIONS

A checklist of inspected items will be created and inspections will be recorded and filed as described in Section 4.0.

2.1 Monitoring Equipment

The monitoring equipment associated with the Hybrid Burn Chamber (HBC) and the associated air pollution control system will be inspected regularly in accordance with the manufacturer's recommendations and good engineering practice.

Automatic Interlock Systems

The monitoring equipment associated with the automatic interlock systems will be inspected and tested on a weekly basis. The inspections will be performed by operating personnel and will be

documented in inspection logs as described in Section 4.0.

2.2 Safety and Emergency Equipment

The safety and emergency equipment must be regularly inspected and function tested. In accordance with 40 CFR §264.33, the equipment is tested and maintained to ensure proper operation in times of emergency. Table 2 lists the safety and emergency equipment inspection frequencies.

2.3 Security Devices

Facility security devices will be inspected for damage and proper working condition on a frequency to minimize risk, but at least weekly. This includes the facility fence, gates, doors, windows, and locks.

2.4 Operating and Structural Equipment

The material preparation area and the HBC process operation area are subject to visual examination daily as part of regular operations. Daily visual inspections are conducted each day that the respective area is in operation and consist of a walk-through of the facility to inspect piping, equipment, and containers for integrity, evidence of leaks, and excessive accumulation of ash/debris in the HBC. Visible cracks or leaks from containers and other identified deficiencies are promptly corrected. The facility's preventative maintenance program helps ensure that equipment is serviced correctly and minimizes the likelihood of spills or releases due to equipment failure.

The concrete pads and the areas around the concrete pads are also inspected for signs of leakage such as erosion, wet spots, or dead vegetation. Concrete pads are visually inspected daily when in operation for cracks, gaps, erosion, wet spots, and damage.

After an emergency, the affected facility areas will be inspected for cleanliness and safe working conditions. Containers will be checked to see that they are in good condition and properly sealed and labeled. Tanks, pipe fittings, pumps, and hoses will be inspected to ensure proper working order. The buildings, building supports, framework, walls, and floors will be checked for signs of deterioration.

3.0 INSPECTIONS SPECIFIC TO HAZARDOUS WASTE

Hazardous waste handling and storage areas inspected as described in this section.

3.1 Loading and Unloading Areas

The loading and unloading areas are inspected for spills, loose debris, and improperly stored materials. Wooden crates, ammunition cans, and any other packaging materials will be inspected for signs of damage, discoloration, perforation, degradation, and unusual odors upon arrival to the facility. Any damaged packaging will be inspected to see if the energetics within are damaged. These visual inspections are also conducted once per day when the areas are in use and being accessed by personnel.

3.2 Storage of Energetic Material [40 CFR §264.1201, §264.174]

The energetic material is stored in dedicated storage magazines designed for energetic materials per 40 CFR §264.1201. Each storage magazine has a log where the type of material, amount of material, and the date the material was put into storage is recorded. Each magazine is designed to hold a different amount of net explosive weight (NEW). The basis for these limits is to ensure explosives safety and are the limits are approved by the Army. The operators assure that the design amount of NEW for each magazine is not exceeded. Weekly inspections of the storage magazines are conducted to meet the requirements of 40 CFR §264.1201(a)(5) and §264.1201(f). In addition, hazardous waste munitions and explosives are inventoried at least annually in accordance with 40 CFR §264.1201(e).

Containers are inspected for leaks or deterioration caused by corrosion or other factors. In accordance with 40 CFR §264.171, if a container holding hazardous wastes is not in good condition or if it begins to leak, the hazardous waste will be removed from the container and placed into another container that is in good condition. The defective container will not be used to manage hazardous waste until the defect is repaired.

The weekly inspections of the storage magazines will be logged and consist of the following inspections:

- Verify doors are locked when not in use
- Verify warning signs are in place and readable
- Verify container labels are readable and containers are closed
- Verify containers are not damaged and there are no leaks or spills
- Verify there is sufficient aisle space
- Inspect the floor for spills, loose debris, cracks, and damage.

3.3 Material Preparation Building

The Rocket Motor Ops Building will be inspected when energetic waste is present. Daily visual inspections (when in operation) will be conducted to look for spills, loose debris, and improperly stored materials.

3.4 Hybrid Burn Chamber (HBC) and APCS Equipment

The HBC and air pollution control system (APCS) is subject to visual examination each day as part of regular operations. Daily visual inspections (when the unit is in operation) will be logged and consist of the following inspections:

- Visual inspections of the HBC and the associated equipment for damage, corrosion, cracks, leaks, signs of tampering, and fugitive emissions
- Visual inspections of the APCS equipment for damage, corrosion, cracks, leaks, signs of tampering
- Visual inspection of the concrete pad for cracks, gaps, erosion, wet spots, and damage.

The operator will also complete a walk-through of the HBC area to inspect equipment for integrity and to look for excessive accumulation of ash or debris (wastes such as wires, paper, plastic, packaging, fragments, shrapnel, etc.). Excessive ash or debris will be properly collected, containerized, and disposed of off-site. Any other identified deficiencies will be promptly corrected before commencing HBC operations.

4.0 RECORDKEEPING

Inspections will be recorded on an inspection log and the records will be maintained on-site at the facility for a minimum of three years as required by 40 CFR §264.15(d). These records will include the inspection's date and time, the inspector's name, a notation of the observations made, and the date and nature of any repairs or other remedial actions. Checks will be performed to assure that records are being adequately maintained.

Any deficiencies found during inspections or during routine operations will be reported to the respective supervisors for correction. Records will be maintained of the reported deficiencies and the associated corrections.

Table 1
Inspection Schedule Regulatory Checklist

Regulatory Citation	Description	Location Addressed
40 CFR §264.15(b)	The owner or operator shall develop and implement a written schedule for inspecting monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment (such as dikes and sump pumps) that are important to preventing, detecting, or responding to environmental or human health hazards. The schedule must be kept at the facility, identify the types of possible problems and the frequency of inspections.	Section 1.0 Table III.D
40 CFR §264.33	All facility communications or alarm systems, fire protection equipment, spill control equipment, and decontamination equipment, where required, must be tested and maintained as necessary to assure its proper operation in time of emergency.	Section 2.2 Table 2
40 CFR §264.174	At least weekly, the owner or operator must inspect areas where containers are stored. The owner or operator must look for leaking containers and for deterioration of containers and the containment system cause by corrosion or other factors.	Section 3.2
40 CFR §264.193(i)	Tank systems	N/A
40 CFR §264.195	Tank systems	N/A
40 CFR §264.226	Surface impoundments	N/A
40 CFR §264.254	Waste piles	N/A
40 CFR §264.273	Land treatment	N/A
40 CFR §264.303	Landfills	N/A
40 CFR §264.347	Incinerators	N/A
40 CFR §264.552	Corrective Action Management Units	N/A
40 CFR §264.574	Drip pads	N/A
40 CFR §264.602	Miscellaneous Units Monitoring, testing, analytical data, inspections, response, and reporting procedures and frequencies must ensure compliance to protect human health and the environment as specified in the permit.	Section 2.1 Section 3.4

Table 1
Inspection Schedule Regulatory Checklist (continued)

Regulatory Citation	Description	Location Addressed
40 CFR §264.1033(f)	Air emission standards for process vents	N/A
40 CFR §264.1034	Air emission standards for process vents	N/A
40 CFR §264.1052	Air emission standards for equipment leaks	N/A
40 CFR §264.1053(e)	Air emission standards for equipment leaks	N/A
40 CFR §264.1057	Air emission standards for equipment leaks	N/A
40 CFR §264.1058	Air emission standards for equipment leaks	N/A
40 CFR §264.1063	Air emission standards for equipment leaks	N/A
40 CFR §264.1084	Air emission standards for tanks, surface impoundments, containers	N/A
40 CFR §264.1085	Air emission standards for tanks, surface impoundments, containers	N/A
40 CFR §264.1086	Air emission standards for tanks, surface impoundments, containers	N/A
40 CFR §264.1088	Air emission standards for tanks, surface impoundments, containers	N/A
40 CFR §264.1101(c)(4)	Containment buildings	N/A
40 CFR §270.14(b)(5)	A copy of the General Inspection Schedule required by §264.15(b), shall include where applicable, as part of the inspection schedule, specific requirements in §§ 264.174, 264.193(i), 264.195, 264.226, 264.254, 264.273, 264.303, 264.602, 264.1033, 264.1052, 264.1053, 264.1058, 264.1084, 264.1085, 264.1086, and 264.1088 of this part.	Table 1

Table 2
Safety and Emergency Equipment Inspection Frequencies

Device Type [a]	Frequency	Inspections, Tests, & Calibrations
Fire extinguishers	Monthly Inspections	Check that extinguisher is present in its proper location. Check that its' most recent test or certification is up-to-date. Check seal.
	Annual Test	The contractor performs pressure and function tests.
Eyewash stations	Monthly Test	Check that adequate water flows from the eyewash fountain when activated.
Sprinkler systems	Monthly Inspections	Operational verification of system performance; verify adequate water volume and pressure will be available during an emergency situation
Spill kits	Monthly Inspection	Check that spill kits and spill containers are present in their proper locations. Check that they are complete and are in good condition.
First Aid kit	Monthly Inspection	Check that first aid kits are present in their proper locations. Check that first aid kits are complete, are in good condition, and the contents have not expired.
	As Needed	Review the first aid kit contents list to ensure that the contents meet the needs of workplace hazards.
Communication systems	Monthly Test	Operational verification
Alarm system	Monthly Test	Operational verification
Security devices	Weekly	Visually inspect fences, gates, locks, and key card entry equipment for compromise; ensure gates, locks, and key card entry equipment are functioning properly

Notes:

[a] The location of the equipment is shown in Table III.E.3 included in *Appendix III.E – Contingency Plan*.

Table III.D. – Inspection Schedule

Facility Unit(s) and Basic Elements	Possible Error, Malfunction, or Deterioration	Frequency of Inspection
Loading and unloading areas	Spills, loose debris, improperly stored material	Daily when in operation
Rocket Motor Ops Building	Spills, loose debris, improperly stored material	Daily when in operation
Hybrid Burn Chamber (HBC) and air pollution control system	Deterioration, and unit malfunction; damage, corrosion, cracks, leaks, signs of tampering, fugitive emissions	Visual inspection daily when in operation
HBC automatic interlock system monitoring equipment	Process monitoring malfunction; incorrect readings or measurements; signal failure; equipment failure; operability	Weekly when in operation
Concrete pads	Cracks, gaps, erosion, wet spots, and damage	Visual inspection daily when in operation
-Above Ground Magazine (AGM) -Earth Covered Magazine (ECM) V-13-1 -ECM V-13-2 ~~-ECM V-13-3 (reserved for future use)~~ ~~-ECM V-13-4 (reserved for future use)~~	Improper storage or labeling, open containers, doors left unlocked, warning signs not visible, spills, loose debris, cracks, inadequate aisle space	Weekly; Inventoried annually

Table III.D. – Inspection Schedule (continued)

Facility Unit(s) and Basic Elements	Possible Error, Malfunction, or Deterioration	Frequency of Inspection
Safety and Emergency Equipment:		
Fire extinguishers	Inadequate pressure, broken seal, access blocked, inspection out of date, bad hose/nozzle	Monthly
Eyewash stations	Inadequate pressure, access blocked, plugged lines	Monthly
Sprinkler systems	Inadequate pressure, malfunction	Monthly
Spill kits	Inadequate supply	Monthly
First Aid kit	Inadequate supply; expired contents	Monthly
Communication systems	Delay in communications; system malfunction	Monthly
Alarm system	Delay in communications; system malfunction	Monthly
Security devices	Fence compromise, gate malfunction; Increased potential of unauthorized access	Weekly

Appendix III.E – Contingency Plan

40 CFR Part 264 Subpart C – Preparedness and Prevention (264.30-264.37) and 40 CFR Part 64 Subpart D – Contingency Plan and Emergency Procedures (264.50-56)

1.0 INTRODUCTION

This document serves as the Contingency Plan for EnviroSafe Demil, LLC (ESD) and includes all information required by 40 CFR Part 264 Subparts C and D. Section 2.0 consists of the Contingency Plan and Emergency Procedures, which satisfies the requirements of Subpart D. Section 3.0 consists of the Preparedness and Prevention Plan which meets the requirements of Subpart C. Table 1.1-1 provides the regulatory references for each of the required components of the Contingency Plan.

The Emergency Response Plan (included as *Appendix III.F – Emergency Response Plan*) is incorporated by reference into this document. In an emergency, both this Contingency Plan and the Emergency Response Plan should be consulted, as applicable.

2.0 CONTINGENCY PLAN AND EMERGENCY PROCEDURES

The Contingency Plan and Emergency Procedures are designed to minimize hazards to human health and the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to the air, soil, or surface water. The plan's provisions should be carried out immediately whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten human health or the environment.

2.1 Distribution of the Contingency Plan

In accordance with 40 CFR §264.53, a copy of the Contingency Plan, and all revisions, is maintained at the facility and is submitted to all local police departments, fire departments, hospitals, and State and local emergency response teams that may be called upon to provide emergency services. These agencies are listed in Table III.E.1.

2.2 Revisions to the Contingency Plan

In accordance with 40 CFR §264.54, the Contingency Plan will be reviewed and immediately amended, if necessary, whenever:

- The facility permit is revised;
- The plan fails in an emergency;
- The facility changes - in its design, construction, operation, maintenance, or other circumstances - in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents or changes the response necessary in an emergency;
- The list of emergency coordinators changes; or
- The list of emergency equipment changes.

Amendments and updated plans will be provided to the agencies listed in Table III.E.1.

2.3 Leadership

Responses to emergencies will be supervised by the Emergency Coordinator, in accordance with 40 CFR §264.55.

2.3.1 Emergency Coordinator

In accordance with 40 CFR §264.55, at all times, there is at least one employee on the facility premises or on call with the responsibility for coordinating all emergency response measures. This person serves as the Emergency Coordinator and 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 all records within the facility, and the facility layout. The Emergency Coordinator has the authority to commit the resources needed to carry out the Contingency Plan.

2.3.2 Persons Qualified to Act as Emergency Coordinator

In accordance with 40 CFR §264.52(d), the names, addresses, and phone numbers (office and home) of all persons qualified to act as Emergency Coordinator must be included in the Contingency Plan and be kept up to date. The list of persons qualified to act as Emergency Coordinator can be found in Table III.E.2.

2.4 Emergency Procedures

The facility's Emergency Response Plan (included as *Appendix III.F - Emergency Response Plan*) describes the specific actions facility personnel must take in response to fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water. The Emergency Procedures described in Sections 2.4.1 and 2.4.2 are required by 40 CFR §264.56 and are in addition to those procedures described in *Appendix III.F - Emergency Response Plan*.

2.4.1 Emergency Procedures Overseen by the Emergency Coordinator

During an imminent or actual emergency situation, the Emergency Coordinator (or their designee when the Emergency Coordinator is on call) must immediately:

1. Activate internal communication systems to notify all facility personnel; and
2. Notify appropriate State or local agencies with designated response roles if their help is needed. The contact information for these agencies is in Table III.E.1.

During a release, fire, or explosion, the Emergency Coordinator must immediately identify the character, exact source, amount, and the areal extent of any released materials. This may be done by observation or review of facility records or manifests and, if necessary, by chemical analysis.

Concurrently, the Emergency Coordinator must assess possible hazards to human health or the environment that may result from the release, fire, or explosion. This assessment must consider both direct and indirect effects of the release, fire, or explosion (e.g., the effects of any toxic, irritating, or asphyxiating gases that are generated or the effects of any hazardous surface water run-off from water or chemical agents used to control fire and heat-induced explosions).

If the Emergency Coordinator determines that the facility has had a release, fire, or explosion which could threaten human health, or the environment, outside the facility, he must report his findings as follows:

1. If his assessment indicates that evacuation of local areas may be advisable, he must immediately notify appropriate local authorities listed in Table III.E.1. He must be available to help appropriate officials decide whether local areas should be evacuated; and
2. He must immediately notify the government official designated as the on-scene coordinator for that geographical area (see Section 2.4.2 for the Regional Administrator's contact information) and, as appropriate, the National Response Center (using their 24-hour toll-free number **800-424–8802**). The report must include:
    i. Name and telephone number of reporter;
    ii. Name and address of facility;
    iii. Time and type of incident (e.g., release, fire);
    iv. Name and quantity of material(s) involved, to the extent known;
    v. The extent of injuries, if any; and
    vi. The possible hazards to human health, or the environment, outside the facility.

During an emergency, the Emergency Coordinator must take all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other hazardous waste at the facility. These measures must include, where applicable, stopping processes and operations, collecting and containing released waste, and removing or isolating containers.

If the facility stops operations in response to a fire, explosion, or release, the Emergency Coordinator must monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, wherever appropriate.

Immediately after an emergency, the Emergency Coordinator must provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion at the facility.

Unless the facility can demonstrate, in accordance with 40 CFR §261.3(c) or (d), that the recovered material is not hazardous waste, the facility must manage this waste in accordance with all applicable requirements of 40 CFR Parts 262, 263, and 264.

The Emergency Coordinator must ensure that, in the affected area(s) of the facility:

1. No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed; and
2. All emergency equipment listed in the contingency plan is cleaned and fit for its intended use before operations are resumed.

2.4.2 Reporting Requirements for Implementing the Contingency Plan

The facility must note in the operating record the time, date, and details of any incident that requires implementing the Contingency Plan. In addition to other reporting requirements mandated by environmental laws, within 15 days after the incident, the facility must submit a written report to the Regional Administrator:

Dr. Earthea Nance, or successor
Regional Administrator
US EPA Region 6
307 W. 7th St., Suite 100
Fort Worth, TX 76102
(214) 665-2200; toll-free (817) 978-5600

The report must include:

1. Name, address, and telephone number of the owner or operator;
2. Name, address, and telephone number of the facility;
3. Date, time, and type of incident (e.g., fire, explosion);
4. Name and quantity of material(s) involved;
5. The extent of injuries, if any;
6. An assessment of actual or potential hazards to human health or the environment, where this is applicable; and
7. Estimated quantity and disposition of recovered material that resulted from the incident.

2.5 Emergency Equipment

In accordance with 40 CFR §264.52(e), the Contingency Plan must include a list of all emergency equipment at the facility and the location and physical description of this equipment. Equipment necessary for safety and emergency response is listed in Table III.E.3 and is discussed further in Section 3.1.

2.6 Evacuation Plan

In accordance with 40 CFR §264.52(f), the Contingency Plan must include an evacuation plan for facility personnel. Evacuation route maps are posted throughout the facility. Through these posted maps and facility-wide drills, employees will understand where their respective evacuation points are located and they will know their actions upon arrival. ESD will maintain a list of all employees on staff at the time of an evacuation and that list will be used to perform a roll call immediately upon evacuating to the designated locations.

2.6.1 Emergency Signals Used to Begin Evacuation

When an evacuation is needed, radio communications and alarm systems will announce the evacuation order.

2.6.2 Evacuation Routes

The designated evacuation routes and points are shown on the Evacuation Map in Figure 2-1. A larger map where the routes are more clearly seen is used for training and in the case of emergencies.

Since each emergency has its own set of conditions, there may be a situation where the primary evacuation route is not usable. Therefore, alternate evacuation routes have been established and are included in the site training program.

Primary Evacuation Route (Marked with a Green Dashed Arrow)

A primary evacuation route has been established to assist in a safe evacuation. The primary evacuation routes are marked with a green dashed arrow on the Evacuation Map.

Alternate Evacuation Route (Marked with a Yellow Dashed Arrow)

If imminent danger may be encountered along the primary evacuation route or the primary evacuation route is not usable, the alternate evacuation route will be used. The alternate evacuation routes are marked with a yellow dashed arrow on the Evacuation Map.

2.6.3 Evacuation Procedures

An evacuation must be conducted in such a way as to minimize the risk of harm to everyone involved. This requires the development of a pre-plan with all foreseeable conditions taken into consideration.

In the event that the emergency necessitates that all personnel evacuate their work areas and report to their designated evacuation point, the following will apply.

1. A designated Evacuation Point Supervisor will be in charge of the evacuation points and will report to the Emergency Coordinator, or their designee if they are in another area of the facility.
2. Follow the primary evacuation route to the designated evacuation areas. If there is imminent danger that may be encountered along the primary evacuation route, you must follow the alternate evacuation route, away from the incident. Remain in the designated area until otherwise notified.
3. Visitors and Contractors will evacuate to the nearest designated evacuation area and report to the Evacuation Point Supervisor.
4. Each lead person/supervisor will take a head count of their employees and report their findings to the Evacuation Point Supervisor.
5. Evacuation Point Supervisors will provide the Emergency Coordinator, or their designee, with a report of those employees present and those unaccounted for as quickly as possible.
6. In the event that someone is missing or unaccounted for, the Emergency Coordinator, or their designee, will:

    - Verify with Evacuation Point Supervisors that person(s) are missing
    - Confer with the area supervisor or lead person and determine the appropriate course of action.

7. All employees must remain in the designated evacuation area until the Emergency Coordinator, or their designee, gives the "all clear" announcement.

2.6.4 Evacuation Drills

The frequency for evacuation drills is discussed in *Appendix III.F - Emergency Response Plan*.

2.7 Arrangements with Local Authorities

In accordance with 40 CFR §264.52(c) and §264.37, the Contingency Plan must describe arrangements agreed to by local police departments, fire departments, hospitals, contractors, and State and local emergency response teams to coordinate emergency services. Coordination with the local emergency planning committee and the aforementioned municipalities is essential to the communication and the success of the response to an emergency scenario. The outside organizations listed in Table III.E.1 are to remain outside the gate until checked in by facility personnel. They will then be directed to the designated Command Center or the Emergency Staging Area.

2.7.1 Familiarizing Off-Site Organizations with the Facility

The facility has provided the local police, fire department, and hospital with the layout of the facility, the locations and characteristics of materials handled at the facility and the associated hazards with these materials, the places where the facility personnel would normally be working, entrances to the facility, roads inside the facility, and possible evacuation routes. In addition, the facility has familiarized the local hospitals with the properties of the materials handled at the facility and the types of injuries or illnesses which could result from fires, explosions, or releases at the facility.

2.7.2 Understanding Between Outside Organizations and the Facility

Documentation describing the understanding between the responding units and the facility is included in *Attachment III.E.1 – Agreement Letters* and will be available at the facility in the operating record. If a State or local authority declines attempts at arrangements, the refusal will be documented in the operating record.

2.7.3 Protocol When Outside Organizations Are Called In

In accordance with 40 CFR §264.37(a)(2), agreements designating primary emergency authority to a specific police or fire department must be made if more than one police and fire department might respond to an emergency. The local authorities listed in Table III.E.1 will have primary emergency authority over another fire or police department who might respond. However, if the Emergency Coordinator decides that based on the specific emergency situation, another

department has increased capability or experience in handling a certain type of emergency, the Emergency Coordinator may designate alternate primary emergency authority.

The information below addresses emergencies requiring outside emergency organization involvement. The purpose of this information is to promote accurate communication among all personnel involved to minimize the effects of a significant emergency in the area.

Emergency Coordinator

The Emergency Coordinator will be the main point of contact for all aspects of the emergency response. If necessary, the Emergency Coordinator may designate other individuals to lead certain areas of the emergency response. All Unit Commanders (i.e., Fire Chief, Police Chief, Head Medical Personnel, etc.) will report directly to the Emergency Coordinator.

Command Center

A Command Center may be established to function as a unified base of operations for response coordination. As Emergency Response Teams are formed, their Unit Commander will report to the Command Center before the team proceeds to the affected area. The Command Center will ideally be located in the main conference room. If conditions are such that this location is unsafe or if a more suitable location for the emergency scenario exists, then an alternate location for the Command Center will be utilized. The alternate site selection will be influenced by meteorological conditions and safe distances from the known and anticipated hazards.

Emergency Staging Area

An Emergency Staging Area may be established and will function as a central location for all emergency service equipment and personnel. The Emergency Staging Area will be selected based on the location and nature of the emergency. It should be in close proximity to the Command Center so that orders from the Emergency Coordinator and/or Unit Commanders can be relayed quickly. The location will ideally be located outside of the building, just outside the main conference room. If the Command Center is situated in an alternate location, then the Emergency Staging Area will be located in a suitable location near the Command Center

Unit Commanders

Upon arrival at the facility, Unit Commanders (i.e., Fire Chief, Police Chief, Head Medical Personnel, etc.) should report to the facility Emergency Coordinator at the Command Center. The Unit Commanders will be briefed and provided pertinent information by the Emergency Coordinator. The facility Emergency Coordinator and responding Unit Commanders will function as a Unified Incident Command and will direct the efforts of the Emergency Response Teams.

Emergency Response Teams

Personnel comprising the Emergency Response Teams will be directed to the Emergency Staging Area to await direction from their Unit Commanders or the Emergency Coordinator. At no time should an Emergency Response Team enter the material handling area of the facility without the direction of their Unit Commander or the Emergency Coordinator. At no time shall responding units attempt to walk through explosive material spills.

If during a response to the emergency, an explosion occurs, the area should be evacuated, and the facility Emergency Coordinator should be notified immediately. The facility Emergency Coordinator will determine the appropriate action to be taken.

3.0 PREPAREDNESS AND PREVENTION PLAN

Preparedness and Prevention provisions under RCRA are identified in 40 CFR §270.14(b)(6) and Part 264 Subpart C. In accordance with 40 CFR §264.31, the facility is designed, constructed, maintained, and operated to minimize the possibility of fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to the air, soil, or surface water which could threaten human health or the environment.

3.1 Required Equipment

Emergency equipment is strategically located throughout the facility. The facility is equipped with the following equipment. More information on the equipment is shown in Table III.E.3.

- An internal communications or alarm system capable of providing immediate emergency instruction (voice or signal) to facility personnel
- A device, such as a telephone (immediately available at the scene of operations) or a hand-held two-way radio, capable of summoning emergency assistance from local police departments, fire departments, or State or local emergency response teams
- Portable fire extinguishers, fire control equipment (including special extinguishing equipment, such as that using foam, inert gas, or dry chemicals), spill control equipment, and decontamination equipment; and
- Water at adequate volume and pressure to supply water hose streams, or foam producing equipment, or automatic sprinklers, or water spray systems.

3.1.1 Communications System and Alarm System

Communication within the facility will be conducted via two-way radios. Additionally, the facility has alarms/speakers that will be used for announcements throughout the facility.

3.1.2 Summoning Emergency Assistance

The facility will use two-way radios to summon emergency assistance. The alarm/speaker system will be used to notify plant personnel of emergency situations.

3.1.3 Fire Control Equipment

The facility's fire extinguishers are dry chemical units. Each unit is portable (either hand held or wheeled) and contains fire suppression chemicals that, when sprayed on a fire, smothers it. The operator points the nozzle towards the fire and pulls the trigger to activate the fire extinguishing chemical. The operator utilizes the PASS method in which the operator first **P**ulls the pin releasing the locking mechanism, **A**ims at the base of the fire, **S**queezes the lever slowly and evenly, and **S**weeps the nozzle from side to side.

3.1.4 Spill Control and Decontamination Equipment

Due to the type of materials handled, the small size of containers handled, and the design of the equipment where the materials are processed, large spills or leaks are not expected to occur.

Facility personnel will respond to all small-scale spills and leaks. Spill response equipment consists of a broom and dustpan, absorbent material, neutralizing/desensitizing agents (diesel or solvent/water mixture), and tools to clean up absorbed spills. Absorbent material can be placed directly on or around a liquid spill to absorb the liquid material. Absorbent material can also be used to form a dike to prevent the spread of a liquid spill. Powder spills are neutralized or desensitized before any attempts are made to clean up. Spill clean-up waste can be shoveled, swept up, and placed in containers with appropriate labels. Clean-up wastes will be appropriately disposed of off-site.

3.1.5 Adequate Volume of Water

Overhead water sprinklers are installed in all process building for fire suppression. The sprinkler systems will be inspected in accordance with *Appendix III.D – Inspection Schedule* to ensure adequate volumes of water and water pressure.

3.2 Testing and Maintenance of Equipment

All emergency response equipment is appropriately maintained and inspections are performed to ensure the equipment is in good working order. Testing and maintenance of emergency response equipment, such as the fire protection equipment, spill control equipment, and decontamination equipment, is discussed in *Appendix III.D – Inspection Schedule*.

The communication system is used on a daily basis and therefore is not scheduled for specific inspections. If a problem is detected in everyday use, the problem is fixed immediately.

3.3 Access to Communications or Alarm System

Whenever hazardous waste is being handled, all personnel involved in the operation will have immediate access to an internal alarm or emergency communication device (either directly or through visual or voice contact with another employee).

It is not anticipated that there will ever be just one employee on the premises while the facility is operating, but in the rare event this may occur, they will have immediate access to a device, such as a telephone or a hand-held two-way radio, that is capable of summoning external emergency assistance.

3.4 Required Aisle Space

Adequate clearance is maintained to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of the facility in an emergency.

3.5 Arrangements with Local Authorities

Arrangements with local authorities are described in Section 2.7 of this document.

Table 1.1-1

Preparedness and Prevention and Contingency Plan Regulatory Checklist

Regulatory Citation	Description	Location Addressed
Subpart C – Preparedness and Prevention		
40 CFR §264.31	Facilities must be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil or surface water that could threaten human health or the environment.	Section 3.0
40 CFR §264.32	Facilities must be equipped with the following: internal communication or alarm system capable of providing immediate emergency instruction to the facility, a telephone or two-way radio capable of summoning emergency assistance from local fire or police departments or response teams, portable fire extinguishers, fire control equipment, spill control equipment, and decontamination equipment, and water at adequate volume and pressure to supply water host streams, automatic sprinklers or water spray systems.	Section 3.1 Table III.E.3
40 CFR §264.33	Facility communications or alarm systems, fire protection equipment, spill control equipment, and decontamination equipment, where required, must be tested and maintained as necessary to ensure their proper operation in an emergency.	Section 3.2
40 CFR §264.34	Facilities must ensure that operators have immediate access to an internal alarm or emergency communication device. If there is ever just one employee on the premises while the facility is operating, he must have immediate access to a device capable of summoning external emergency assistance.	Section 3.3
40 CFR §264.35	The owner or operator must maintain aisle space to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of facility operation in an emergency.	Section 3.4
40 CFR §264.37~~;~~ ~~40 CFR §264.52(c)~~	Describe arrangements agreed to by local police departments, fire departments, hospitals, contractors, and State and local emergency response teams to coordinate emergency services.	Section 2.7 Section 2.7.2 Section 3.5 Table III.E.1

Table 1.1-1
Contingency Plan Regulatory Checklist (continued)

Regulatory Citation	Description	Location Addressed
Subpart D – Contingency Plan and Emergency Procedures		
40 CFR §264.51	Each owner or operator of a facility must have a Contingency Plan 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.	Section 2.0
40 CFR §264.52(a)	Describe the actions facility personnel must take to comply with §264.51 and §264.56 in response to 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 facility.	Section 2.4
40 CFR §264.52(c)	Describe arrangements agreed to by local police departments, fire departments, hospitals, contractors, and State and local emergency response teams to coordinate emergency services.	Section 2.7 Section 2.7.2 Section 3.5 Table III.E.1
40 CFR §264.52(d)	List names, addresses, and phone numbers (office and home) of all persons qualified to act as emergency coordinator (see §264.55).	Table III.E.2
40 CFR §264.52(e)	List of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems (internal and external), and decontamination equipment) where this equipment is required. The location and a physical description of each item must be included.	Section 2.5 Section 3.1 Table III.E.3
40 CFR §264.52(f)	Include an evacuation plan for facility personnel where there is a possibility that evacuation could be necessary. This plan must describe signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes (in cases where the primary routes could be blocked by releases of hazardous waste or fires).	Section 2.6
40 CFR §264.53	Distribution of copies of the Contingency Plan	Section 2.1
40 CFR §264.54	Amendments of the Contingency Plan	Section 2.2
40 CFR §264.55	The emergency Coordinator must have the authority to commit the resources needed to carry out the Contingency Plan.	Section 2.3.1
40 CFR §264.56	Emergency Procedures	Section 2.4

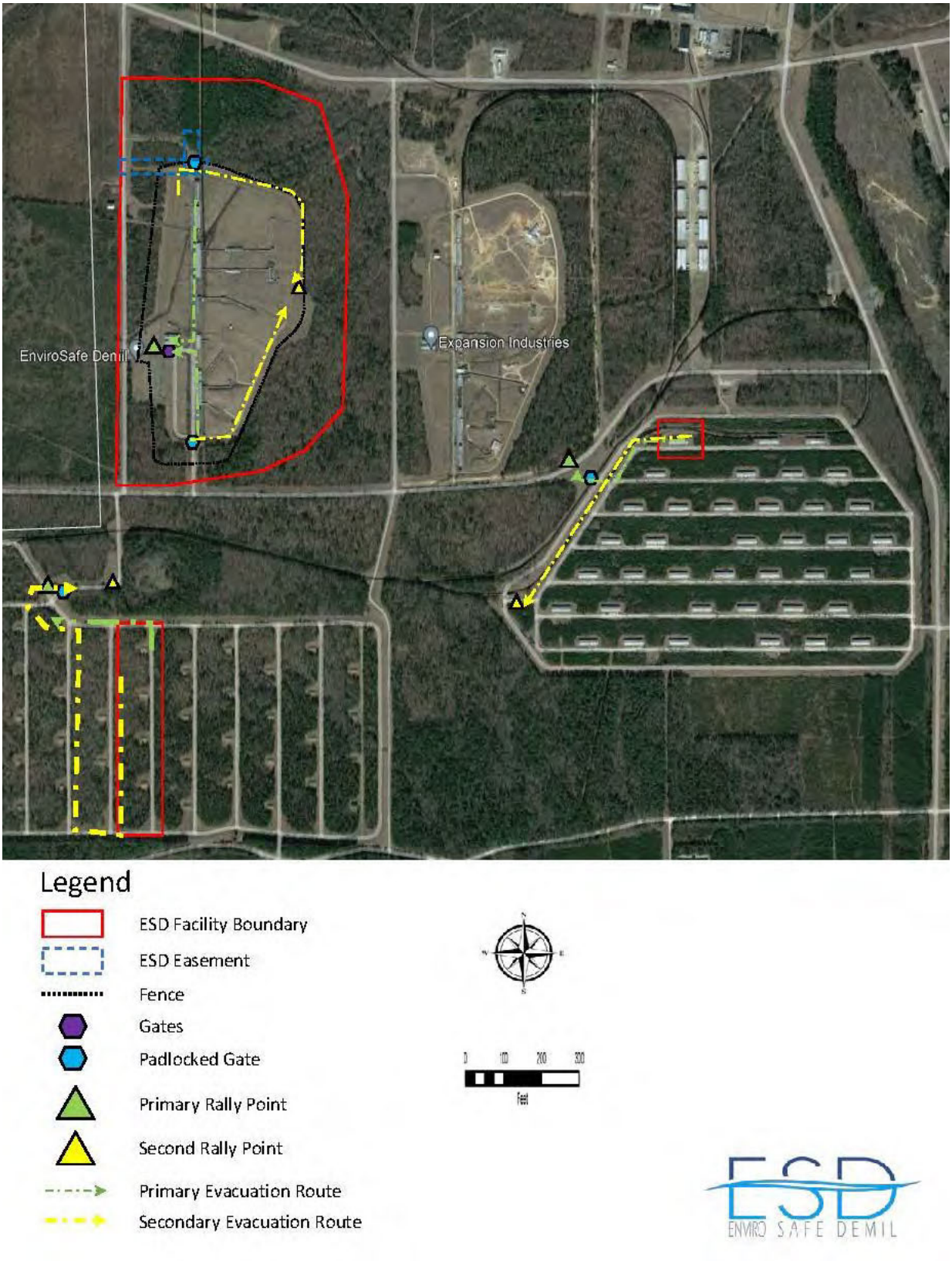


Figure 2-1
Evacuation Map

Table III.E.1
Arrangements with Local Authorities

	City of Hooks Police Department
Address	603 E. Avenue A, Hooks, TX 75561
Person Contacted	Police Chief Ricky Woodard [redacted]
Phone Number	903-547-2222
Agreed Arrangements	Provide emergency and non-emergency response support services that require the assistance of the police department.

	Hooks Volunteer Fire Department
Address	1007 E. Avenue A, Hooks, TX 75561
Person Contacted	Fire Chief Brandon Whitehurst [redacted]
Phone Number	903-547-2250
Agreed Arrangements	Provide emergency response support services during fire emergencies or other types of emergencies if needed.

	Christus St. Michael Hospital – Texarkana: Emergency Room
Address	2600 St. Michael Drive, Texarkana, TX 75501
Person Contacted	Nicole Cole [redacted]
Phone Number	903-614-2027; 903-614-1000
Agreed Arrangements	Provide emergency medical services (emergency room will be used) and provide occupational injury evaluations.

	(Other)
Organization Name	
Address	
Person Contacted	
Phone Number	
Agreed Arrangements	

Table III.E.2
Emergency Coordinators [a]

Name	Home Address	Office Phone(s) and/or Pager	Home Phone(s)
Primary Emergency Coordinator			
See note b	See note b	See note b	See note b
Alternate Emergency Coordinator			
See note b	See note b	See note b	See note b

Notes:

[a] In an emergency, contact the Primary Emergency Coordinator. If the Primary Emergency Coordinator is not readily available, the Alternate Emergency Coordinator will assume responsibility.

[b] 40 CFR §264.52(d) states: "*For new facilities,* this information must be supplied to the Regional Administrator at the time of certification, rather than at the time of permit application."

Table III.E.3
Emergency Equipment

Equipment	Location	Physical Description	Capability
Fire extinguishers	Buildings F-1, F-2, F-27 and F-28	Portable (hand held, wheeled) extinguishers with chemical agents. Extinguisher sizes are variable (e.g., 5, 10, 20, 30 pounds)	Fire suppression
Eyewash stations	Buildings F-1, F-2, and F-28	Portable eyewash stations	Chemical decontamination
Sprinkler systems	Buildings F-1, F-2, and F-28	Pumps, piping, and sprinkler nozzles provide water at adequate volume and pressure during an emergency situation	Fire suppression
Spill kits	Buildings F-1, F-2, and F-28	Absorbent material	Spill clean up
Communication systems	Facility-wide	Portable communication receivers/transmitters with base station	Emergency communication
Alarm system	Facility-wide	Facility-wide alarm signal notification system	Emergency communication

ATTACHMENT III.E.1

AGREEMENT LETTERS

August 9, 2023

Christus St. Michael Hospital – Texarkana: Emergency Room
Attn: Nicole Cole
2600 St. Michael Drive
Texarkana, TX 75501
E-mail: [redacted]

RE: ENVIROSAFE DEMIL, LLC (HOOKS, TEXAS)
EMERGENCY RESPONSE ARRANGEMENTS

Dear Ms. Cole:

EnviroSafe Demil, LLC (ESD), located at 401 N Montague Street in Hooks, Texas, will operate an energetic demilitarization facility in Hooks, Texas. The facility will accept military munitions and commercial munition items from off-site facilities for treatment. The facility is subject to the Resource Conservation and Recovery Act (RCRA) permitting and operating requirements.

40 CFR §264.37 requires ESD to attempt to make arrangements with local authorities for assistance in the event of an emergency at the facility. ESD must familiarize local authorities with the layout of the facility, properties of hazardous waste handled at the facility and the associated hazards, places where facility personnel would normally be working, entrances to and roads inside the facility, and possible evacuation routes. ESD must also familiarize local hospitals with the types of injuries or illnesses which could result from fires, explosions, or releases from the facility. The main hazards associated with activities at this facility are related to energetic material – the possibility for fires or explosions would be the worst-case emergency scenario at the facility. ESD has attached their Contingency Plan and the Emergency Response Plan (which is incorporated into the Contingency Plan by reference) and these documents include a map of the facility evacuation routes and other required information.

In addition ESD would like to offer the opportunity for you to visit the facility in order to become more familiar with the plant layout, the hazardous waste facilities and their locations, and the emergency response systems.

ESD is requesting that the Christus St. Michael Hospital – Texarkana: Emergency Room provide assistance in the event of an emergency at the facility. Please acknowledge your willingness to assist in emergencies and your receipt and review of the Contingency Plan by signing and returning the enclosed form.

Thank you in advance. If you have any questions, please feel free to contact me at 430-200-2296.

Sincerely,

Michael Wentz, President
EnviroSafe Demil, LLC
401 N Montague Street
Hooks, Texas 75561

Attachment: Contingency Plan and Emergency Response Plan

EnviroSafe Demil, LLC
401 N Montague Street
Hooks, Texas 75561

ENVIROSAFE DEMIL, LLC (HOOKS, TX) EMERGENCY RESPONSE ARRANGEMENTS

In the event of an emergency at the EnviroSafe Demil, LLC (ESD) facility in Hooks, Texas, the Christus St. Michael Hospital – Texarkana: Emergency Room agrees to provide assistance as requested. The level of assistance will be determined by the resources available as determined by CHRISTUS St. Michael Health System and the extent to which CHRISTUS St. Michael Health System is affected by the disaster. This form acknowledges receipt of the ESD RCRA Contingency Plan (and the Emergency Response Plan which is incorporated into the Contingency Plan by reference).

Signature _____ Date 8/17/23

Printed Name Stephen Johnson

Title Manager of Emergency Preparedness

Signature _____ Date 8/21/2023

Printed Name M Glen Boles

Title CFO

401 N Montague Street
Hooks, TX 75561

December 12, 2022

Brandon Whitehurst
Hooks Fire Department
1007 E. Avenue A.
Hooks, Texas 75561

Re: EnviroSafe Demil LLC – Hooks
Emergency Response Arrangements

Dear Mr. Whitehurst:

EnviroSafe Demil LLC, (ESD) will operate a demilitarization facility in Hooks, Texas. The facility will be called ESD, Hooks. ESD will accept munition items from offsite facilities for demilitarization and recycling. The initial permitted units at the facility will consist of 4 Earth Covered Magazines (ECM), 1 Above Ground Magazine (AGM), two packaging disassembly buildings, one feed building with an external Energetic Activation Unit (EAU), and one Hybrid Burn Chamber (HBC). The facility will also operate several accumulation (less than 90-day) waste container storage areas in the future. Future waste management units may be subject to the Resource Conservation and Recovery Act (RCRA) general permitting and operating requirements of Title 40 Code of Federal Regulations (CFR) Parts 264, 266, and 270.

40 CFR § 264.37 requires ESD to attempt to make the arrangements with local authorities for assistance in the event of an emergency at the facility. ESD must familiarize local authorities with the layout of the facility, properties of hazardous materials handled at the facility and associated hazards, places where facility personnel would normally be working, entrances to and roads inside the facility, and possible evacuation routes. The attached draft Contingency Plan for the ESD facility provides the required information. In addition, ESD is offering the opportunity to visit the facility in order to become more familiar with the facility layout, the hazardous material facilities and their locations, as well as the emergency response systems.

ESD is requesting that the Hooks Fire Department provide aid in the event of an emergency at the facility. Please acknowledge your willingness to assist in emergencies and your receipt and review of the draft Contingency Plan by signing and returning the enclosed form.

Thank you in advance. If you have any questions, please feel free to contact me at (903) 490-7626.

Sincerely,

EnviroSafe Demil LLC

Calvert Cannon
Program Manager

ESD
ENVIRO SAFE DEMIL

401 N Montague Street
Hooks, TX 75561

Attachment: Contingency Plan

EnviroSafe Demil LLC
401 N. Montague St
Hooks, TX 75561

In the event of an emergency at the ESD facility, the Hooks Fire Department agrees to provide aid as requested. This form acknowledges receipt of the draft ESD RCRA Contingency Plan December 12, 2022.

Signature B W Date 12/13/22

Print Name Brandon Whitehurst

Title Fire chief

December 12, 2022

Ricky Woodard
Hooks Police Department
603 E. Avenue A.
Hooks, Texas 75561

Re: EnviroSafe Demil LLC – Hooks
Emergency Response Arrangements

Dear Mr. Woodard:

EnviroSafe Demil LLC, (ESD) will operate a demilitarization facility in Hooks, Texas. The facility will be called EnviroSafe Demil LLC, Hooks, TX. ESD will accept munition items from offsite facilities for demilitarization. The permitted units at the facility will consist of 4 Earth Covered Magazines (ECM), 1 Above Ground Magazine (AGM), two packaging disassembly buildings, one feed building with an external Energetic Activation Unit (EAU), and one Hybrid Burn Chamber (HBC). The facility will also operate several accumulation (less than 90-day) waste container storage areas in the future. The hazardous waste management units are subject to the Resource Conservation and Recovery Act (RCRA) general permitting and operating requirements of Title 40 Code of Federal Regulations (CFR) Parts 264, 266, and 270.
40 CFR § 264.37 requires ESD to attempt to make the arrangements with local authorities for assistance in the event of an emergency at the facility. ESD must familiarize local authorities with the layout of the facility, properties of hazardous waste handled at the facility and associated hazards, places where facility personnel would normally be working, entrances to and roads inside the facility, and possible evacuation routes. The attached Contingency Plan for the ESD facility provides the required information. In addition, ESD is offering the opportunity to visit the facility in order to become more familiar with the plant layout, the hazardous waste facilities and their locations, and the emergency response systems.
ESD is requesting that the Hooks Police Department provide assistance in the event of an emergency at the facility. Please acknowledge your willingness to assist in emergencies and your receipt and review of the Contingency Plan by signing and returning the enclosed form.
Thank you in advance. If you have any questions, please feel free to contact me at (903)472-8331.

Sincerely,

EnviroSafe Demil LLC

Calvert Cannon
Program Manager

Attachment: Contingency Plan

EnviroSafe Demil LLC
401 N. Montague St
Hooks, Texas 75561

In the event of an emergency at the ESD facility, the Hooks Police Department agrees to provide assistance as requested. This form acknowledges receipt of the ESD RCRA Contingency Plan December 12, 2022.

Signature _____ Date 12-13-2022

Print Name Ricky Woodard

Title Chief of Police

Section III - Facility Management

Appendix III.F – Emergency Response Plan

30 TAC 305.50(a)(12)(C) and (D)

1.0 INTRODUCTION

New commercial hazardous waste management facilities are required to show sufficient evidence to demonstrate that emergency response capabilities are available before receiving wastes on-site. This plan shows that the facility has sufficient emergency response capabilities for managing a reasonable worst-case emergency condition associated with the operation of the facility. The Contingency Plan (included as *Appendix III.E – Contingency Plan*) is incorporated by reference into this document.

It is expected that facility response personnel, with support as needed, will mitigate the consequences of a potential disaster and restore the facility to normal operations. Emergencies will be addressed safely and effectively in an environmentally responsible way, minimizing risks to employees, contractors, visitors, plant property and resources, as well as beyond the facility boundaries to the citizens of Hooks, Texas and surrounding areas.

2.0 REASONABLE WORST-CASE EMERGENCY SCENARIO

Per 30 TAC 305.50(a)(12)(C)(IV), a definition of a worst-case emergency should be listed and evidence should be provided to show the ability to manage the worst-case emergency condition. A worst-case emergency scenario would involve an explosion and/or a fire in an area that contains explosives. Explosives are kept in the storage magazines and when they are ready to be processed, they are removed from the storage magazines and are sent to the Hybrid Burn Chamber (HBC). A fire or explosion could happen in any of these areas.

In order to prevent an explosion from propagating, the facility is designed and has operational practices in place to ensure that a fire or explosion in one area will not spread or cause additional explosions in another area. The storage areas are designed to hold a certain amount of net explosive weight (NEW) and regular inventory and inspections ensure these limits are not exceeded. In addition, there are limits on the amount of NEW that can be fed to the HBC and this amount is tracked in the daily logs. During operation, operating personnel are kept at a safe distance from the HBC. Additionally, applicable employees are trained in proper handling and transport of energetic materials. Employees who handle energetic waste are also trained on

emergency response in the event of an explosion. "No Smoking" signs are placed wherever there might be a hazard from energetic material.

Lightning has the potential to strike buildings containing explosives, possibly leading to an explosion. In accordance with the Department of Defense (DOD) Contractor's Safety Manual for Ammunition and Explosives (DOD 4145.26-M, March 13, 2008), the facility will be equipped with a lighting protection system that includes lightning rods and advanced warning systems. When an electrical storm is approaching the facility, the HBC will be shutdown as soon as possible after the current batch of explosives has been processed and all employees will relocate to a place that is a safe distance from the areas containing explosives.

If, despite the efforts listed above, an explosion were still to occur, ESD will ensure that emergency response teams are adequately trained on potential worst-case emergency scenarios for the facility. ESD will ensure the emergency response teams and are familiar with alternate routes to the facility in the event one or more routes are blocked. The Emergency Response Drills discussed in Section 6.1 will include scenarios such as this worst-case emergency. As mentioned in Sections 6.1 and 6.2, the emergency response teams will be invited to participate in the Emergency Response Drills.

3.0 WEATHER AND POSSIBLE EFFECTS ON EMERGENCY RESPONSE

Per 30 TAC 305.50(a)(12)(C)(III), weather data that might tend to affect emergency response should be evaluated.

3.1 Historical Weather Data

The ESD facility in Hooks, Texas has a relatively mild climate with hot summers and mild winters. Snowfall in the area is rare and usually very light. The relatively high humidity year-round is generally attributed to the influence of the Gulf of Mexico.

The average annual temperature from 1991-2020 in Texarkana, Texas was 64°F. The hottest month is typically July, averaging a temperature of 83.2°F and the coolest month is typically January, averaging 43.7°F. This data is shown in Attachment III.F.1.

3.2 Precipitation

Charts of monthly total precipitation and monthly total snowfall over the past 22 years for Texarkana, Texas is shown in Attachment III.F.2.

The average annual rainfall over the last 22 years in Texarkana, Texas was 53.45 inches, the maximum was 78.21 inches in 2009, and the minimum was 30.79 inches in 2005.

The average rainfall per month over the last 22 years in Texarkana, Texas was 4.33 inches, the maximum was 17.74 inches in October 2009, and the minimum was 0.01 inches in October 2005.

The average annual snowfall over the last 22 years in Texarkana, Texas was 2.4 inches, the maximum was 11.9 inches in 2011, and the minimum was 0.0 inches (many years). Although the average snowfall value calculated is 2.4 inches per year, this average was largely influenced by heavier than normal snowfall during a couple of years. However, for more than half of the years in this data set, the snowfall is 0.0 inches.

3.3 Wind

Average wind speeds are around 8 mph, with gusts to 23 mph, mainly blowing from the south. A chart of monthly wind speed statistics and directions for Texarkana Regional Airport are shown in Attachment III.F.3.

3.4 Potential for Major Weather Events

The potential for major weather events is summarized in the table below.

Natural Disasters	Risk	Information
Hurricanes	Very Low [a]	24 hurricanes have been recorded in Hooks, TX since 1930.
Tornadoes	High [b]	Hooks, TX averages 2 tornadoes per year.
Icy Conditions	Very Low	Temperatures are typically greater than the freezing point, though lower temperatures occasionally occur during the months of December, January, and February.
Flash Flooding	Low	The facility is not in the 100-year floodplain. The area around the facility has good drainage and flash flooding is not expected during normal weather patterns. However, extreme weather patterns could result in flash flooding around the facility.

Notes:

[a] Source: Hooks, TX - Hurricane Information & Risks | Homefacts

[b] Source: Hooks, Bowie County, TX Tornadoes (homefacts.com)

3.5 Effect of Weather on Emergency Response

Additional considerations must be accounted for in the emergency response in the event of extreme weather. Emergency operations are expected to be much slower if there is severe weather. Roads may become flooded, or blocked due to a fallen tree, and emergency responders may have to use alternative routes to and from the facility. Alternate routes are discussed during practice drills and communication with external emergency response crews.

4.0 EMERGENCY RESPONSE

The response during an emergency is covered in Sections 2.4 and 2.7.3 of the Contingency Plan (included as *Appendix III.E – Contingency Plan*).

Response Time

Response time during an emergency is important in minimizing the impacts of the incident, so the facility will participate in training and drills in order to ensure response time is as quick as possible. During normal operations, the response teams should be assembled within less than five minutes. During off-hours, the complete response team assembly may take longer (up to 30 minutes) if personnel need to be called in from off-site.

5.0 IDENTIFICATION OF FIRST-RESPONDERS

5.1 Emergency Coordinator - (On-Scene Coordinator (OSC))

The On-Scene Coordinator (OSC) will be the Emergency Coordinator or their designee. The names, addresses, and phone numbers (office and home) of all persons qualified to act as Emergency Coordinator is found in *Table III.E.2 – Emergency Coordinators* (included as part of *Appendix III.E – Contingency Plan*).

5.2 List of First-Responders

A list of first-responders is provided in *Table III.E.1 – Arrangements with Local Authorities* (included as part of *Appendix III.E – Contingency Plan*). Section 2.7.3 of the Contingency Plan (included as *Appendix III.E – Contingency Plan*) discusses which responder will have primary emergency authority.

5.3 Medical Services or Hospitals

The name, address, and phone number of the hospital that will provide assistance if outside medical care is needed is listed in *Table III.E.1 – Arrangements with Local Authorities* (included as part of *Appendix III.E – Contingency Plan*). A map showing the quickest route to the hospital is included in Attachment III.F.4. The hospital is located approximately 14-15 miles from the facility.

Off-site medical facilities will not require any specific hazardous materials training to deal with injuries from the facility. The most likely serious injuries that would require transport to a medical facility would result from fires or explosions. Hazardous materials contamination is not a concern based on types of materials handled at the facility.

The need for decontamination is not a major concern and is unlikely based on the types of materials handled at the facility. However, if determined necessary, decontamination procedures for injured personnel will simply be removing work boots, personal protective equipment (PPE), and any outer clothing (if not covered by PPE). Any clothing that has the possibility of being contaminated will either need to be decontaminated or containerized for disposal off-site. Additionally, the affected area may be washed with soap and water. Drills will be run periodically that require decontamination and transport of injured people to the appropriate medical centers.

5.4 Local Emergency Planning Committee (LEPC)

ESD does not anticipate relying on the Bowie County Local Emergency Planning Committee for emergency response capabilities. ESD personnel who may come into contact with hazardous materials will be thoroughly trained on the hazards associated with explosives and the required emergency response procedures. ESD believes that facility personnel, with assistance from the local police and fire departments (when needed), will be better equipped to handle these emergencies than the LEPC. In the event the LEPC ever needs to be contacted, the contact information is included below.

Local Emergency Planning Committee (LEPC)
Bowie County LEPC
Mr. Lance Hall (subject to change)
710 James Bowie Drive
New Boston, TX 75570
LEPC phone: 903-628-6776
Spill phone: 903-798-3042
Report type required: Electronic via E-mail
E-mail address: [redacted] (subject to change)

6.0 PRE-DISASTER PLAN

The facility has developed a pre-disaster plan to ensure that employees and outside responders are ready in the event of an emergency. The pre-disaster plan consists of drills and training.

6.1 Drills

As part of the facility's pre-disaster plan, at least two evacuation drills and two emergency response drills will be conducted each year. Additionally, the facility will conduct drills for "predictable" emergencies such as floods or hurricanes. The purpose of these drills is to:

1. Promote emergency preparedness
2. Test or evaluate emergency operations, procedures, or facilities
3. Ensure personnel are properly trained in emergency response duties and their knowledge of emergency response duties is refreshed at a regular interval
4. Demonstrate operational capability

Procedures to account for personnel are included in all drills. The Contingency Plan (included in *Appendix III.E – Contingency Plan*) includes information on proper response to emergencies, a list showing the location of the emergency equipment, and contact information for emergency responders.

Evacuation Drills

The Evacuation Plan is included in Section 2.6 of the Contingency Plan (which is included by reference) and can be found in *Appendix III.E – Contingency Plan*. The Evacuation Plan includes the signals used to begin evacuation, a map of the evacuation routes, and the evacuation procedures.

Emergency Response Drills

There are different scenarios that could result in emergency response and these are covered during new hire orientation and in the annual review of training given for operations personnel responsible for energetic material management and emergency response. Not every type of possible scenario will be exercised each year during the drills. The rotation of the drill scenarios will be chosen based on those scenarios that are most likely and the scenarios that are the most destructive. The type of drill scenario chosen is at the discretion of facility management. A facility practice drill schedule is kept to ensure adequate rotation of practice drills. When planning a drill, the county emergency management agency, police, fire, and ambulance rescue services, if applicable, should be included in the planning process and invited to participate in the event, if possible.

Severe Weather Drills

The facility will also conduct drills for severe weather. These can include tornado drills, hurricane drills, flooding drills, earthquake drills, etc. Responses to severe weather is also covered during new hire orientation and in the annual review of training given for applicable facility personnel.

6.2 Emergency Response Training

Employee training for emergency responses is included in *Appendix III.B – Personnel Training Plan*. Outside organizations will be invited to participate in the Emergency Response Drills. Section 2.7 of the Contingency Plan (included as *Appendix III.E – Contingency Plan*) discusses arrangements with local authorities, the protocol when outside organizations are called in, and documentation describing the understanding between the responding units and the facility.

All personnel who may come into contact with hazardous materials are trained in basic firefighting response, emergency communication procedures, emergency equipment locations, and plant evacuation procedures. Additional job-specific training is given to applicable operations personnel responsible for energetic material management and emergency response. ESD plans to have an on-site team of at least 2 individuals who are fully trained for emergency response related to energetic materials.

7.0 NOTIFICATION OF EMERGENCY RESPONSE INCIDENTS

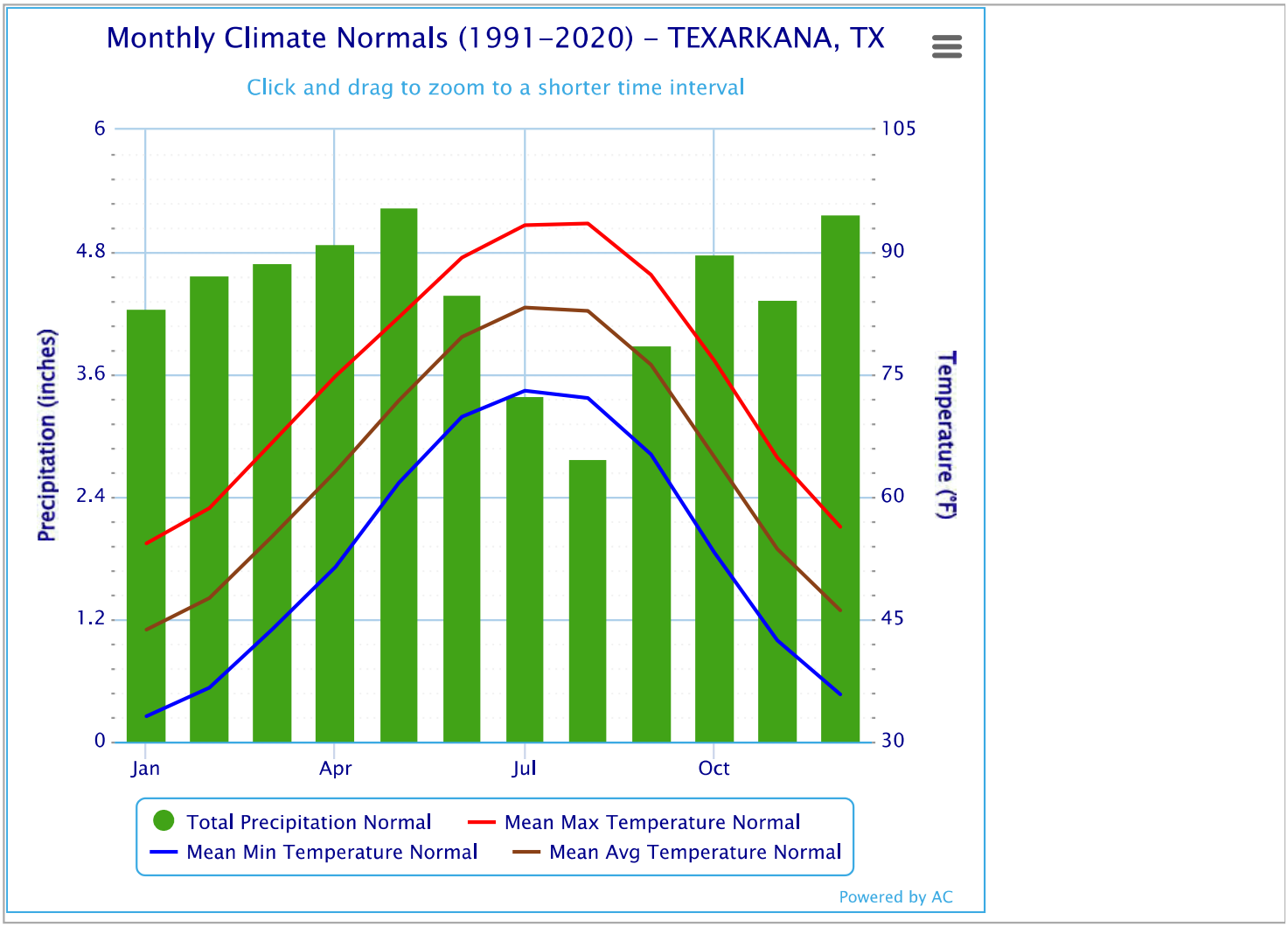
As described in Section 2.4.1 of the Contingency Plan (included as *Appendix III.E – Contingency Plan*), the Emergency Coordinator, or their designee, will immediately notify the appropriate emergency response services needed.

Government agencies including the Texas Commission on Environmental Quality (TCEQ), Texas Parks and Wildlife, General Land Office, Texas Department of State Health Services, and Texas Railroad Commission may also be notified when an incident occurs, if applicable. The notification may not be immediate if the Emergency Coordinator is responding to immediate emergency response activities that do not need the assistance of these agencies. Notification may take place via a telephone call or an email as soon as possible after the incident occurs. As discussed in Section 2.4.2 of the Contingency Plan (included as *Appendix III.E – Contingency Plan*), a written report will also be submitted to the Regional Administrator within 15 days after the incident.

ATTACHMENT III.F.1

HISTORICAL WEATHER DATA

Source: <https://www.weather.gov/wrh/Climate?wfo=shv>



Month	Total Precipitation Normal (inches)	Mean Max Temperature Normal (°F)	Mean Min Temperature Normal (°F)	Mean Avg Temperature Normal (°F)
January	4.26	54.3	33.1	43.7
February	4.58	58.6	36.6	47.6
March	4.70	66.7	43.8	55.2
April	4.88	74.8	51.4	63.1
May	5.25	82.0	61.7	71.8
June	4.39	89.3	69.8	79.6
July	3.40	93.3	73.0	83.2
August	2.77	93.5	72.1	82.8
September	3.89	87.2	65.2	76.2
October	4.78	76.7	53.2	64.9
November	4.33	64.8	42.4	53.6
December	5.18	56.3	35.8	46.1
Annual	52.41	74.8	53.2	64.0

ATTACHMENT III.F.2

PRECIPITATION

Source: <https://www.weather.gov/wrh/Climate?wfo=shv>

Monthly Total Precipitation for TEXARKANA, TX

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2000	3.77	2.71	3.31	4.09	8.00	7.21	0.28	0.17	3.92	2.07	15.13	7.17	57.83
2001	5.98	9.70	7.46	6.03	5.60	4.34	2.20	2.35	7.45	8.69	4.84	9.14	73.78
2002	2.51	2.51	10.05	3.87	4.98	2.18	1.80	0.90	1.50	5.67	2.09	M	M
2003	0.04	7.64	2.42	2.32	4.77	10.93	0.35	1.14	2.22	1.43	3.43	3.29	39.98
2004	3.28	6.28	3.56	3.80	4.09	10.66	2.02	0.82	0.65	5.12	6.72	2.64	49.64
2005	4.49	2.96	2.12	2.72	1.13	1.22	5.15	3.70	3.73	0.01	2.75	0.81	30.79
2006	4.72	3.87	7.03	3.27	1.85	4.74	3.99	0.69	1.37	3.09	2.02	6.80	43.44
2007	9.95	2.02	4.30	2.77	4.93	5.71	5.74	0.42	3.42	3.53	1.81	3.56	48.16
2008	2.38	4.39	6.95	7.14	6.46	4.14	2.48	5.23	9.38	4.56	3.93	2.10	59.14
2009	2.52	1.02	6.90	4.14	12.72	1.11	10.86	2.16	8.49	17.74	3.83	6.72	78.21
2010	3.50	4.32	1.80	1.15	3.10	4.37	4.84	2.35	4.37	2.36	4.12	1.59	37.87
2011	2.46	2.89	0.63	6.09	6.82	1.22	2.02	0.26	1.72	1.35	3.11	6.34	34.91
2012	3.53	3.85	6.09	M	0.46	1.14	5.02	1.85	3.51	2.48	0.38	4.13	M
2013	4.38	2.28	1.81	4.54	5.24	2.67	3.16	1.08	13.42	7.57	3.97	5.62	55.74
2014	1.15	4.58	3.33	4.60	5.87	4.99	2.76	1.16	1.62	2.97	3.34	3.38	39.75
2015	5.19	4.02	9.19	6.94	10.69	3.46	1.39	1.12	0.70	7.72	10.73	7.42	68.57
2016	2.50	4.64	8.02	7.84	4.50	3.42	2.52	5.97	0.32	0.22	3.71	7.70	51.36
2017	4.77	3.13	2.30	5.47	3.98	2.89	7.08	9.34	0.36	1.16	1.75	9.34	51.57
2018	3.30	13.26	4.81	3.24	1.85	4.87	3.26	1.96	7.41	6.86	7.16	5.01	62.99
2019	4.70	5.00	2.29	8.17	12.50	6.88	3.21	1.24	0.29	6.55	2.81	2.94	56.58
2020	6.98	8.06	7.30	6.50	7.85	3.15	2.74	12.24	7.25	1.31	0.80	6.15	70.33
2021	7.50	5.83	6.32	3.81	13.45	1.82	4.43	2.48	3.06	2.80	2.53	4.26	58.29
2022	1.53	4.87	5.98	4.50	3.12	3.10	1.17	9.14	0.12	1.70	4.76	M	M
Mean	3.96	4.78	4.96	4.68	5.82	4.18	3.41	2.95	3.75	4.22	4.16	5.05	53.45
Max	9.95 2007	13.26 2018	10.05 2002	8.17 2019	13.45 2021	10.93 2003	10.86 2009	12.24 2020	13.42 2013	17.74 2009	15.13 2000	9.34 2017	78.21 2009
Min	0.04 2003	1.02 2009	0.63 2011	1.15 2010	0.46 2012	1.11 2009	0.28 2000	0.17 2000	0.12 2022	0.01 2005	0.38 2012	0.81 2005	30.79 2005

Monthly Total Snowfall for TEXARKANA, TX

Year	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Season
1999-2000	0.0	0.0	0.0	0.0	0.0	0.0	M	0.0	0.0	0.0	0.0	0.0	M
2000-2001	0.0	0.0	0.0	0.0	0.0	M	6.0	0.0	0.0	0.0	0.0	0.0	M
2001-2002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	4.8
2002-2003	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003-2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	2.0
2004-2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005-2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006-2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2007-2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008-2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2009-2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	6.0
2010-2011	0.0	0.0	0.0	0.0	0.0	0.0	7.0	4.9	0.0	0.0	0.0	0.0	11.9
2011-2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	M	0.0	M	M
2012-2013	M	M	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	M
2013-2014	0.0	0.0	M	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	M
2014-2015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	1.0	0.0	0.0	0.0	6.0
2015-2016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2016-2017	0.0	0.0	0.0	0.0	0.0	0.0	M	0.0	0.0	0.0	M	0.0	M
2017-2018	0.0	M	M	0.0	M	0.0	4.0	0.0	0.0	0.0	0.0	0.0	M
2018-2019	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2019-2020	0.0	0.0	0.0	0.0	M	0.0	0.0	M	0.0	0.0	M	M	M
2020-2021	M	0.0	M	0.0	0.0	0.0	T	17.5	0.0	M	0.0	0.0	M
2021-2022	0.0	0.0	0.0	0.0	0.0	0.0	M	0.0	0.0	0.0	0.0	0.0	M
Mean	0.0	0.0	0.0	0.0	0.0	0.1	0.9	1.9	0.0	0.0	0.0	0.0	2.4
Max	0.0 2021	0.0 2021	0.0 2021	0.0 2021	0.0 2021	2.0 2012	7.0 2011	17.5 2021	1.0 2015	0.0 2022	0.0 2022	0.0 2022	11.9 2011
Min	0.0 2021	0.0 2021	0.0 2021	0.0 2021	0.0 2021	0.0 2021	0.0 2020	0.0 2022	0.0 2022	0.0 2022	0.0 2022	0.0 2022	0.0 2019

ATTACHMENT III.F.3

WIND

Source: <https://www.windfinder.com/windstatistics/texarkana_regional_airport>

windfinder.com/windstatistics/texarkana_regional_airport

https://www.office.c... HCPSS Connect – H... New Tab

WINDFINDER Map Locations Search

Monthly wind speed statistics and directions for Texarkana Regional Airport

Dominant wind direction

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
WSW	NE	S	S	S	S	S	SE	E	SSW	SSE	S

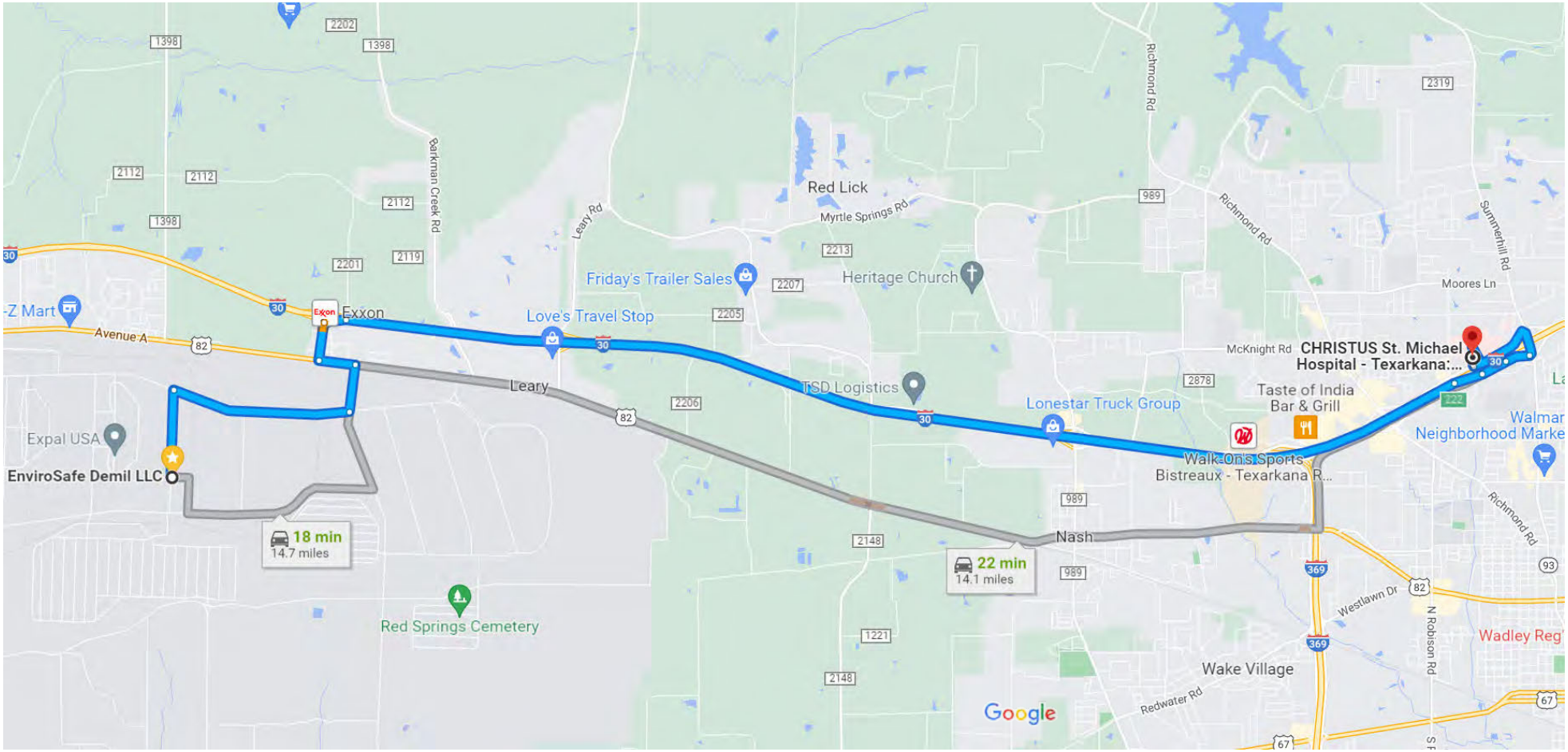
Average wind speeds and gusts (mph)

ATTACHMENT III.F.4

ROUTE TO MEDICAL SERVICE

ENVIROSAFE DEMIL, LLC TO CHRISTUS ST. MICHAEL HOSPITAL – TEXARKANA: EMERGENCY ROOM

Google Maps EnviroSafe Demil LLC to CHRISTUS St. Michael Hospital - Texarkana: Emergency Room Drive 14.2 miles, 18 min



via I-30 E Fastest route now due to traffic conditions	18 min 14.2 miles
via Pine St and I-30 E	18 min 14.7 miles
via US-82 E/W New Boston Rd	22 min 14.1 miles

IV. Wastes and Waste Analysis

Provide all Part B responsive information in Appendix IV. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

A. Waste Management Information

For a new hazardous waste management facility or for a facility hazardous waste management capacity expansion, complete Table IV.A. - Waste Management Information for each waste, source, and volume of waste to be stored, processed, or disposed of in the facility units to be permitted as required by 30 TAC 305.50(a)(9). For on-site facilities, list "on-site" for the waste source. For off-site facilities, list the source of the waste. If unknown, identify potential sources (e.g., industries/processes to be serviced).

Table IV.A. - Waste Management Information is included.

B. Waste Managed In Permitted Units

For all hazardous waste management facilities and for inclusion into a permit, complete Table IV.B. - Wastes Managed In Permitted Units for each waste and debris to be managed in a permitted unit. Provide a description, EPA waste codes, and TCEQ waste form codes and classification codes. Guidelines for the Classification & Coding of Industrial Wastes and Hazardous Wastes, TCEQ publication RG-22, contains guidance for how to properly classify and code industrial waste and hazardous waste in accordance with 30 TAC 335.501-335.515 (Subchapter R).

Applicants need not specify the complete 8-digit waste code formulas for their wastes but must include the 3-digit form codes and 1-digit classification codes. This allows the applicant to specify major categories of wastes in an overall manner without having to list all the specific waste streams as generated.

Table IV.B. - Wastes Managed in Permitted Units is included.

C. Sampling and Analytical Methods

For inclusion into a permit, complete Table IV.C. - Sampling and Analytical Methods for each waste and debris proposed to be sampled and analyzed and include sampling location, sampling method, sample frequency, analytical method, and desired accuracy level for each waste and debris to be managed in a permitted, storage, processing, or disposal unit at the facility.

Table IV.C. - Sampling and Analytical Methods is included.

D. Waste Analysis Plan

Information addressing the requirements below is included in Appendix IV.D – Waste Analysis Plan.

The Waste Analysis Plan must address the requirements of 40 CFR §264.13 and §268.7. The Plan should include supplemental and coordinating information on how the facility will analyze wastes and debris (as listed in Table IV.B) to be managed in permitted units. The plan must address the determination of land disposal restrictions.
Generators must determine and certify with the manifest the land disposal restriction status of a waste, even if the waste or debris is not intended for land disposal. Land disposal treatment facilities must identify the treatment process and analytical procedures to be used, and include them in the waste analysis plan. Land

disposal restriction records must be maintained at the facility until closure of the facility [40 CFR §264.73(b)]. Landfill facilities must determine through the Paint Filter Liquids Test (SW-846 Method 9095) if there is free liquid in a bulk or containerized waste to be landfilled. If so, it must be stabilized; adding adsorbents alone is not acceptable, even for containerized waste.

For off-site facilities the waste analysis plan must specify procedures which will be used to inspect and, if necessary, analyze each movement of industrial and hazardous waste or hazardous debris received at the facility to ensure it matches the identity of the waste designated on the accompanying shipping ticket. The plan must describe methods which will be used to determine the identity of each movement of waste and debris managed at the facility and sampling method used if the identification method includes sampling in order to store, process, or dispose of the wastes and debris in accordance with 40 CFR Parts 264 and 268 and any abnormal characteristics which may upset further treatment or processing operations. Include rejection criteria for shipments of waste and debris received at the facility

For on-site facilities the waste analysis plan must specify the normal characteristics of the waste (including EPA hazardous waste codes, EPA hazard codes, and 40 CFR Part 261, Appendix VIII Hazardous Constituents) which must be known to store, process, or dispose of the wastes and debris in accordance with 40 CFR Parts 264 and 268 and any abnormal characteristics which may upset further treatment or processing operations.

The methods and equipment used for sampling waste materials will vary with the form and consistency of the waste materials to be sampled. Those sampling methods listed in 40 CFR Part 261 Appendix I, for sampling waste with properties similar to the indicated materials, or equivalent sampling methods approved by EPA under 40 CFR §260.20 and §260.21, will be considered by the TCEQ to be acceptable.

Section IV – Wastes and Waste Analysis

Appendix IV.A –Waste Management Information

30 TAC 305.50(a)(9)

Information for each waste, the source of the waste, and the expected volume of the waste to be stored or processed at EnviroSafe Demil, LLC (ESD) is provided in *Table IV.A. - Waste Management Information*.

Table IV.A
Waste Management Information

Waste Type(s) [a]	Source	Volume (tons/year)
Materials Shipped to ESD for Processing		
Military and industrial energetics, ammunition, munitions and munition components, and energetically combustible materials from off-site sources	See note b	16,500,000 lbs NEW received
Materials Prepared On-Site for Processing		
Prepared military and industrial energetics, ammunition, munitions and munition components, and energetically combustible materials from off-site sources	On-site preparation of military and industrial energetics, ammunition, munitions and munition components, and energetically combustible materials from off-site sources	16,500,000 lbs NEW prepared

Notes:

[a] These energetic materials will be stored on-site in the storage magazines. They will be prepared for processing in the Rocket Motor Ops Building and processed in the Hybrid Burn Chamber (HBC).

[b] All energetic materials processed at the facility are generated off-site. These energetic materials come from various government and commercial customers, such as federal, state or local agencies, explosive manufacturing facilities, chemical and specialty industries, military and defense industries, and/or emergency response agencies.

Section IV – Wastes and Waste Analysis

Appendix IV.B – Waste Managed In Permitted Units

30 TAC 335.501-335.515

Information on the wastes managed at ESD is shown in *Table IV.B. - Wastes Managed In Permitted Units*. This table provides a description of the waste, EPA waste codes, and TCEQ waste form codes and classification codes.

Table IV.B
Wastes Managed In Permitted Units [a]

No.	Waste	EPA Hazardous Waste Numbers	TCEQ Waste Form Codes and Classification Codes
Materials Shipped to ESD for Processing			
5001	Military and industrial energetics, ammunition, munitions and munition components, and energetically combustible materials from off-site sources	D001, D003, D004, D005, D006, D007, D008, D009, D010, D011, D030	315H
Materials Prepared On-Site for Processing			
5002	Prepared military and industrial energetics, ammunition, munitions and munition components, and energetically combustible materials from off-site sources	D001, D003, D004, D005, D006, D007, D008, D009, D010, D011, D030	315H

Notes:
[a] These energetic materials will be stored on-site in the storage magazines. They will be prepared for processing in the Rocket Motor Ops Building and processed in the Hybrid Burn Chamber (HBC).

Section IV – Wastes and Waste Analysis

Appendix IV.C – Sampling and Analytical Methods

Table IV.C. - Sampling and Analytical Methods includes the sampling and analytical information for each waste and debris proposed to be sampled and analyzed. This table includes the sampling location, sampling method, sample frequency, analytical method, and desired accuracy level for each waste to be managed at ESD.

Table IV.C
Sampling and Analytical Methods

Waste No.[1]	Sampling Location	Sampling Method[2]	Frequency	Parameter	Test Method[2]	Desired Accuracy Level[3]
5001 and 5002	None; [a] Energetic materials will be inspected upon delivery	None; [a] Visual observation by operators familiar with the types of energetic materials expected to be shipped on-site [a]	Every shipment	Ensure energetic materials match the information on the accompanying manifest or shipping documents [b,c]	See notes b and c	100% [d]

[1] from Table IV.B, first column

[2] Sampling and Test/Analysis methods should be specified in enough detail to allow determination of whether they are suitable and correct for the purpose indicated while allowing flexibility in selection and future updates to the specified method. Standard methods, such as those from SW-846, will generally require no further submittal. Non-standard and proprietary methods may require additional information to determine suitability. ASTM methods may require submittal of a copy of the specified method.

[3] Desired Accuracy Level should provide a specified numeric minimum performance level (maximum acceptable reporting limit) for method detection and quantitation limits that will be accepted from the laboratory performing the analysis and must ensure that reported data will allow determinations of compliance with regulatory limits for the parameter tested.

Notes:

[a] No sampling or analysis will be performed due to the dangerous nature of explosives.

[b] Off-site generators of the energetic materials are responsible for providing the information needed in order to safely and properly treat, store, or dispose of the energetic materials. ESD operators will verify energetic materials match the information on the accompanying manifest or shipping documents.

[c] Military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS). The U.S. Government provides information about the munitions to disposition. Documentation from manufacturers, suppliers, or reliable resources will be used to characterize industrial munitions.

[d] If the materials do not match the identification information on the accompanying manifest or shipping documents, ESD will refuse the shipment delivery and will return the materials to the generator for proper characterization.

Section IV – Wastes and Waste Analysis

Appendix IV.D – Waste Analysis Plan

40 CFR §264.13 and §268.7

1.0 TYPES OF HAZARDOUS WASTES

For the purposes of describing the processes used to characterize the waste, the waste streams are divided into two main categories:

- Energetic Materials Shipped to the Facility to be Processed On-site
- Wastes Generated On-site

These categories are described in more detail in the following sections.

1.1 Energetic Materials Shipped to the Facility to be Processed On-site

Energetic materials shipped to the facility will be packaged and shipped to meet the Department of Transportation (DOT) regulations. The off-site generators of the energetic materials are responsible for providing the information needed in order to safely and properly treat, store, or dispose of the energetic materials. Documentation from the manufacturer will be used to characterize industrial munitions.

The military munitions received by the facility have been manufactured following U.S. Government specifications. The military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS), which is an ammunition information database~~d~~ located within the Defense Ammunition Center (DAC) Munitions Analytical Compliance System (MACS). The database information is based upon military specifications and specific production records and contains the chemical constituent information for all ammunition, components, and parts.

Due to the dangers associated with sampling and analyzing explosives, ESD does not intend to rely on sampling and analysis to characterize the materials shipped to the facility. The energetic materials received on-site will be inspected to determine whether they match the identification information specified on the accompanying manifest or shipping documents. The manifest for military munitions will have the product identification numbers assigned by the military (DODICs), but will not have the constituent information as that is confidential per the

military. The waste composition (constituent information) for the munitions will be in ESD's computer database associated with the DODIC assigned by the military. The operators conducting the inspections are very familiar with the types of energetic materials expected to be shipped on-site and will be able to tell by visual observation if the energetic materials match the accompanying manifest or shipping documents. If the energetic materials match the information, they will be stored in dedicated storage magazines until they can be processed on-site. If the energetic materials do not match the identification information on the manifest or in ESD's database, ESD will refuse the shipment delivery and will return the materials to the generator for proper characterization.

When the materials are ready to be processed, they will be sent to the Rocket Motor Ops Building (prior to being processed in the HBC). In this building, the materials will be removed from their packaging and will be prepared for processing. The packaging will be recycled.

1.2 Wastes Generated On-site

The facility generates wastes that may be hazardous. These wastes generated on-site include:

Wastes Generated from HBC and APCS Operation:

- HBC ash/debris
- Filter cakes from filter press in HBC Wash System
- Air pollution control wastes from the HBC APCS (~~used baghouse and HEPA filters, baghouse and cyclone separator~~spent sorbent and particulate dust, used ceramic filters (replaced approximately every 10 years))

The wastes will be collected in drums, or an equivalent storage device, and will be sampled and analyzed (TCLP for metals) to determine if they are hazardous prior to final disposal. Waste profiles are developed for each waste based upon facility knowledge of the characteristics of the waste and/or analytical data. Each waste is assigned a waste profile and is packaged in accordance with the description on the respective profile. If wastes are not hazardous, they will be disposed of at an off-site landfill. If wastes are determined to be hazardous, they will be shipped off-site to a permitted Treatment, Storage, and Disposal Facility (TSDF).

2.0 WASTE CHARACTERIZATION

In accordance with 40 CFR §264.13, before treating, storing, or disposing of any hazardous wastes, a detailed chemical and physical analysis of a representative sample of the wastes must be obtained. At a minimum, the analysis must contain all the information which must be known to treat, store, or dispose of the waste. The purpose of this section is to identify the waste streams and to describe the method used to properly characterize these waste streams so that they are treated, stored, and disposed of correctly. All approved waste characterization profiles are kept on-site.

2.1 Energetic Materials Shipped to the Facility to be Processed On-site

As mentioned in Section 1.1, the off-site generators of the energetic materials will supply the information needed in order to safely and properly treat, store, or dispose of the energetic materials in the accompanying manifest or shipping documents. The information in the manifest or shipping documents will either be used to create a waste characterization profile (WCP) for the energetic wastes or will be cross referenced against the DODIC in MIDAS to create a WCP. These profiles contain all the information which must be known to treat, store, or dispose of the wastes properly. This information includes the following items, if applicable to the particular waste:

- Waste description (product name)
- Hazardous waste codes
- ~~Product~~ Waste (product) composition
- Net explosive weight (NEW)
- Special handling requirements
- Proper packaging requirements
- Shipping requirements (DOT EX numbers, etc.)

One important parameter listed on the WCP is the net explosive weight (NEW). The percentage by weight of the reactive portion, or the NEW, is important in determining the amount of waste that can be stored in each magazine because each magazine is designed to safely store a certain limit in pounds of NEW. The NEW is also important in determining the amount of energetic material that can be safely processed in the HBC at one time.

The military munitions will be characterized by information provided by the U.S. Government and documentation from manufacturers, suppliers, or reliable resources will be used to characterize industrial munitions. This information demonstrates that no free liquids are present in the energetic materials.

2.2 Wastes Generated On-site

In general, the waste generated at the facility can be substantially characterized by knowledge of the materials that were processed in the HBC. All of the wastes generated on-site are dry and contain no free liquids. Waste characterization profiles are created based upon the type of materials processed in the HBC and on analytical results. These profiles contain all the information which must be known to treat, store, or dispose of the wastes properly. This information includes the following items, if applicable to the particular waste:

- Waste description ~~Product name~~
- Hazardous waste codes
- ~~Product~~ Waste composition
- Special handling requirements
- Proper packaging requirements
- Shipping requirements (DOT EX numbers, etc.)

The waste characterization profiles are to be reviewed to ensure they are accurate and up to date when there is reason to believe that the composition of the feed material has changed or if notified that the hazardous waste does not match the waste designated on the accompanying waste shipping manifest.

In order to properly characterize~~d~~ waste, process knowledge and/or analytical results will be used. A representative sample will be collected using the "scoops and shovels" method listed in SW-846 Chapter 9 for off-site laboratory analysis by the methods listed in Table 2-1. The results of this analysis will then be used to create a waste profile for future waste streams from the same source.

Quality assurance/quality control (QA/QC) procedures specified in *Chapter One of the SW-846 Compendium: Project Quality Assurance and Quality Control* will be included with each batch of samples analyzed in accordance with this Waste Analysis Plan, as applicable for the method. The QA/QC documentation will be maintained at the facility along with the results of all analyses.

2.3 Hazardous Waste Codes

A list of the hazardous waste codes to be managed at the facility is provided in Part A of the permit application and is also included in *Table IV.B. - Wastes Managed In Permitted Units*.

Table 2-1
Analytical Methods for Waste Generated On-Site

Type of Analysis	Frequency	Parameter	Analysis Method (or equivalent) [a]
Waste characterization	Once initially for each new item processed	Reactivity	Process knowledge and inspection [a]
		Metals, including: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver	SW-846 Methods 1311 and 6010, 6020, or 7000 series
		2,4-dinitrotoluene	Process knowledge and inspection [a] or SW-846 Methods 1311 and 8270
Land Disposal Restriction	Once initially for each new item processed	Metals, including: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver	SW-846 Methods 1311 and 6010, 6020, or 7000 series
		Underlying hazardous constituents as listed in 40 CFR §268.48	SW-846 Methods 1311 and 8000 series

Notes:

[a] Process knowledge and inspections will be used to assess some of the characteristics of the wastes generated on-site. For example, the wastes resulting from the HBC process are not expected to be reactive or to contain any organics. Therefore, the samples will not be analyzed for these parameters unless visual inspection indicates a concern. The samples will only be analyzed for constituents that are reasonably expected to be present in the wastes, such as metals.

3.0 WASTE FEEDSTREAM ANALYSIS PLAN

In order to ensure that the HBC system does not exceed the permitted total feedrate limit, NEW feedrate limit, and constituent feedrate limits (chlorine, metals, and ash), values for each munition will be calculated as described in Section 3.1, documented, and entered into the ESD database. The Human Machine Interface (HMI) will evaluate the constituent information in the ESD database for the munition being fed and will not allow the batch to be fed if the constituent feedrate amounts are above the required operating parameter limit.

Munitions are processed in campaigns – a campaign is where multiple batches of the same munition are processed through the HBC in a consecutive time period. For example, a certain type of munition will be processed through the HBC for several days to several months, depending on the amount of munitions needing to be processed. Before a new campaign begins, the inputs in the ESD database will be reviewed to ensure the information matches the upcoming campaign.

3.1 Determining Constituent Amounts in Munitions

The MIDAS documentation shows the total net explosive (NEW) of each munition and the components of the NEW; therefore, the data from MIDAS will be used to determine the amounts of the constituents (chlorine, metals, and ash) in each munition. For example, the amount of ammonium perchlorate in a rocket motor can be used to determine the amount of chlorine in the rocket motor.

For example: Ammonium perchlorate (NH_4ClO_4) contains one chlorine atom (1 x 35.453 grams/mole = 35.453 grams/mole) and has a total molecular weight of 117.49 grams/mole. The mass fraction of chlorine in ammonium perchlorate is:

$$0.30175 \frac{lb\ Chlorine}{lb\ Ammonium\ Perchlorate} = \frac{(35.453\text{g})_{Chlorine}}{(117.49\text{g})_{Ammonium\ Perchlorate}}$$

If a munition has 100 pounds of ammonium perchlorate in its composition, then the amount of chlorine in its composition can be calculated as follows:

$$30.175\ lb\ Chlorine = 100\ lb\ Ammonium\ Perchlorate \cdot 0.30175 \frac{lb\ Chlorine}{lb\ Ammonium\ Perchlorate}$$

The results of these calculations for each constituent (chlorine, metals, and ash) for the different munitions are provided in Appendix IV (Rocket Motor Constituents) to the Trial Burn Plan. This

appendix includes information obtained from the MIDAS database on the constituents of the various rocket motors' Net Explosive Weight (NEW). The constituents in the NEW were used to calculate the amount of chlorine, metals, and ash in the rocket motors. The constituent information will be entered into the ESD database and the Human Machine Interface (HMI) will not allow the batch to be fed if the constituent feedrate amounts are above the required operating parameter limit.

3.2 Compliance with Constituent Feedrate Limits

As mentioned in Section 2.1, the feedrates of the constituents will be determined using the information provided in the MIDAS database for each of the munitions to be processed in accordance with the Waste Analysis Plan. Munitions shall either be counted by piece or other applicable units or weighed to determine feedrate compliance. Documentation of compliance with the feedrates shall be maintained in facility operating records.

Because the HBC is operated in a batch mode of operation, a "feedrate" in the traditional sense cannot be directly applied. Therefore, ESD's feedrate limits in lb/hr will be calculated based upon the "charge rates" per batch. ESD will ensure the "charge rates" comply with the "lb/hr" limits by calculating the effective feedrate in "lb/hr" as follows:

$$Effective\ Feedrate\left(\frac{lb}{hr}\right) = Charge\ Rate\left(\frac{lb}{batch}\right)\ x\ Number\ of\ Batches\ per\ Hour\left(\frac{batches}{hr}\right)$$

Feedrate limits and compliance will be tracked in units of pounds per hour (lb/hr), as calculated per the equation above. The charge rates shall be summed for each munition or unit of munitions processed over a one hour period of time. Total feedrate limits may rely upon weighing the munitions processed per unit time for compliance.

3.3 Review of MIDAS Database

No changes are expected to the MIDAS database for the munitions that ESD will be processing as the MIDAS database was populated when the munitions were manufactured by the DOD. However, to meet the requirement in 40 CFR §63.1209(c)(2)(vi), ESD must specify the frequency at which the analysis of the feedstreams will be reviewed. ESD will review the MIDAS documentation to ensure the constituent information is accurate and up to date on an annual basis.

3.4 Waiver of Monitoring of Constituents in Certain Feedstreams

In 40 CFR §63.1207(f)(1)(xi) and 40 CFR §63.1209(c)(5), the HWC MACT standard requires documentation of the expected levels of the regulated constituents (metals and chlorine) in natural gas, process air and feedstreams from vapor recovery systems.

Natural Gas

The HBC does not use natural gas. Natural gas is used in the afterburner that is part of the APCS. The natural gas will be commercially supplied. The concentration of the applicable metals and chlorine in natural gas is very insignificant and is negligible compared to these constituents in the hazardous waste feedstreams. Therefore, natural gas is not considered when documenting compliance with the feedrate limits for metals and chlorine/chloride on an ongoing basis.

Process Air

The combustion air (process air) for the unit is drawn from ambient air near the unit. Since the HBC system is sealed during treatment and the resulting combustion gases are routed through the APCS, the fugitive emissions of regulated constituents (metals and chlorine) from the unit will be negligible. Therefore, the feedrate of regulated constituents in the process air introduced to the HBC is considered negligible as compared to the regulated constituents contained in the process feed. The process air is not considered when documenting compliance with the feed limits for metals and chlorine/chloride on an ongoing basis.

Feedstreams from Vapor Recovery Systems

The HBC does not have any feedstreams from vapor recovery systems.

~~3~~4.0 HANDLING OF IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES

40 CFR §264.17 states that precautions must be in place to prevent accidental ignition or reaction of ignitable or reactive waste. Ignitable and reactive waste will be handled at this facility and will be separated and protected from open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat. "No smoking" signs will be conspicuously placed wherever there is a hazard from reactive waste. Reactive wastes are stored in dedicated storage magazines until they are ready to be processed on-site.

The energetic materials are not incompatible with each other. Each type of energetic material is stored in its own sealed container and will not be mixed with another type of energetic material. Materials will be stored in the original shipping containers which are designed to safely hold the energetic material until they are ready to be prepared for processing. The containers are compatible with their contents and there is no potential for the energetic material to react with the containers.

V. Engineering Reports

Provide all Part B responsive information in Appendix V. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

For multiple units provide and include all Part B responsive information in a separate Appendix for each unit.

The engineering report represents the conceptual basis for the storage, processing, or disposal units at the hazardous waste management (HWM) facility. It should include calculations and other such engineering information as may be necessary to follow the logical development of the facility design. Plans and specifications are an integral part of the report. They should include construction procedures, materials specifications, dimensions, design capacities relative to the volume of wastes (as appropriate), and the information required by 40 CFR 270.14(b)(8), 270.14(b)(10). Since these reports may be incorporated into any issued permit, the report should not include trade names, manufacturers, or vendors of specific materials, equipment, or services unless such information is critical to the technical adequacy of the material. Technical specifications and required performance standards are sufficient to conduct a technical review. For landfills, surface impoundments, and waste piles, a Construction Quality Assurance Plan, which considers the guidance in EPA publication 530-SW-85-014, Minimum Technology Guidance on Double Liner Systems for Landfills and Surface Impoundments; Design, Construction, and Operation, and/or EPA/600/R-93/182, Quality Assurance And Quality Control For Waste Containment Facilities, should be submitted.

For facilities which will receive wastes from off-site sources, the engineering report must also contain information on the units which will manage these off-site wastes in accordance with 30 TAC 335.45(a).

Certain ancillary components or appurtenant devices must be addressed in the Part B application. These include but are not limited to sumps, pipelines, ditches, and canals. The technical information and the level of detail required will vary with the nature, scope, and location of the ancillary component. At a minimum they should be included in descriptions of piping and process flow. More information may be required. A single area containing a large number of ancillary components or a remote appurtenant device in an unusually sensitive location may warrant some specific permit requirements. All ancillary components must be included in calculating closure cost estimates.

In each of the unit-specific sections, describe precautions taken to prevent accidental commingling of incompatible wastes. If reactive or ignitable wastes are to be managed, or if incompatible wastes are deliberately commingled, provide information to ensure that precautions are taken to avoid danger due to:

- generation of extreme heat or pressure, fire, explosion, or violent reaction;
- production of uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health;
- production of uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosion;
- damaging the structural integrity of the device or facility containing the waste; or
- threatening human health or the environment by any other means.

Comprehensive consideration should be given to ensure that the facility is designed in accordance with good public health and hazardous waste management practices. The application will be evaluated primarily for the aspects of design covered by the regulations. Nothing in any approval is intended to relieve the facility owner or operator of any liabilities or responsibilities with respect to the design, construction, or operation of the project.

Appendix V – Engineering Reports includes Table V.A – Facility Waste Management Handling Units, Table V.B – Container Storage Areas, and Table V.K – Miscellaneous Units.

A. General Engineering Reports

The information below is addressed in Appendix V.A – General Engineering Reports.

1. General Information

   Complete Table V.A. - Facility Waste Management Handling Units listing all past, current or proposed units. *[Indicate units' status as* Active, Closed, Inactive *(built but not yet managing waste)*, Proposed *(not yet built)*, Never Built, Transferred, or Post-Closure. *Indicate appropriate units for Capacity information.]* **Note for renewals and modifications involving adding or dropping units from the permit:** List all TCEQ Permit Unit Numbers that have been assigned previously as in a current permit Attachment D - Authorized Facility Units table and do not reuse or reassign permit numbers for units that have been replaced, closed, removed from the permit, or transferred to other ownership. All Notice of Registration (NOR) Numbers must match the State of Texas Environmental Electronic Reporting System (STEERS) and may not be reused for replacement units.

   Provide an overall plan view of the entire facility. Identify each hazardous or industrial solid waste management unit (container storage area, tank, incinerator, etc.) to be permitted in relation to its location and the type of waste managed in that unit. Also provide a plan view at an appropriate scale to clearly show the location of all hazardous waste management units to be permitted on one or more 8 1/2" x 14" sheets. Indicate on this plan view how the design or operation provides for buffer zones or waste segregation as appropriate for incompatible, ignitable, or reactive wastes.

   Submit a topographic map or maps of the facility which clearly shows the information specified in 40 CFR 270.14(b)(19), 270.14(c)(3), and 270.14(d)(1)(i) (for large HWM facilities, the TCEQ will allow the use of other scales on a case- by-case basis). Please note that the term "facility" includes all contiguous land, structures, other appurtenances, and improvements on the land for storing, processing, or disposing of hazardous and industrial solid waste.

2. Features to Mitigate Unsuitable Site Characteristics

   For all new hazardous waste management storage and/or processing facilities or areal expansions of existing hazardous waste management storage and/or processing facilities, include in the engineering report design, construction, and operational information specified in 30 TAC 335.204(a)(1) and (a)(3) through (9).

3. Construction Schedules

   a. In order to meet the required design standards, extensive retrofitting of some facilities may be required. In the worst case, the applicant may elect to close certain operations rather than comply with the RCRA standards. Thus, the permit may specify a schedule of compliance

requiring the accomplishment of given tasks within specific time frames. As required, indicate an appropriate schedule(s) of compliance in this application. The schedule should provide for facility compliance as soon as possible and in accordance with 40 CFR 270.33(a)(2) and 270.33(b).

b. For commercial hazardous waste management facilities, permit applications (new, renewal, or interim status applications), major amendments, and Class 3 modifications must include a construction schedule. A construction schedule must be submitted even if the application does not include an addition of units or a revision to permitted units. This schedule should comply with the requirements of 30 TAC 305.149.

4. Provide detailed plans and specifications which when, accompanied by the engineering report, will be sufficiently detailed and complete to allow the Executive Director to ascertain whether the facility will be constructed and operated in compliance with all pertinent permitting requirements. Engineering plans and specifications must be prepared under the supervision of and sealed by a licensed Professional Engineer, with current license, along with the Registered Engineering Firm's name and Registration Number as required by the Texas Engineering Practice Act. For some facilities, plans in the form of a standard piping and instrumentation diagram will be sufficient. Overall dimensions and materials of construction must be shown.

B. Container Storage Areas

The information below is addressed in Appendix V.B – Container Storage Areas.

1. Provide an engineering report which includes all of the information specified in 40 CFR 264.170-264.173, 264.175-264.177, and 270.15.

   Complete Table V.B - Container Storage Areas and list the container storage areas covered by this application to be permitted. List the N.O.R. unit number, the rated capacity or size of each unit (including the maximum number of each type of container to be stored at each unit and total maximum capacity of all types wastes stored in the unit), the areal dimensions, containment volume, aisle space requirements, whether ignitable, reactive, or incompatible waste will be stored in each unit, and whether processing will occur within the unit.

2. Container storage areas must have a containment system that is capable of collecting and holding spills, leaks, and precipitation. In addition to the requirements of 40 CFR 270.15, the design report should include the following:

   a. Capacity of the containment relative to the number and volume of containers to be stored; in addition, for unenclosed areas, the amount of rainfall collected prior to removal. The TCEQ recommends using a 25-year, 24-hour rainfall event for this extra capacity; and

   b. Run-on into the containment system must be prevented, or a collection system with sufficient excess capacity must be provided. If run-on is collected within the containment system, delineate the area(s) from which run-on is collected. The 25-year, 24-hour rainfall event should be used to calculate the excess capacity.

3. Wastes Containing No Free Liquids

With the exception of 40 CFR 264.175(d), storage areas that hold only wastes that do not contain free liquids need not have a containment system, provided that compliance with 40 CFR 264.175(c) is demonstrated. This demonstration must be submitted as part of the application and must include:

a. test procedures and results or other documentation or information to show that the wastes do not contain free liquids; and

b. a description of how the storage area is designed or operated to drain and remove liquids or how containers are kept from contact with standing

liquids.

4. Managing Ignitable or Reactive Wastes

If a container storage area will manage ignitable or reactive waste, as indicated on Table V.B, provide in the engineering report drawings demonstrating compliance with the buffer zone requirement of 40 CFR 264.17 and 264.176.

5. Managing Incompatible Wastes

If a container storage area will manage incompatible waste, as indicated on Table V.B, provide in the engineering report a description of the procedures used to ensure compliance with 40 CFR 264.17 and 264.177.

6. Managing Nonhazardous Wastes and/or Universal Wastes

If a container storage area will manage nonhazardous wastes, and/or universal wastes in addition to hazardous waste, provide a description of all types of wastes managed in the engineering report and procedures used to ensure compliance with 40 CFR 264 Subpart I.

C. Tanks and Tank Systems - RESERVED

D. Surface Impoundments - RESERVED

E. Waste Piles - RESERVED

F. Land Treatment Units - RESERVED

G. Landfills – RESERVED

H. Incinerators – RESERVED

I. Boilers and Industrial Furnaces - RESERVED

J. Drip Pads – RESERVED

K. Miscellaneous Units

A miscellaneous unit is a unit other than a container, tank, incinerator, boiler, industrial furnace, landfill, surface impoundment, waste pile, underground injection well, land treatment area, drip pad, or unit eligible for an R, D & D permit that is used to process, store, or dispose of hazardous waste.

For each miscellaneous unit for which an operating permit is sought, provide an engineering report which includes all of the information specified in 40 CFR 264.600-264.602, and 270.23.

This information is addressed in the following appendices:

- **Appendix V.K – Miscellaneous Units (Rocket Motor Ops Building)**
- **Appendix V.K – Miscellaneous Units (Hybrid Burn Chamber)**

1. Complete Table V.K - Miscellaneous Units and list the miscellaneous units covered by this application. List the waste managed in each unit and the rated capacity or size of the unit. If the information requested is not applicable, an explanation must be submitted.

   Table V.K – Miscellaneous Units is included.

2. Provide any other information which is descriptive of the relationship between the miscellaneous unit and the environment. Application information may include design requirements of 30 TAC 305 and 335, 40 CFR Part 264 Subparts I through O, and Part 270 that are appropriate for the miscellaneous unit or portions of the unit being permitted.

   This information is addressed in the following appendices:

   - **Appendix V.K – Miscellaneous Units (Rocket Motor Ops Building)**
   - **Appendix V.K – Miscellaneous Units (Hybrid Burn Chamber)**

3. For a unit which involves combustion, please provide emissions data or a trial burn plan. Tables V.H.1-5 for incinerators or Tables V.I.1-5 for boilers and industrial furnaces may be adapted as appropriate to provide operation, monitoring, and emission information for a miscellaneous combustion unit.

   The HBC is not an incinerator. There is no controlled flame combustion. The operation most closely resembles open burning/open detonation, but is more environmentally responsible. As opposed to open burning/open detonation, this system has the advantage of containing and cleaning the exhaust gases.

   Tables V.K.2, V.K.3, V.K.4, ~~and~~ V.K.5 and V.K.8 are included for the HBC and provide compliance information for this miscellaneous unit.

L. Containment Buildings - RESERVED

Section V – Engineering Reports

Appendix V – Engineering Reports

Table V.A, Table V.B, and Table V.K

This Section includes the following tables:

- *Table V.A – Facility Waste Management Handling Units*
- *Table V.B – Container Storage Areas*
- *Table V.K.1 – Miscellaneous Units*

Table V.A. – Facility Waste Management Handling Units

TCEQ Permit Unit No.[1]	Unit Name	NOR No.[1]	Unit Description[3]	Capacity [a,b]	Unit Status[2]
100	Rocket Motor Ops Building	100	Preparation of materials prior to processing in the HBC	80 lbs HD 1.1 NEW 1,500 lbs HD 1.2.2 NEW 10,000 lbs HD 1.3 NEW 10,000 lbs ~~Unlimited~~ HD 1.4 NEW 33,333 lbs Total Weight	Proposed
101	Hybrid Burn Chamber (HBC)	101	The HBC is a contained burn system followed by air pollution control equipment.	~~80 lbs HD 1.1 NEW~~ ~~1,500 lbs HD 1.2.2 NEW~~ ~~10,000 lbs HD 1.3 NEW~~ ~~Unlimited HD 1.4 NEW~~250 lbs HD 1.3 NEW per batch 250 lbs HD 1.4 NEW per batch 833 lbs Total Weight per batch	Proposed
300	Above Ground Magazine (AGM)	300	Energetic material storage magazine	100,000 lbs HD 1.3 NEW 100,000 lbs ~~Unlimited~~ HD 1.4 NEW 333,333lbs Total Weight	Proposed
301	Earth Covered Magazine (ECM) (V-13-1)	301	Energetic material storage magazine	300,000 lbs HD 1.3 NEW 300,000 lbs ~~Unlimited~~ HD 1.4 NEW 1,000,000 lbs Total Weight	Proposed
302	Earth Covered Magazine (ECM) (V-13-2)	302	Energetic material storage magazine	200,000 lbs HD 1.1 NEW 150,000 lbs HD 1.2.1 NEW 200,000 lbs HD 1.2.2 NEW 200,000 lbs HD 1.3 NEW 200,000 lbs ~~Unlimited~~ HD 1.4 NEW 666,667 lbs Total Weight	Proposed
~~Reserved for future use~~	~~Earth Covered Magazine (ECM) (V-13-3)~~	~~Reserved for future use~~	~~Energetic material storage magazine (reserved for future use)~~	~~TBD (reserved for future use)~~	~~Proposed (reserved for future use)~~

TCEQ Permit Unit No.[1]	Unit Name	NOR No.[1]	Unit Description[3]	Capacity [a,b]	Unit Status[2]
~~Reserved for future use~~	~~Earth Covered Magazine (ECM) (V-13-4)~~	~~Reserved for future use~~	~~Energetic material storage magazine (reserved for future use)~~	~~TBD (reserved for future use)~~	~~Proposed (reserved for future use)~~

Notes

1. Permitted Unit No. and NOR No. cannot be reassigned to new units or used more than once and all units that were in the Attachment D of a previously issued permit must be listed.
2. Unit Status options: Active, Closed, Inactive (built but not managing waste), Proposed (not yet built), Never Built, Transferred, Post-Closure.
3. If a unit has been transferred, the applicant should indicate which facility/permit it has been transferred to in the Unit Description column of Table V.A.

[a] NEW stands for Net Explosive Weight.
[b] Most of these figures are the NEW values that have been approved in relation to ESD's contract with the U.S. Army.

Table V.B. – Container Storage Areas

Permit Unit No.	Container Storage Area	N.O.R. No.	Waste Nos.[4]	Rated Capacity[3,a,b]	Dimensions	Containment Volume (including rainfall for unenclosed areas)	Unit will manage Ignitable[1], Reactive[1], or Incompatible[2] waste (state all that apply)	Unit Status
300	Above Ground Magazine (AGM)	300	5001 and 5002	100,000 lbs HD 1.3 NEW 100,000 lbs ~~Unlimited~~ HD 1.4 NEW 333,333lbs Total Weight	225 ft x 60 ft	Not Applicable	Ignitable, Reactive	Proposed
301	Earth Covered Magazine (ECM) (V-13-1)	301	5001 and 5002	300,000 lbs HD 1.3 NEW 300,000 lbs ~~Unlimited~~ HD 1.4 NEW 1,000,000 lbs Total Weight	27 ft x 60 ft	Not Applicable	Ignitable, Reactive	Proposed
302	Earth Covered Magazine (ECM) (V-13-2)	302	5001 and 5002	200,000 lbs HD 1.1 NEW 150,000 lbs HD 1.2.1 NEW 200,000 lbs HD 1.2.2 NEW 200,000 lbs HD 1.3 NEW 200,000 lbs ~~Unlimited~~ HD 1.4 NEW 666,667 lbs Total Weight	27 ft x 60 ft	Not Applicable	Ignitable, Reactive	Proposed
~~Reserved for future use~~	~~Earth Covered Magazine (ECM) (V-13-3)~~	~~Reserved for future use~~	~~5001 and 5002~~	~~TBD (reserved for future use)~~	~~27 ft x 60 ft~~	~~Not Applicable~~	~~Ignitable, Reactive~~	~~Proposed (reserved for future use)~~
~~Reserved for future use~~	~~Earth Covered Magazine (ECM) (V-13-4)~~	~~Reserved for future use~~	~~5001 and 5002~~	~~TBD (reserved for future use)~~	~~27 ft x 60 ft~~	~~Not Applicable~~	~~Ignitable, Reactive~~	~~Proposed (reserved for future use)~~

Notes:

1. Containers managing ignitable or reactive waste must be located at least 15 meters (50 feet) from the facility's property line.
2. Incompatible waste must be separated from other waste or materials stored nearby in other containers, piles, open tanks, or surface impoundments by means of a dike, berm, wall, or other device.
3. Container Storage Areas need to include in capacity calculations any nonhazardous wastes and universal wastes managed in the unit in addition to hazardous wastes.
4. from Table IV.B, first column

[a] NEW stands for Net Explosive Weight.
[b] Most of these figures are the NEW values that have been approved in relation to ESD's contract with the U.S. Army.

Table V.K.1. - Miscellaneous Units

Permit Unit No.*	Miscellaneous Unit	N.O.R. No.	Storage, Processing, and/or Disposal	Waste Nos.[1,a]	Rated Capacity [b,c]	Dimensions	Unit will manage Ignitable, Reactive, or Incompatible Waste (state all that apply)
100	Rocket Motor Ops Building	100	Processing	5001 and 5002	80 lbs HD 1.1 NEW 1,500 lbs HD 1.2.2 NEW 10,000 lbs HD 1.3 NEW 10,000 lbs ~~Unlimited~~ HD 1.4 NEW 33,333 lbs Total Weight	407 ft x 70 ft	Ignitable, Reactive
101	Hybrid Burn Chamber (HBC)	101	Processing	5001 and 5002	250 lbs HD 1.3 NEW per batch~~80 lbs HD 1.1 NEW~~ ~~1,500 lbs HD 1.2.2 NEW~~ ~~10,000 lbs HD 1.3 NEW~~ ~~Unlimited HD 1.4 NEW~~ 250 lbs HD 1.4 NEW per batch 833 lbs Total Weight per batch	20 ft x 20 ft (HBC) 100 ft x 50 ft (APCS)	Ignitable, Reactive

Notes:

[1] from Table IV.B, first column

* If the unit is already permitted, use the established "Permit Unit No." If the unit is not yet permitted, the number given here for the unit will become the "Permit Unit No." The numbers should be in an order that will be convenient for the facility operator.

[a] No wastes are pumpable; all wastes are in solid form.

[b] NEW stands for Net Explosive Weight.

[c] Most of these figures are the NEW values that have been approved in relation to ESD's contract with the U.S. Army.

Section V – Engineering Reports

Appendix V.A – General Engineering Reports

1.0 ~~INTRODUCTION~~GENERAL INFORMATION

Table V.A – Facility Waste Management Handling Units lists information for the different hazardous waste management units for the facility. Additional information for the storage magazines is provided in *Table V.B – Container Storage Areas. Table V.K – Miscellaneous Units* provides information about the miscellaneous units at the facility.

This section of the permit application includes additional appendices that cover more in depth information about each of the hazardous waste management units. The additional appendices included in this section are shown in *Table 1-1 – Additional Engineering Reports Appendices*.

An overall view of the entire facility can be found in *Attachment V.A – Maps for General Engineering Reports – General Information*~~*Attachment D – Photographs* of the Part A Application Form~~. On this map, each hazardous waste management unit to be permitted (container storage areas, preparation building, and processing unit) are shown. Figure V.A.1 includes a map showing the location of all hazardous waste management units to be permitted and their distance from the facility's property line. Per 40 CFR §264.176, these units must be 50 feet from the facility's property line because they handle reactive materials.

Topographic maps of the facility are included in *Attachment V.A – Maps for General Engineering Reports – General Information*~~*Attachment C – Topographic Maps* of the Part A Application Form~~. Table 1-2 shows the location of the information specified in 40 CFR 270.14(b)(19), 270.14(c)(3), and 270.14(d)(1)(i). More information on the siting and location information for the facility can be found in *Section II – Facility Siting Criteria.*

Table 1-1
Additional Engineering Reports Appendices

Appendix	Units Covered
Appendix V.B – Container Storage Areas	- Above Ground Magazine (AGM) - Earth Covered Magazine (ECM) V-13-1 - Earth Covered Magazine (ECM) V-13-2 ~~- Earth Covered Magazine (ECM) V-13-3 (reserved for future use)~~ ~~- Earth Covered Magazine (ECM) V-13-4 (reserved for future use)~~
Appendix V.K – Miscellaneous Units (Rocket Motor Ops Building)	Rocket Motor Ops Building
Appendix V.K – Miscellaneous Units (Hybrid Burn Chamber)	Hybrid Burn Chamber (HBC)

Table 1-2
Table of Information Requirements for Maps

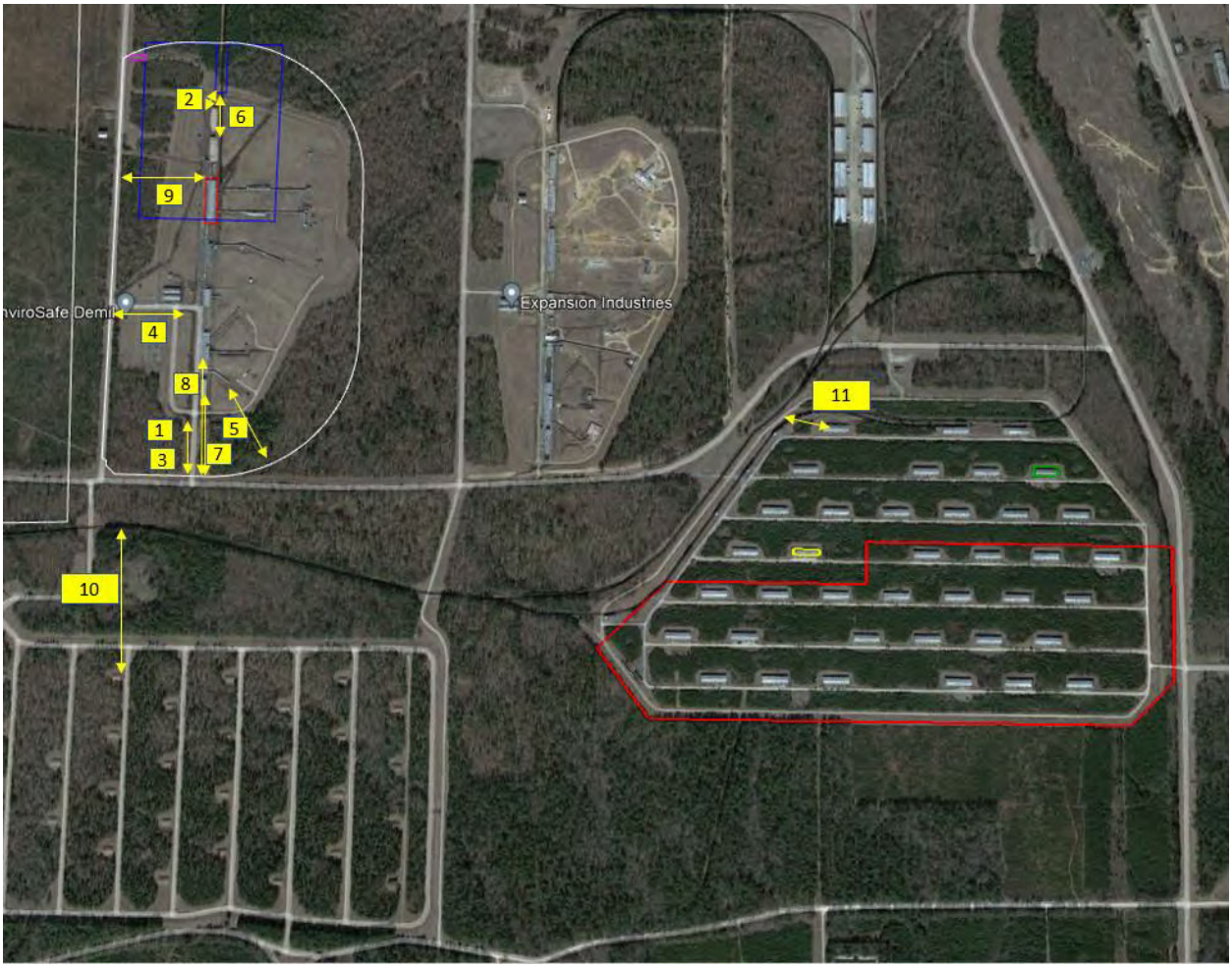
Regulatory Citation (40 CFR)	Description	Location Requirement is Addressed [a]
§270.14(b)(19)	Topographic map	~~*Attachment C – Topographic Maps* of the Part A Application Form~~*Attachment V.A – Maps for General Engineering Reports – General Information*
§270.14(b)(19)(i)	Topographic map scale and date	*Attachment V.A – Maps for General Engineering Reports – General Information*~~*Attachment C – Topographic Maps* of the Part A Application Form~~
§270.14(b)(19)(ii)	100-year floodplain area	*Appendix II.F – Flooding* and *Attachment V.A – Maps for General Engineering Reports – General Information*
§270.14(b)(19)(iii)	Surface waters including intermittent streams	~~*Attachment C – Topographic Maps* of the Part A Application Form;~~ *Attachment II.4 – Surface Water Intake* and *Attachment V.A – Maps for General Engineering Reports – General Information*
§270.14(b)(19)(iv)	Surrounding land uses (residential, commercial, agricultural, recreational)	*Attachment II.G.1 - Land Use Maps* and *Attachment V.A – Maps for General Engineering Reports – General Information*
§270.14(b)(19)(v)	A wind rose (*i.e.*, prevailing wind-speed and direction)	*Attachment V.A – Maps for General Engineering Reports – General Information*~~*Attachment C – Topographic Maps* of the Part A Application Form~~
§270.14(b)(19)(vi)	Orientation of the map (north arrow)	*Attachment V.A – Maps for General Engineering Reports – General Information*~~*Attachment C – Topographic Maps* of the Part A Application Form~~
§270.14(b)(19)(vii)	Legal boundaries of the HWM facility site	*Attachment V.A – Maps for General Engineering Reports – General Information*~~*Attachment B – Legal Description of the Facility* of the Part A Application Form;~~ ~~*Attachment C – Topographic Maps* of the Part A Application Form~~
§270.14(b)(19)(viii)	Access control (fences, gates)	Figure 2-1 in *Appendix III.E – Contingency Plan* and *Attachment V.A – Maps for General Engineering Reports – General Information*
§270.14(b)(19)(ix)	Injection and withdrawal wells both on-site and off-site	N/A
§270.14(b)(19)(x)	Buildings; treatment, storage, or disposal operations	*Attachment V.A – Maps for General Engineering Reports – General Information*~~*Attachment D – Photographs of the Part A Application Form~~
§270.14(b)(19)(xi)	Barriers for drainage or flood	N/A

	control	
§270.14(b)(19)(xii)	Location of operational units within the HWM facility site, where hazardous waste is (or will be) treated, stored, or disposed (include equipment cleanup areas).	*Attachment V.A – Maps for General Engineering Reports – General Information*~~*Attachment D – Photographs* of the Part A Application Form~~
§270.14(c)(3)	Location of waste management area, property boundary, aquifers	~~*Attachment B – Legal Description of the Facility* of the Part A Application Form; *Attachment D – Photographs* of the Part A Application Form;~~ -*Attachment II.3 – Aquifer Information* and *Attachment V.A – Maps for General Engineering Reports – General Information*
§270.14(d)(1)(i)	The location of the unit on the topographic map	*Attachment V.A – Maps for General Engineering Reports – General Information*~~*Attachment C – Topographic Maps* of the Part A Application Form~~

Notes:

[a] The location listed is within the Part B Application~~, unless otherwise noted~~.

Figure V.A.1
Distances from the Property Line



Line Number on Map	Description	Distance to Nearest Property Line
1	Hybrid Burn Chamber (HBC)	100
2	Energetic Activation Unit (EAU)	150
3	Air Pollution Control System (Pollution Abatement System)	100
4	Employee/ Operations Building	590
5	Range Control Building	800
6	Energetic and Recycling Ops Building	415
7	Rocket Motor Ops Building (Rocket Motor Prep Area)	300
8	Rocket Motor Ops Building (Segmenting Area)	450
9	Inert Storage Building	770
10	Earth Covered Magazines	1250 or greater
11	Above Ground Magazine	400

2.0 FEATURES TO MITIGATE UNSUITABLE SITE CHARACTERISTICS

Table 2-1 shows the information specified in 30 TAC §335.204(a)(1) and (a)(3) through (9). All of this information is addressed in other portions of this permit application and Table 2-1 indicates which section of the permit application contains this information.

Table 2-1
Table of Information Requirements for Mitigating Unsuitable Site Characteristics

Regulatory Citation (30 TAC)	Description *The facility may not be located in:*	Location Requirement is Addressed [a]
§335.204(a)(1)	the 100-year floodplain	*Section 2.2 of Appendix II – Facility Siting Criteria; Appendix II.F - Flooding*
§335.204(a)(3)	the recharge zone of a sole-source aquifer	*Section 2.5 of Appendix II – Facility Siting Criteria; Attachment II.3 – Additional Aquifer Information*
§335.204(a)(4)	areas overlying regional aquifers unless:	*Section 2.5 of Appendix II – Facility Siting Criteria; Attachment II.3 – Additional Aquifer Information*
§335.204(a)(5)	areas where soil unit(s) within five feet of the containment structure have a Unified Soil Classification of GW, GP, GM, GC, SW, SP, or SM, or a hydraulic conductivity greater than 10^{-5} cm/sec	*Section 3.2 of Appendix II – Facility Siting Criteria; Attachment II.5 – Soil Unit Information*
§335.204(a)(6)	areas of direct drainage within one mile of a lake at its maximum conservation pool level, if the lake is used to supply public drinking water through a public water system	*Section 3.1 of Appendix II – Facility Siting Criteria; Attachment II.4 – Surface Water Intake*
§335.204(a)(7)	areas of active geologic processes	*Section 2.6 of Appendix II – Facility Siting Criteria; Appendix VI.A – Geology and Topography; Attachment VI.A.1 – Geologic Information; Attachment VI.A.2 – Fault Information; Attachment VI.A.3 – Earthquake Information*
§335.204(a)(8)	the critical habitat of an endangered species of plant or animal	*Section ~~2.9~~3.3 of Appendix II – Facility Siting Criteria; Attachment II.~~5~~ 6 – Critical Habitat of an Endangered Species of Plant or Animal*
§335.204(a)(9)	within 30 feet of the upthrown side or 50 feet of the downthrown side of the actual or inferred surface expression of a fault that has reasonably been shown to have caused displacement of shallow Quaternary sediments or of man-made structures	*Appendix VI.A – Geology and Topography; Attachment VI.A.2 – Fault Information*

Notes:

[a] The location listed is within the Part B Application~~, unless otherwise noted~~.

3.0 CONSTRUCTION SCHEDULES

The construction schedules for each hazardous waste management unit are included in their respective appendix, if a construction table is applicable to the particular unit. The appendices for each unit are listed in *Table 1-1 – Additional Engineering Reports Appendices.*

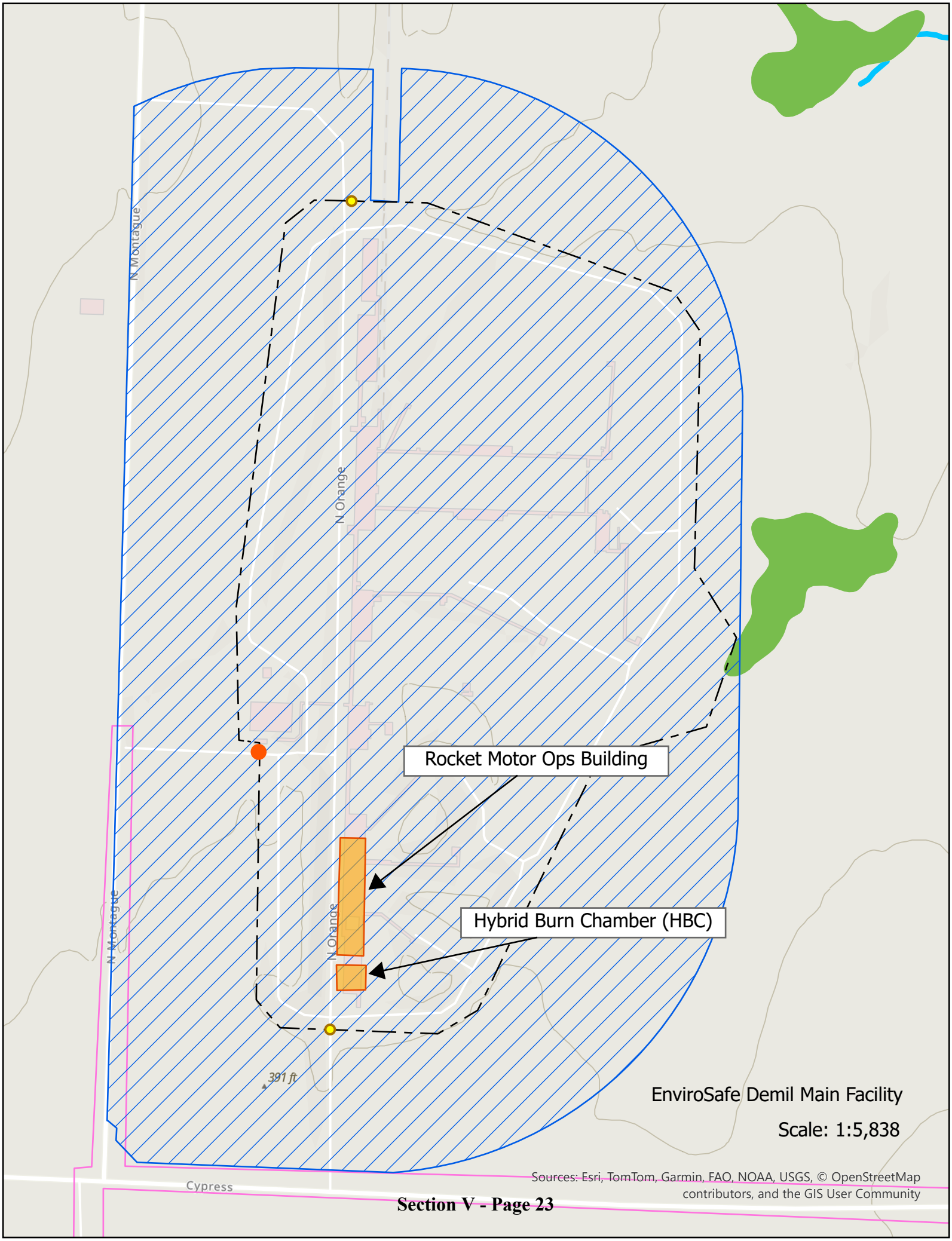
4.0 PLANS, SPECIFICATIONS, AND OPERATIONS

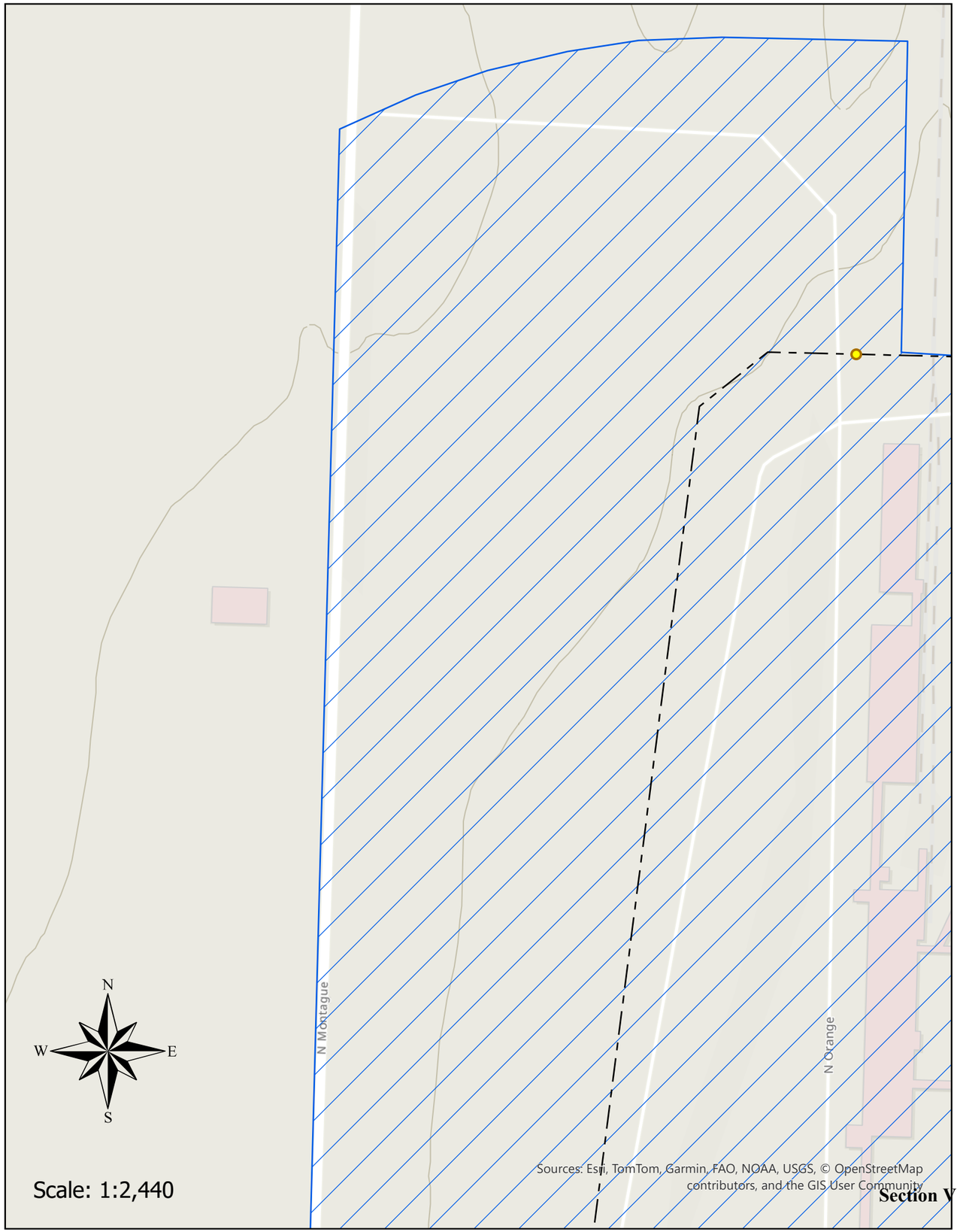
The plans, specification and operations for each hazardous waste management unit are included in their respective appendix. The appendices for each unit are listed in *Table 1-1 – Additional Engineering Reports Appendices.*

ATTACHMENT V.A –

MAPS FOR GENERAL ENGINEERING REPORTS – GENERAL INFORMATION

EnviroSafe Demil Facility Hooks, Texas
May 2025
Padlocked Gate (Not Used)
Controlled Access Gate
Fenceline
Waste Management Unit
Area Boundary
Roadways with Rights of Way
Surface Waters
Marsh, Swamp, Bog, Prairie
Stream, River
Flood Hazard
100-Year Floodplain Area
Hooks
E Ave A
Elm Cir
Oak St
Leary
O'Leary St
Walnut
Cedar
Lamar Rd
Freedom Way
Harrison Ave
Taylor Ave
Bowie Pkwy
Denton St
N Montague
N Orange
Cypress
Huckleberry
DZ PVT 3
Alder Cir
Maple Rd
Hopkins Rd
Old Boston
Anderson
Brazos
Delta
Ellis
Fannin
Gregg
Kaufman
Limestone
Montague
Nacogdoches
Panola
Rains
Smith
Trinity
402 ft
445 ft
0
0.25
0.5
1 Miles
Scale: 1:28,730
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


N Montague
N Orange
Rocket Motor Ops Building
Hybrid Burn Chamber (HBC)
N Montague
N Orange
391 ft
Cypress
EnviroSafe Demil Main Facility
Scale: 1:5,838
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


N
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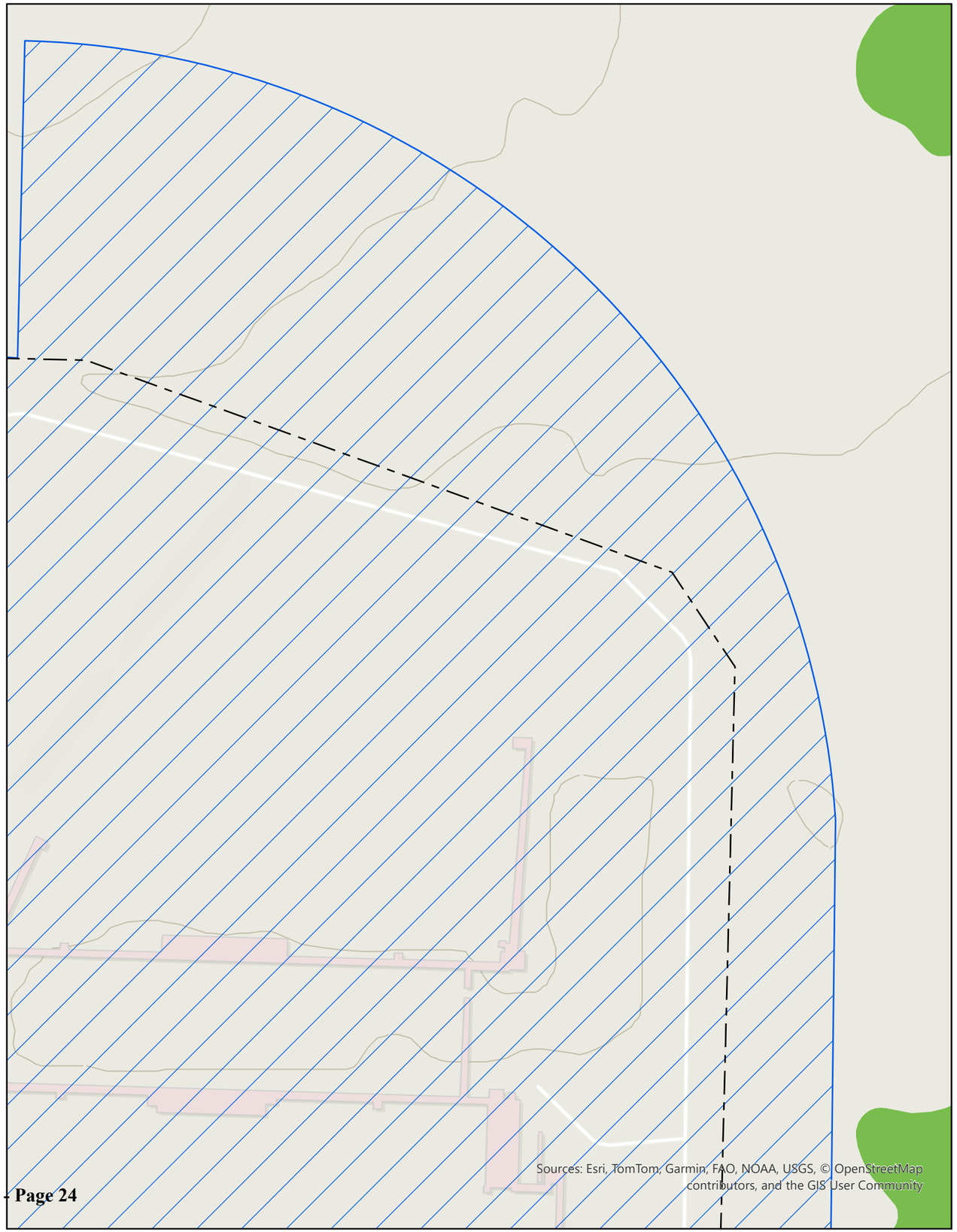
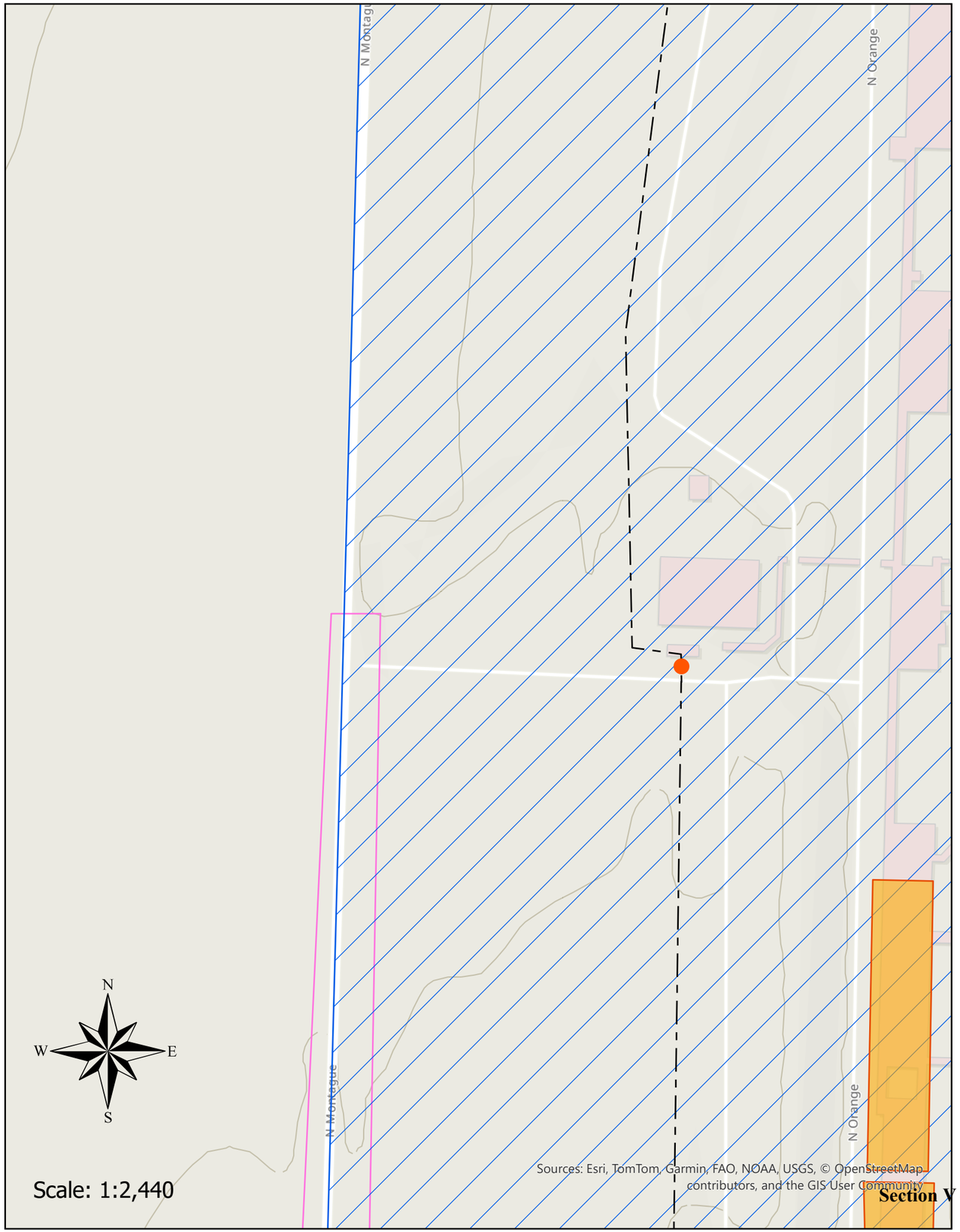
Scale: 1:2,440
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


N Montague
N Orange
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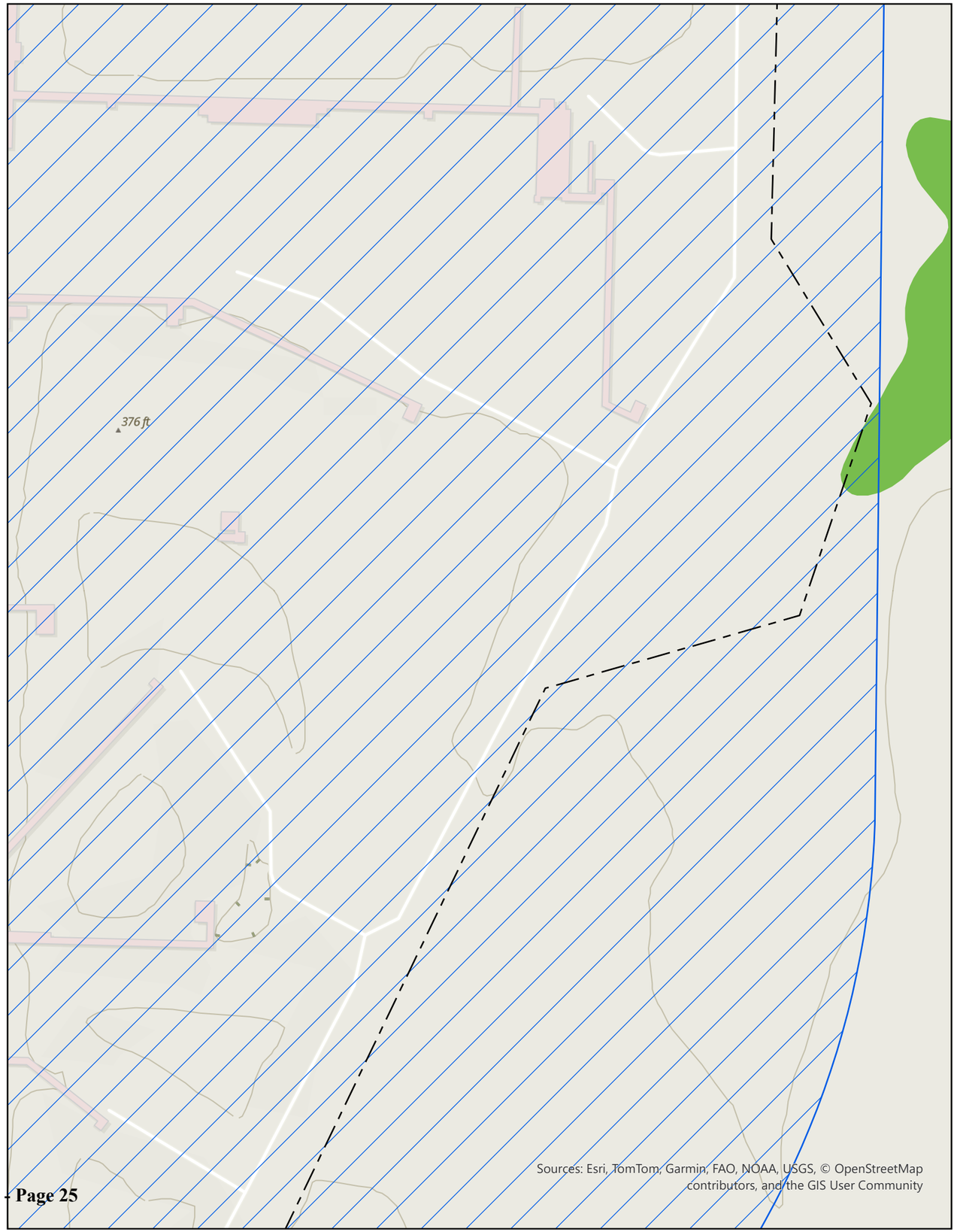
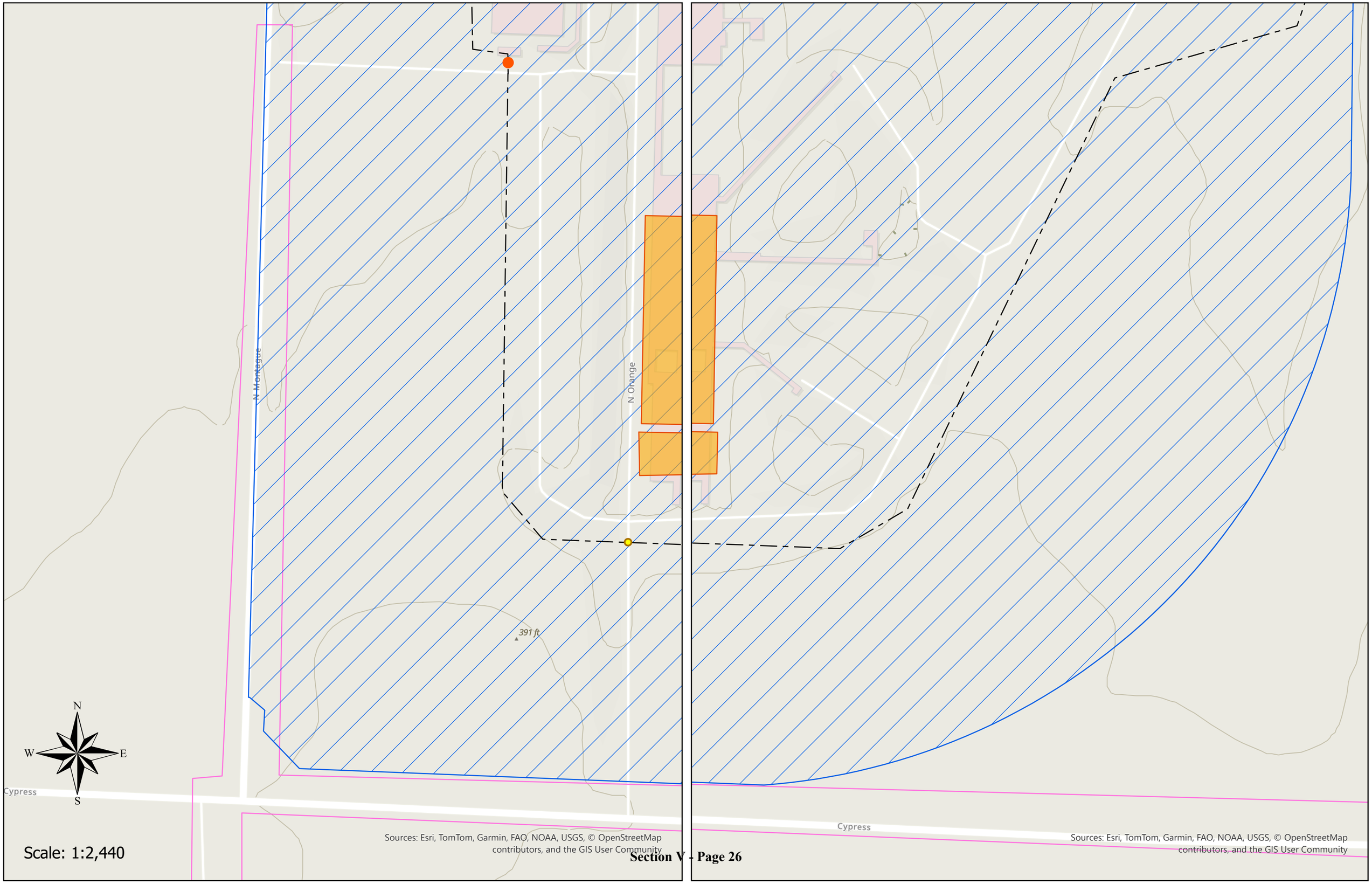
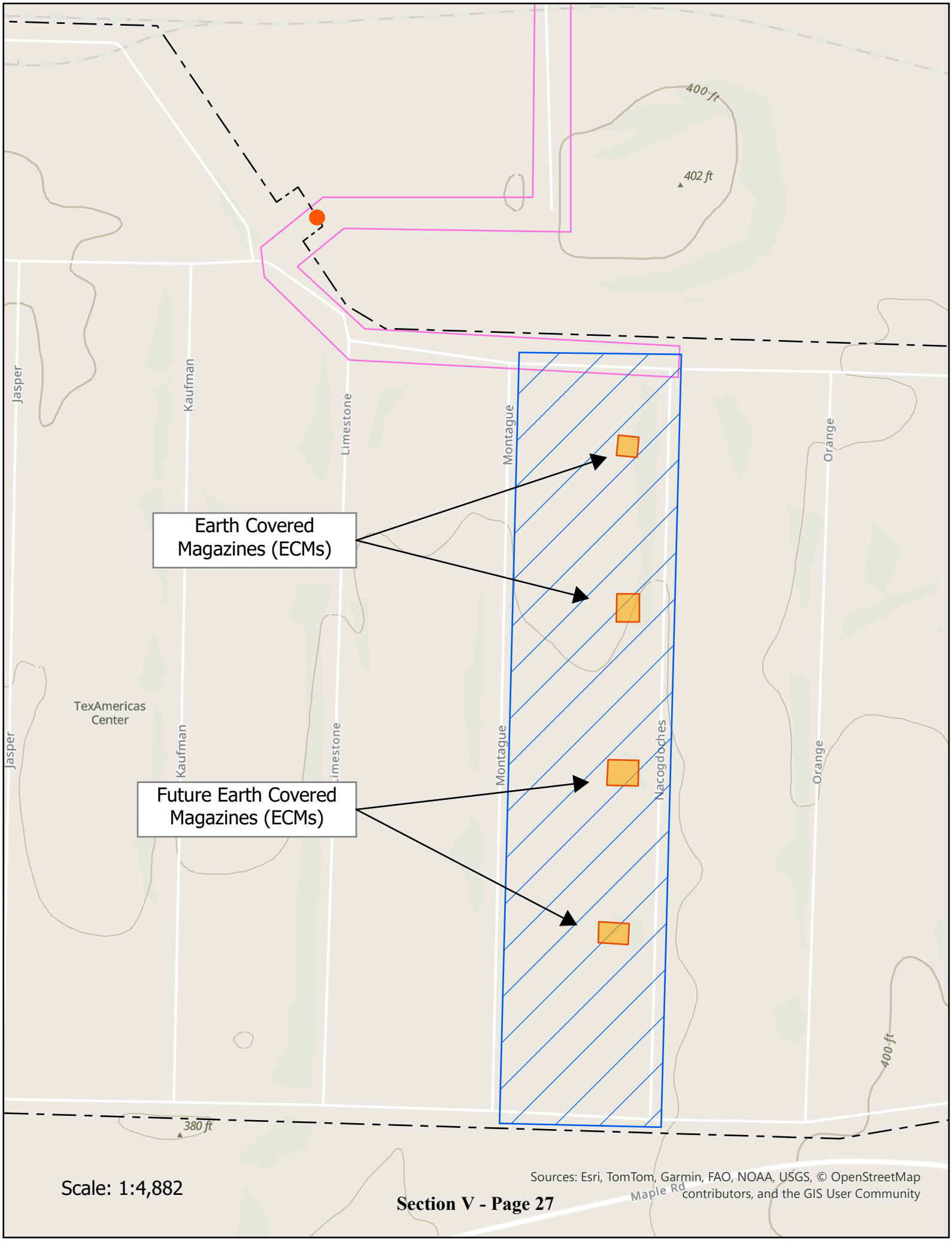
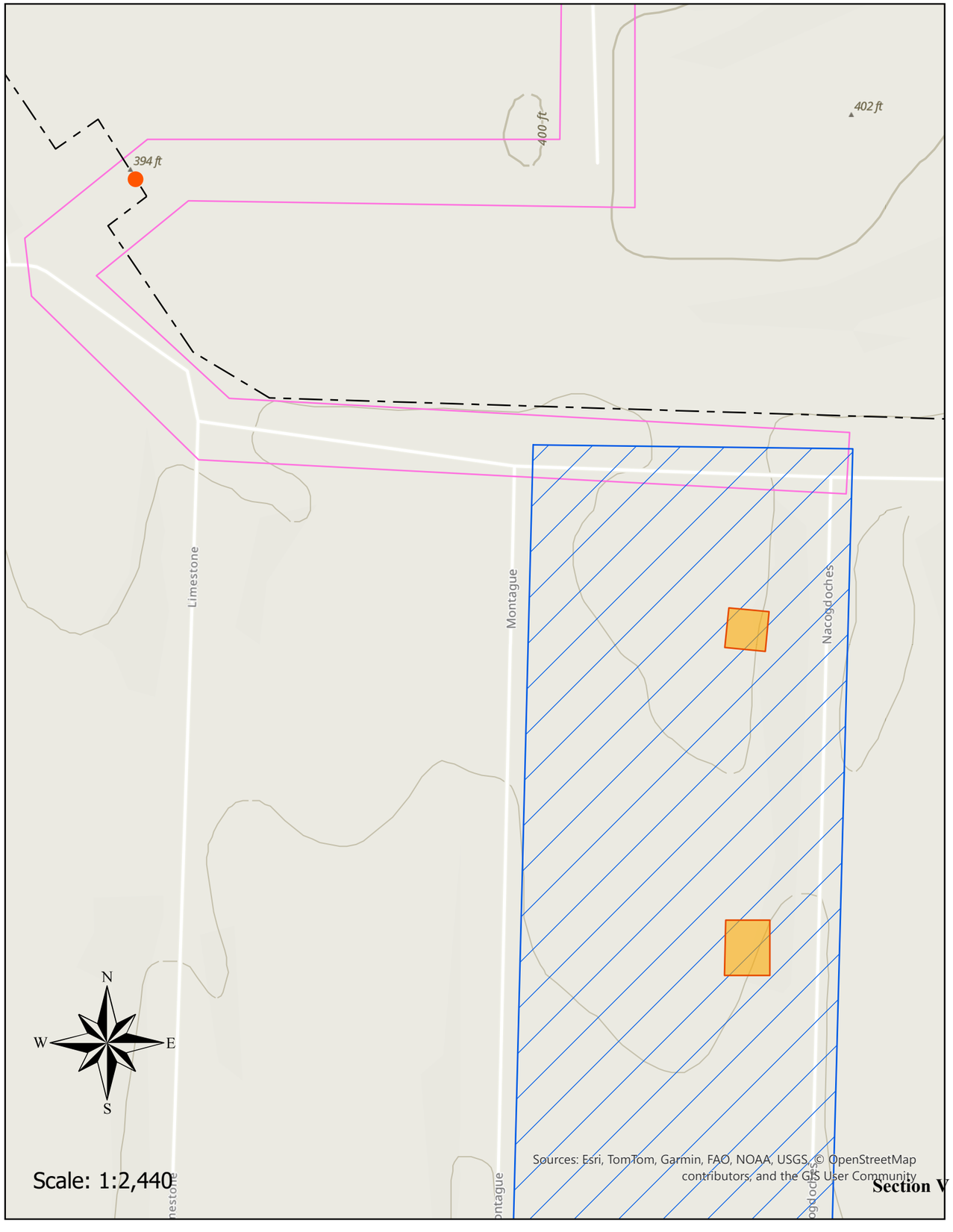
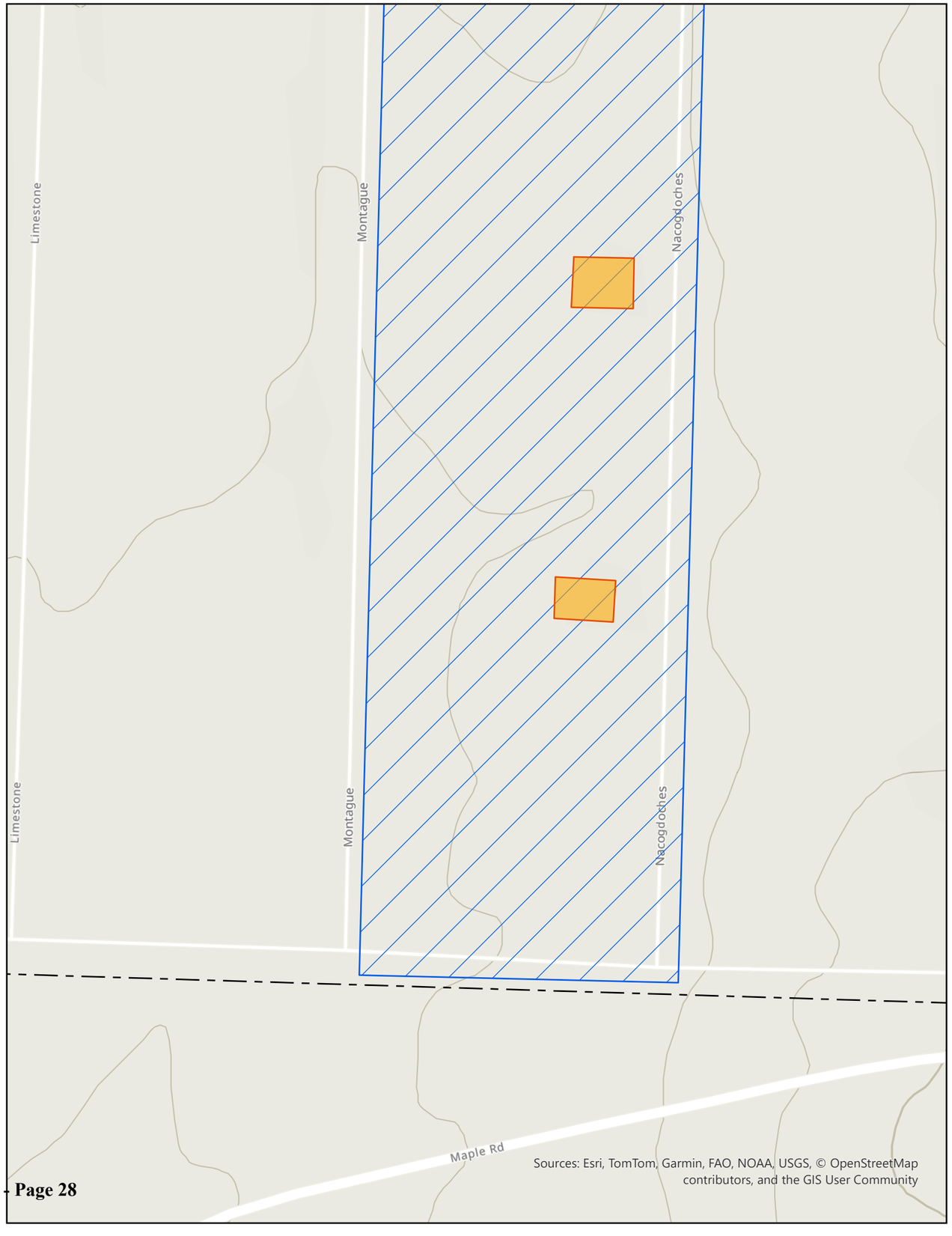
E
S
Scale: 1:2,440
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

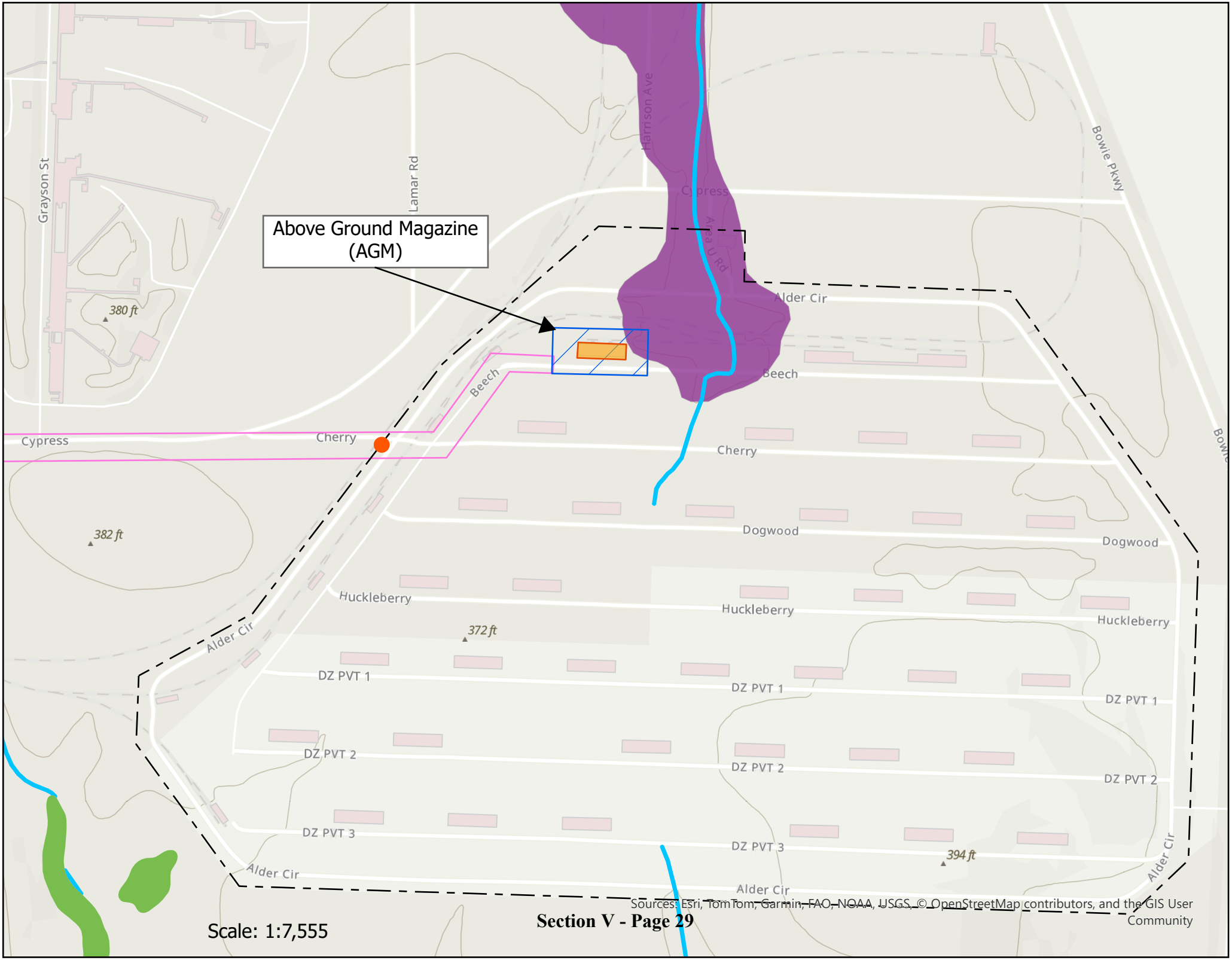

376 ft
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

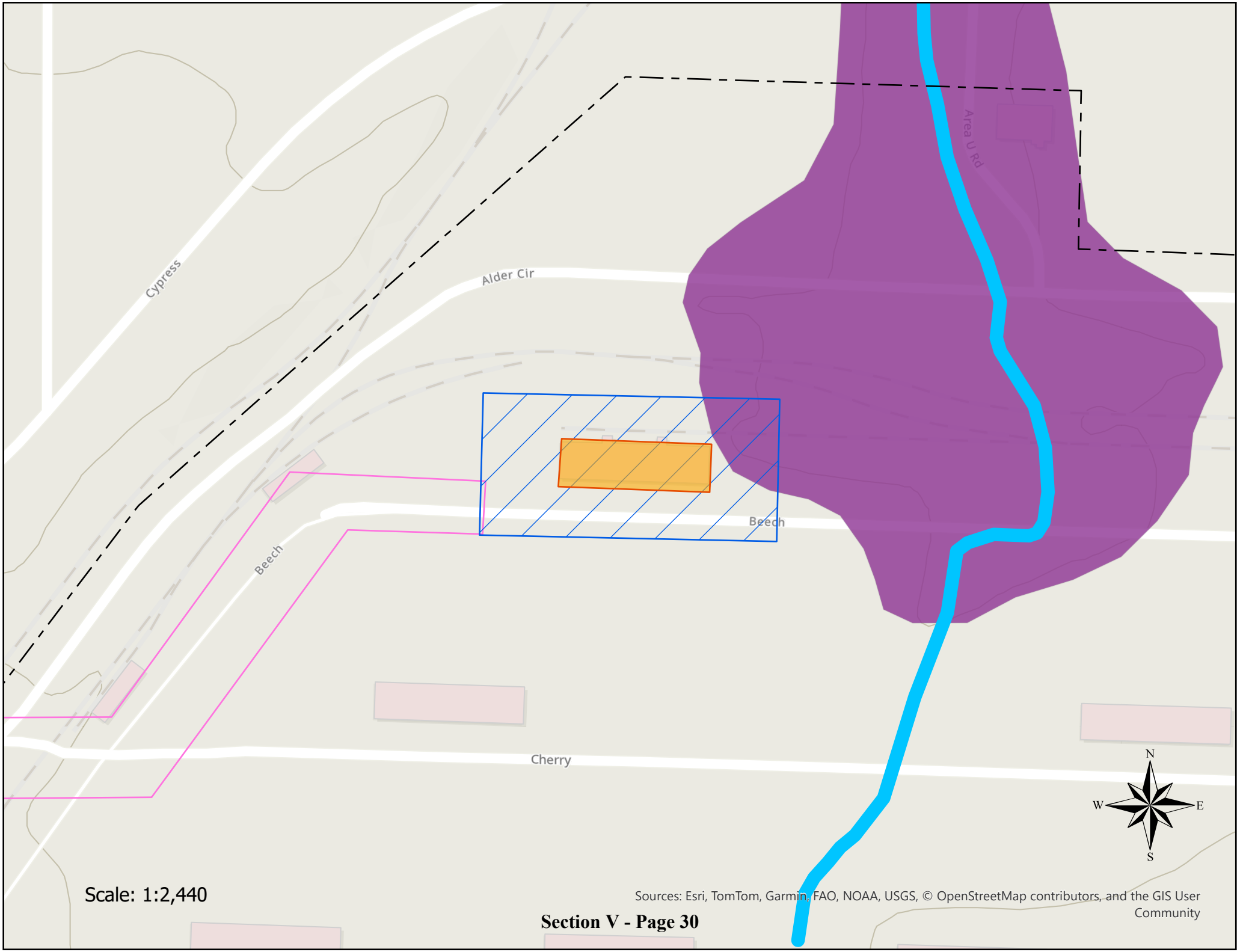

N Montague
N Orange
391 ft
Cypress
Cypress
N
W
E
S
Scale: 1:2,440
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


Earth Covered Magazines (ECMs)
Future Earth Covered Magazines (ECMs)
400 ft
402 ft
Jasper
Kaufman
Limestone
Montague
Nacogdoches
Orange
TexAmericas Center
380 ft
Maple Rd
Scale: 1:4,882
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


394 ft
400 ft
402 ft
Limestone
Montague
Nacogdoches
N
W
E
S
Scale: 1:2,440
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


Limestone
Montague
Nacogdoches
Maple Rd
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


Above Ground Magazine (AGM)
Grayson St
Lamar Rd
Harrison Ave
Bowie Pkwy
Cypress
Alder Cir
Beech
Cherry
Dogwood
Huckleberry
DZ PVT 1
DZ PVT 2
DZ PVT 3
380 ft
382 ft
372 ft
394 ft
Scale: 1:7,555
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

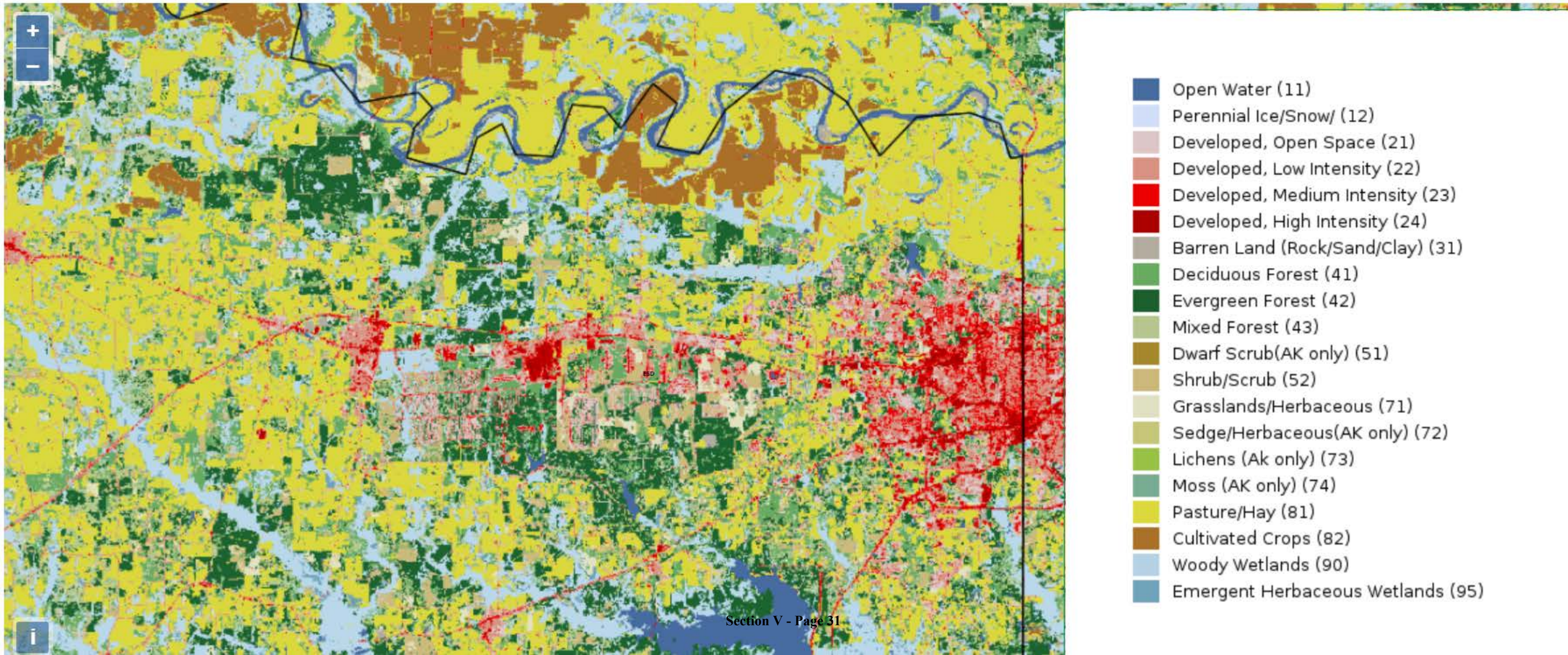

Cypress
Alder Cir
Area U Rd
Beech
Beech
Cherry
N
W
E
S
Scale: 1:2,440
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

https://www.mrlc.gov/viewer/

Lat/Lon and UTM C... | Dell | New folder | MyWin | Microsoft Office Ho... | Mortgage - Weichert | Carroll Home Servic... | HCPSS Connect – H... | CHADD Greater Bal...

All NLCD Land Cover 2019 CONUS Land Cover

Land Use

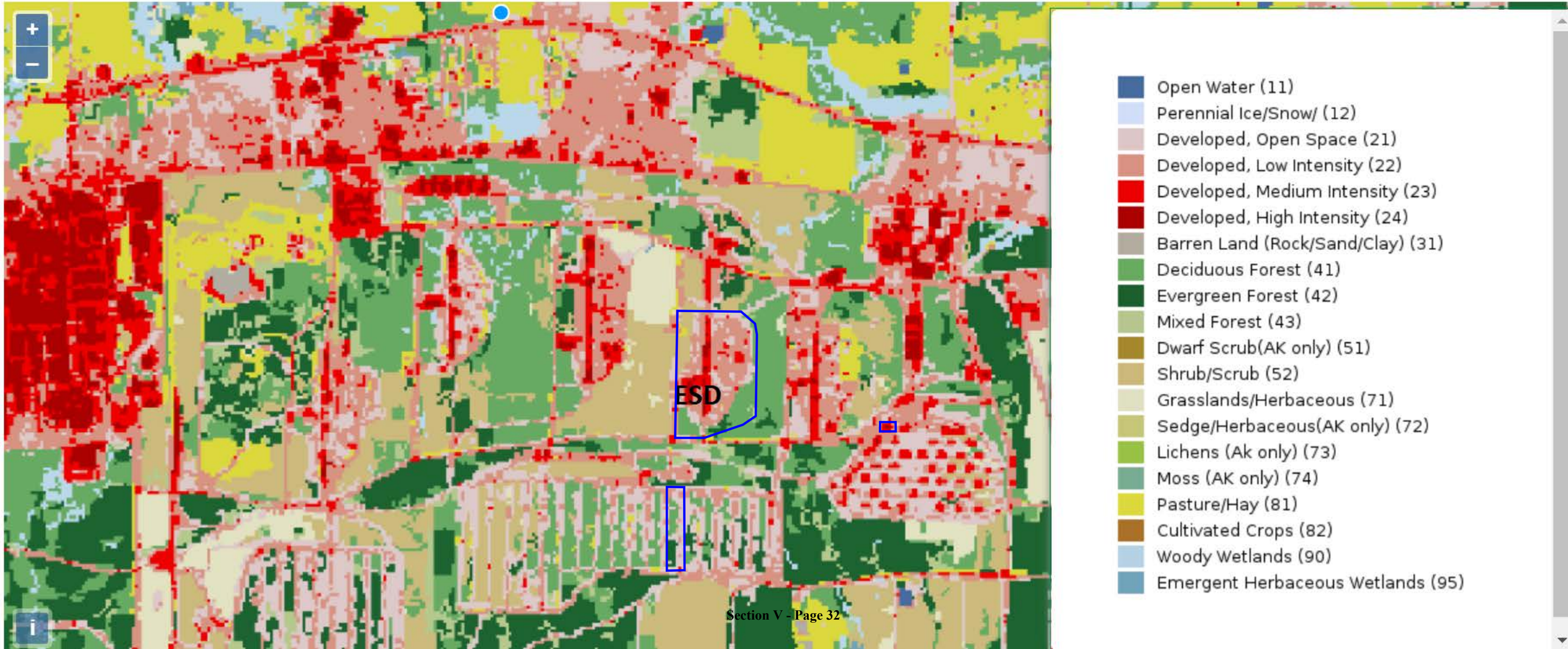


https://www.mrlc.gov/viewer/

Lat/Lon and UTM C... | Dell | New folder | MyWin | Microsoft Office Ho... | Mortgage - Weichert | Carroll Home Servic... | HCPSS Connect – H... | CHADD Greater Bal...

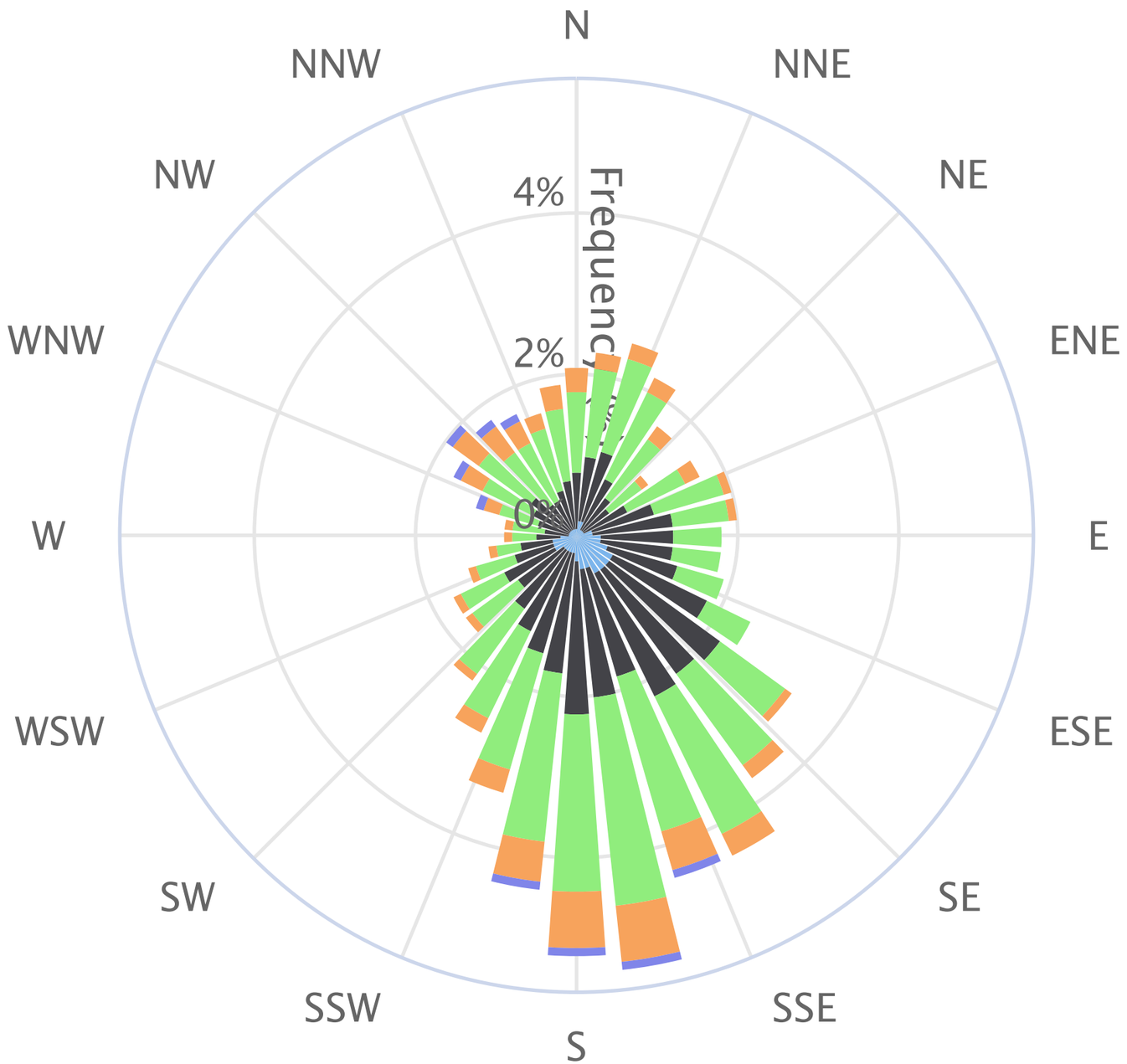
All NLCD Land Cover 2019 CONUS Land Cover

Land Use



SHREVEPORT RGNL AP (LA) Wind Rose

Feb. 1, 2018 - Feb. 1, 2023
Sub-Interval: Jan. 1 - Dec. 31, 0 - 23



Wind Speed (m/s)

- 1.3 - 1.8
- 1.8 - 3.6
- 3.6 - 5.85
- 5.85 - 8.55
- 8.55 - 11.25
- 11.25 - 14.4
- 14.4 - 17.55
- 17.55 - 21.15
- 21.15 -

Click and drag to zoom

Section V – Engineering Reports

Appendix V.B – Container Storage Areas

40 CFR §264.170-§264.173, §264.175-§264.177, and §270.15

1.0 INTRODUCTION

EnviroSafe Demil, LLC (ESD) will use storage magazines that are ~~adjacent~~ proximate to the main facility to store energetic materials. The storage magazines are listed below:

- Above Ground Magazine (AGM)
- Earth Covered Magazine (ECM) V-13-1
- Earth Covered Magazine (ECM) V-13-2
- ~~Earth Covered Magazine (ECM) V-13-3 (reserved for future use)~~
- ~~Earth Covered Magazine (ECM) V-13-4 (reserved for future use)~~

The above ground magazine (AGM) is located to the southeast of the main facility and the earth covered magazines (ECMs) are located to the south of the main facility. More information on the siting and location information for the storage magazines can be found in *Section II – Facility Siting Criteria*.

Table 1, *Table of Information Requirements for Container Storage Areas*, presents the regulatory references for the information required to be submitted for container storage areas in 40 CFR §264.170-§264. 177 and 40 CFR §270.15 and the section of this document that addresses the specific requirement.

Table 1
Table of Information Requirements for Container Storage Areas

Regulatory Citation (40 CFR)	Description	Section Requirement is Addressed
§264.171	If a container holding hazardous waste is not in good condition or if it begins to leak, the hazardous waste must be transferred from this container to a container that is in good condition	Section 5.0
§264.172	Hazardous waste must be stored in a container that is compatible with, the hazardous waste to be stored	Section 5.0
§264.173(a)	A container holding hazardous waste must be closed during storage, except when adding or removing waste	Section 5.0
§264.173(b)	A container holding hazardous waste must not be opened, handled, or stored in a manner which may rupture the container or cause it to leak	Section 5.0
§264.174	Inspections	Section 5.0
§264.175(a)	Containment system	N/A, see §264.175(c) and Section 4.0 [a]
§264.175(b)	Containment system design	N/A, see §264.175(c) and Section 4.0 [a]
§264.175(c)	Storage areas that store containers holding only wastes that do not contain free liquids do not need to have a containment system	Section 4.0 [a]
§264.175(d)	Applicable to waste codes F020, F021, F022, F023, F026, and F027	N/A
§264.176	Containers holding ignitable or reactive waste must be located at least 15 meters (50 feet) from the facility's property line	Section 6.0
§264.177	Incompatible wastes	Section 6.0
§270.15(a)	Containment system description	N/A, see Section 4.0 [a]
§270.15(b)	Requirements for storage of wastes that do not contain free liquids	Section 4.0
§270.15(c)	Sketches, drawings, or data showing location of buffer zone for containers holding ignitable or reactive wastes	Section 6.0
§270.15(d)	Incompatible waste requirements	Section 6.0
§270.15(e)	Air emission control equipment	N/A

Notes:

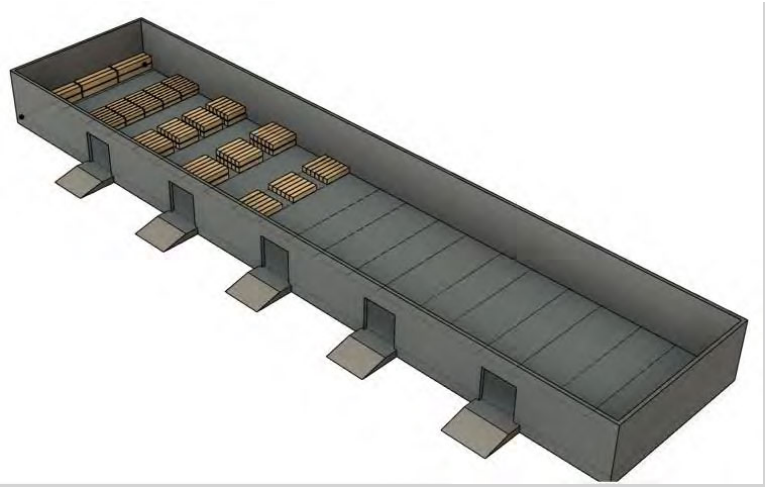
[a] The storage magazines will not store containers with free liquids. Per 40 CFR §264.175(c), storage areas that store containers holding only wastes that do not contain free liquids need not have a containment system described by 40 CFR §264.175(b) as long as certain requirements are met. See Section 4.0 for more information.

2.0 DESCRIPTION OF THE ABOVE GROUND MAGAZINE

2.1 Physical Characteristics, Materials of Construction, and Dimensions

The above ground magazine (AGM) was constructed in the 1940s and is approximately 225 feet by 60 feet with 16-foot tall walls. The walls are steel beam construction with reinforced brick and concrete foundations. The roof is steel. All of the doors have locking hasps and all vents are covered with security grating. It can be described as a large above ground storage facility for explosives. The entrance to the above ground magazine has a raised edge so that in the event of a spill, no material will reach the soil outside.

The figure below shows the shape of the AGM.



Above Ground Magazine

2.2 Design and Safety

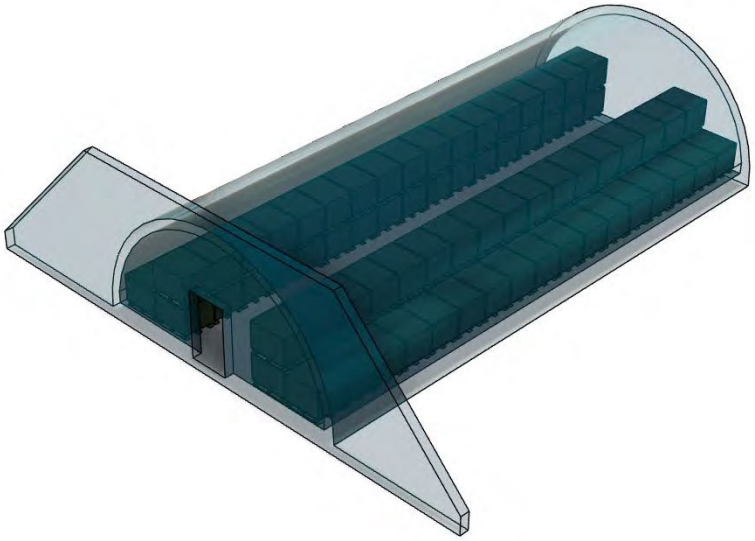
The Department of Defense (DoD) Explosives Safety Board (DDESB) has safety standards that cover the design, construction, and use of all ammunition and explosive storage magazines within the DoD. The AGM meets the design and construction requirements for the safety standards specified in DoD 6055.09-M and DoD 4145.26-M for DoD Contractors. It is designed for the storage of Hazard Division 1.3 or 1.4 ammunition and explosives. The Army has approved net explosive weight (NEW) limits for the AGM and these limits are included in this application in *Table V.B – Container Storage Area*.

3.0 DESCRIPTION OF THE EARTH COVERED MAGAZINES

3.1 Physical Characteristics, Materials of Construction, and Dimensions

The earth covered magazines (ECMs) were constructed in 1942 and are approximately 27 feet by 60 feet. They are arched-shaped with a midline height of 13 feet and the walls and floor are 12-inches thick and are made from rebar reinforced concrete. Each ECM has a concrete headwall and the earth and grass cover on each magazine is kept at a depth of at least two feet. The floor of each storage magazine is sloped from the center towards the channels that run along the side walls. The channels discharge to the ground and are part of the ventilation system. The ECMs are watertight and are designed to drain water out of small holes in the front of the magazine that are attached to the channels.

The figure below shows the shape of the earth covered magazines. Each earth covered magazine consists of a reinforced concrete headwall and endwall, an at grade floor, and an arched roof all sealed watertight to each other as one unit. The roof is also covered with a minimum of two feet thick soil covering.



Earth Covered Magazine(s)

3.2 Design and Safety

The Department of Defense (DoD) Explosives Safety Board (DDESB) has safety standards that cover the design, construction, and use of all ammunition and explosive storage magazines within the DoD. The ECMs meet the design and construction requirements for the safety standards specified in DoD 6055.09-M and DoD 4145.26-M for DoD Contractors. The ECMS are designed to prevent propagation of an explosion that may occur in an adjacent magazine. They are designed to store certain amounts of Hazard Division 1.1, 1.2, 1.3, or 1.4 ammunition and explosives. Each

storage magazine has an approved net explosive weight (NEW) limit and these limits are included in this application in *Table V.B – Container Storage Area*.

They are built to the standards for Mounded Concrete Igloo Magazines on page 20 of the document included in *Attachment V.B. – Army Engineering Publication* (source: Department of the Army; U.S. Army Corps of Engineers; Engineering and Design; Explosive Storage Magazines; EP-1110-345-102; 31 August 1995).

4.0 SECONDARY CONTAINMENT

As discussed in *Appendix IV.D – Waste Analysis Plan*, the information used to characterize the energetic materials demonstrates that no free liquids are present. Since the storage magazines will not store containers with free liquids, secondary containment is not required by 40 CFR §264.175(c) as long as:

- The storage area is sloped or is otherwise designed and operated to drain and remove liquid resulting from precipitation, or
- The containers are elevated or are otherwise protected from contact with accumulated liquid.

The storage magazines are enclosed structures and there is no possibility of precipitation or run-on entering the storage magazines. Additionally, the energetic materials that will be stored contain no free liquids. Therefore, there is no potential for liquid spills or leaks. All containers will be stored on pallets in order elevate them above the floor surface in the event of an accumulated liquid, such as condensation, being on the floor.

5.0 INSPECTIONS AND CONTAINER MANAGEMENT

Each storage magazine has a log where the type of material, amount of material, and the date the material was put into storage is recorded. Each magazine is designed to hold a different amount of net explosive weight (NEW). The basis for these limits is to ensure explosives safety and are the limits are approved by the Army. The operators assure that the design amount of NEW for each magazine is not exceeded. Weekly inspections of the storage magazines are conducted in accordance with *Appendix III.D – Inspection Schedule*. In addition, hazardous waste munitions and explosives are inventoried at least annually.

Containers are inspected for leaks or deterioration caused by corrosion or other factors. In accordance with 40 CFR §264.171, if a container holding hazardous wastes is not in good condition or if it begins to leak, the hazardous waste will be removed from the container and placed

into another container that is in good condition. The defective container will not be used to manage hazardous waste until the defect is repaired.

Materials will be stored in the original shipping containers which are designed to safely hold the energetic material. The containers are compatible with their contents and there is no potential for the energetic material to react with the containers. All containers are kept closed during storage. No open containers or containers without covers securely fastened are allowed in the storage magazines. Containers are not opened, handled, or stored in a manner which may rupture the container or cause it to leak.

Containers may be stacked in the storage magazines. Stacked containers will be grouped and identified according to lots. Appropriate stacking methods are used in order to provide good ventilation to all parts of the stack and to ensure that the containers are not damaged.

Adequate aisle space will be maintained so that units in each stack can be inspected and inventoried as required. Aisle space will also be maintained such that containers can be accessed when they are ready to be sent to the on-site processing areas.

6.0 HANDLING OF IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES

Ignitable and reactive waste will be handled at this facility and will be separated and protected from open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat. "No smoking" signs will be conspicuously placed wherever there is a hazard from reactive waste. Reactive wastes are stored in dedicated storage magazines until they are ready to be processed on-site. In accordance with 40 CFR §264.176, the storage magazines are located at least 15 meters (50 feet) from the facility's property line. Figure V.A.1 in *Appendix V.A – General Engineering Reports* shows the distance from the storage magazines to the property lines.

The energetic materials are not incompatible with each other. Each type of energetic material is stored in its own sealed container and will not be mixed with another type of energetic material.

7.0 CONSTRUCTION SCHEDULE

The storage magazines are existing structures that will be used for storage of energetic materials at the ESD facility. Therefore, a construction schedule is not applicable.

8.0 CERTIFICATION

The drawings of the storage magazines and the certification statement by Mr. Clay Brownlee, Professional Engineer, State of Texas are included on the following pages.

RE: EnivroSafe Demil LLC
Facility: EnviroSafe Demil LLC
Facility Location: Hooks, Texas
CN: 606060028 / RN: 111572442

Certification Statement

I hereby certify that I have reviewed the attached design drawings for the Storage Igloos and Standard Ammunition Magazine located at the proposed EnviroSafe Demil facility in Hooks, Texas.

I have inspected Photos and Pictures of general measurements related to the facilities and, based on components observable through visual inspection, the facilities appear to have been constructed according to the referenced drawings.

This certification applies to the drawings listed below:

Referenced Drawings

- **Figure 1a – 7115-1400.3**
  Underground Magazine Deep Foundation Details & Plot Plan
- **Figure 1b – 7115-1400.4**
  Underground Magazine Plan, Elevations, Section A Details
- **Figure 1c – 7115-1400.5**
  Underground Magazine Platform, Ventilator Stack, and Lightning Arrester Details
- **Figure 1d – 7115-1400.6**
  Underground Magazine Entrance Door Details
- **Figure 1e – 7115-1400.7**
  Underground Magazine Ventilator & Damper Details
- **Figure 1f – 7115-1400.8**
  Underground Magazine Bar Placing and Welding Details
- **Figure 2a – 7115-1375.1**
  Ammunition Magazine Foundation Plan and Details
- **Figure 2b – 7115-1375.2**
  Floor Plan – Elevations - Sections
- **Figure 2c – 7115-1375.3**
  Ammunition Magazine Roof Framing Plan - Steel Details

- **Figure 2d – 7115-1377.0 RP**
  Ammunition Magazine Plans – Elevations – Sections - Details
- **Figure 2e – 7115-1377.1 RP**
  Ammunition Magazine Plans – Elevations - Details
- **Figure 2f – 7115-1377.3 RP**
  Ammunition Magazine Plans – Elevations - Details

Legal Certification

In accordance with the language requirements specified in 40 CFR 270.11(d):

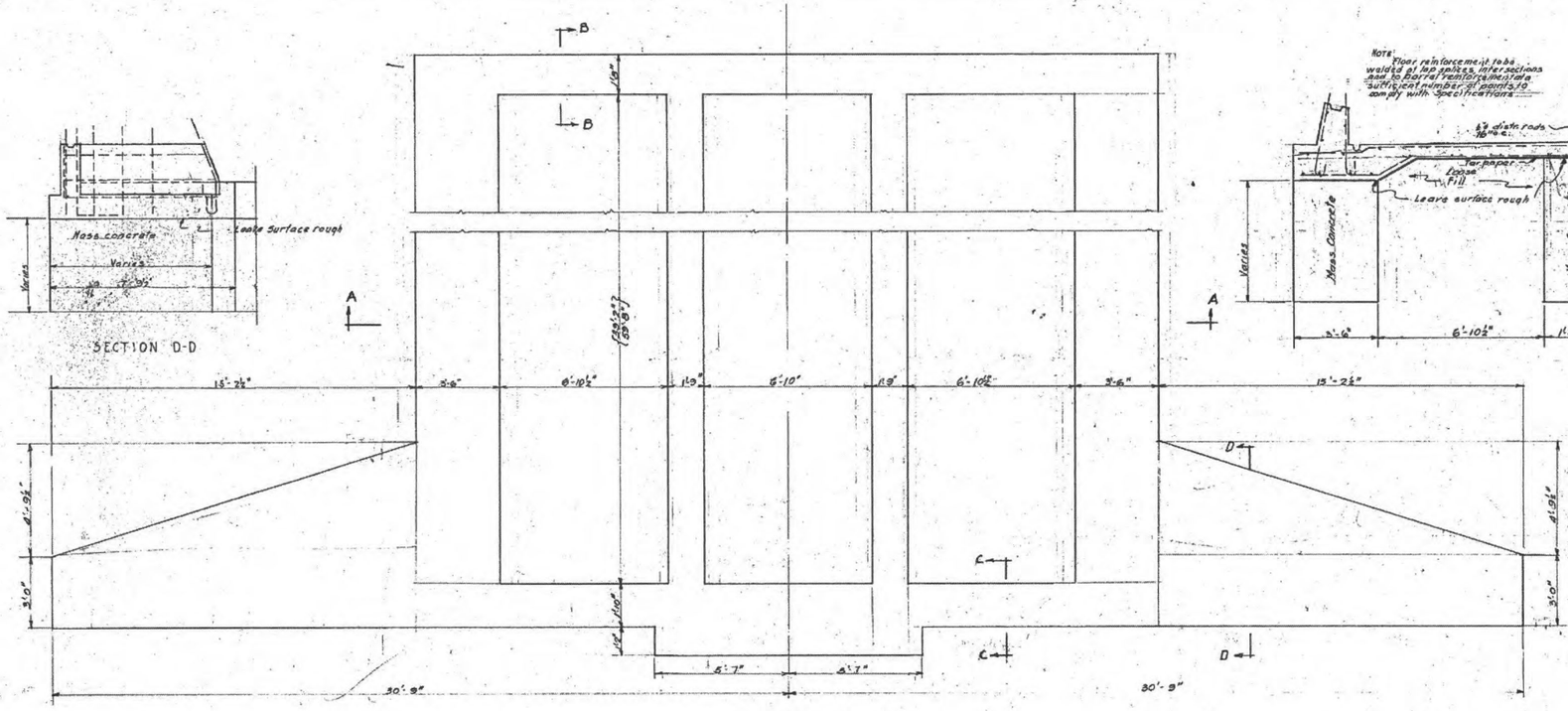
I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted.

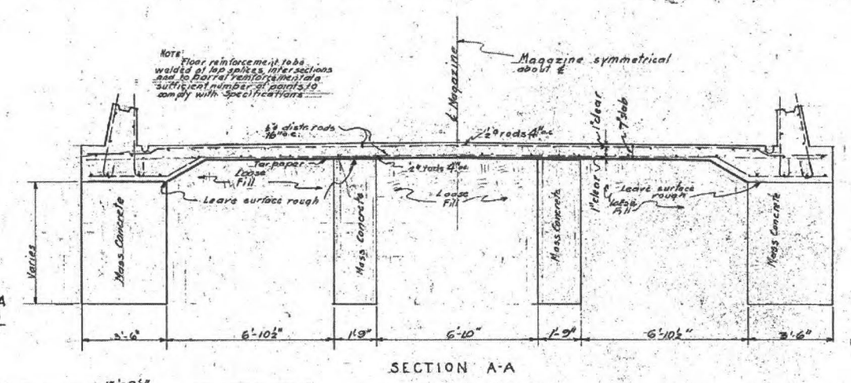
Based on my inquiry of the persons who manage the system, or those directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

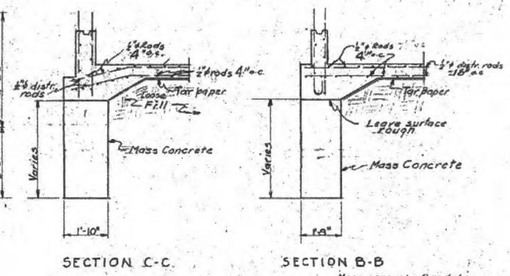
I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Sincerely,

Clay Brownlee, P.E.
Brownlee Engineering, LLC
806-801-0854
PE # 149522
Firm Registration # F-26737







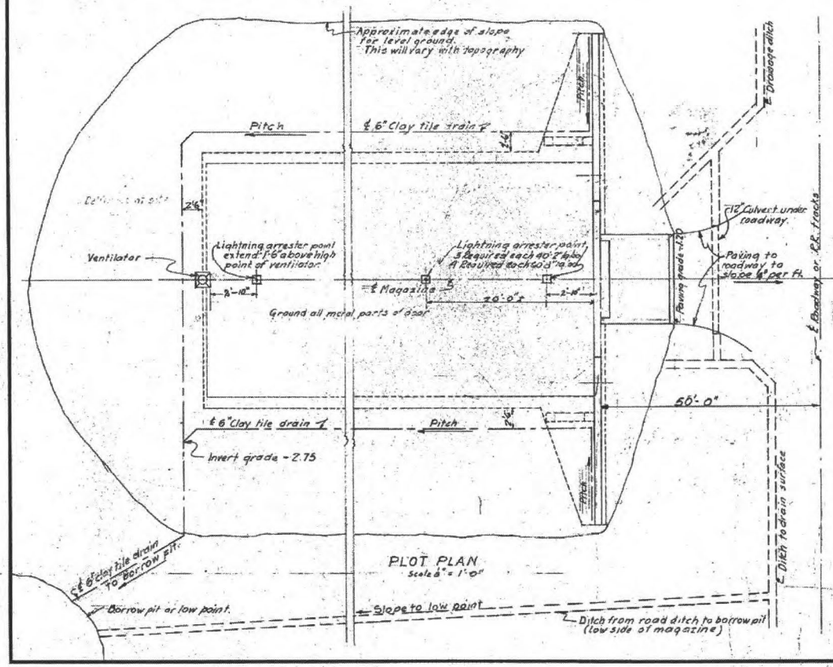
Mass concrete foundations, as shown, are to be used where local conditions make it necessary to extend the footings downward to reach required stable bearing. The depths of these footings are to be determined in the field to meet local conditions.

The widths shown are based on 4000 #/s.f. bearing pressure, and may be varied to suit soils having a lesser bearing capacity.

Fill between foundation walls shall be loose, with careful compaction sufficient only to support steel concrete floor for relay shelves. (Sect's A-A, B-B & C-C) All other items of construction are to be the same as shown on plate # 1115 - 1400.5

Slab designed for load of 1000 #/s.f.

PLAN & DETAILS FOR DEEP FOUNDATIONS
Scale ⅜" = 1'-0"



GENERAL Notes

1. Structural drawings are to be used in conjunction with specifications
2. Shallow type footing is not to be used unless the soil has a minimum bearing capacity of 4000 lbs/sq ft.
3. Placing of fill over arch shall proceed in such a manner that loads are kept equalized on opposite sides of arch.
4. Fill over waterproofing shall be placed in such a manner so as not to injure the membrane.
5. For typical arch and footing details see dwg # 7115-1400.4
6. For door details see dwg # 7115-1400.6
7. For details of lightning protection see dwg # 7115-1400.8
8. For details of ventilator stack see dwg # 7115-1400.5 & 7116-1400.7
9. Footing types:
   (a) Top of footings with bottom elevation not more than 1'-7½" below H.P. of fin. floor use shallow type footing.
   (b) For footings with bottom elevation more than 1'-7½" below H.P. of fin. floor use deep type footing.
10. Shallow and deep type footings are based on a min. bearing capacity of 4000 #/s.f. when the soil bearing capacity is less than 4000 #/s.f. the size of footing is to be modified accordingly
11. Finishes:
   (a) Top of arch ring to be well screeded smooth.
   (b) Floor and platform haunches smooth.
   (c) Tops of walls and entrance to be well screeded smooth.
   (d) All other surfaces shall be left as smooth as can be obtained by careful formwork and proper placing and spading of concrete. Any fins or projections shall be carefully removed and all honeycombs filled carefully and completely painted.
12. All exposed corners shall be chamfered.

FIGURE V.B.2

DETAILS OF REVISIONS	APPROVALS	PRACK & PRACK :: ARCHITECTS AND THE CHESTER ENGINEERS	
1. Changed partial dimensions on Plan. Changed footing dimensions. Plan & Sect. Added dimensions to pipe risers. Changed note on grounding. 10-28-41 AST	ARCHITECT – ENGINEER by A.R. Prack 10/29/41	PITTSBURGH, PENNA.	TEXARKANA, TEXAS
2. Changed note at roof lightning arrester. Changed quantity of reinf. 11-15-41 AST	LONE STAR DEFENSE CORP. by H.B. Thompson	REVISIONS 1. 10-28-41 AST 2. 11-15-41 AST	CONSTRUCTION DIVISION OFFICE OF THE QUARTERMASTER GENERAL
3. Relocated drain at headwall. Changed note on grounding. 1945	CONSTRUCTING QUARTERMASTER by [illegible] 1st Lieut.		LONE STAR ORDNANCE PLANT TEXARKANA, TEXAS CONTRACT NUMBER W-ORD-516-DA-W-ORD-3
	FOR THE CHIEF OF ORDNANCE by [illegible] 1st Lt. C.E.		AREAS - T, V & W UNDERGROUND MAGAZINE DEEP FOUNDATION DETAILS & PLOT PLAN
		DRAWN BY TOTH; CHECKED BY [illegible]; DATE 10-20-41; SCALE As Noted. TRACED BY; PRINT NUMBER; DRAWING NUMBER 7115 - 1400.3	

POOR QUALITY ORIGINAL

SECTION A-A
Scale 1" = 1'-0"

Note: Width of footing based on 8000#/s'min soil bearing capacity

SECTION B-B
scale 1" = 1'-0"

HALF PLAN
Scale 1" = 1'-0"

SECTION C-C
Scale 1" = 1'-0"

TYPICAL HALF SECTION
Scale 1" = 1'-0"

HALF INSIDE ELEVATION OF REAR WALL

Notes: Magazine is Symmetrical about ℄

HALF FLOOR PLAN
Scale 1" = 1'-0"

DETAIL OF LAP FOR WELDED FABRIC

SECTION F-F
Scale 1" = 1'-0"

SECTION G-G
Scale 1" = 1'-0"

SECTION D-D
Scale 1" = 1'-0"

SECTION E-E
Scale 1" = 1'-0"

FRONT ELEVATION
scale 1" = 1'-0"

GROUNDING SYSTEMS FOR LIGHTNING PROTECTION

TYPICAL ARRANGEMENT OF LIGHTNING RODS

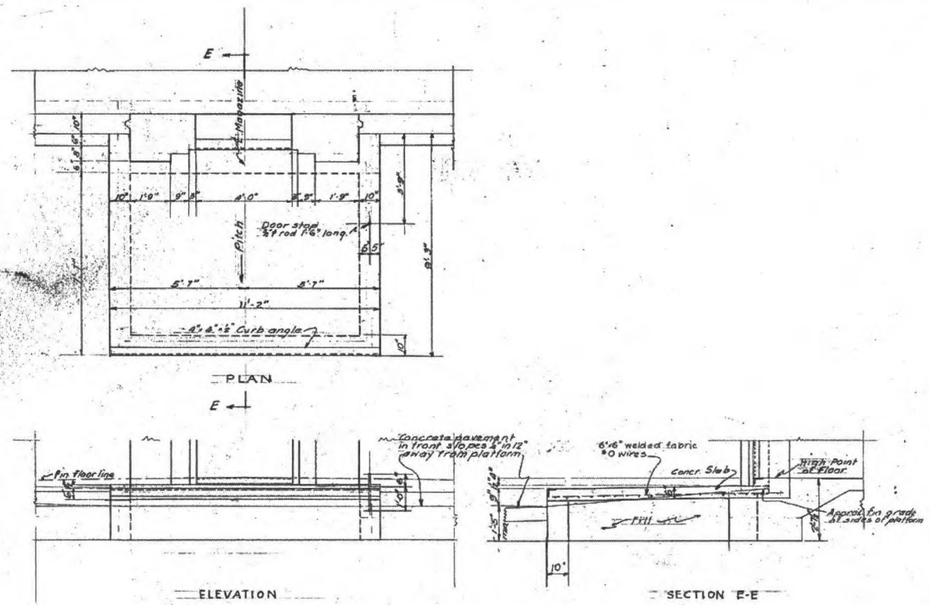
DRIP DETAIL AT DOOR

59 MAGAZINES REQUIRED AT 40'-2" x 26'-6" INSIDE
138 MAGAZINES REQUIRED AT 60'-8" x 26'-6" INSIDE
PROPOSED: 45 MAGAZINES REQUIRED AT 80'-8" x 26'-6" INSIDE

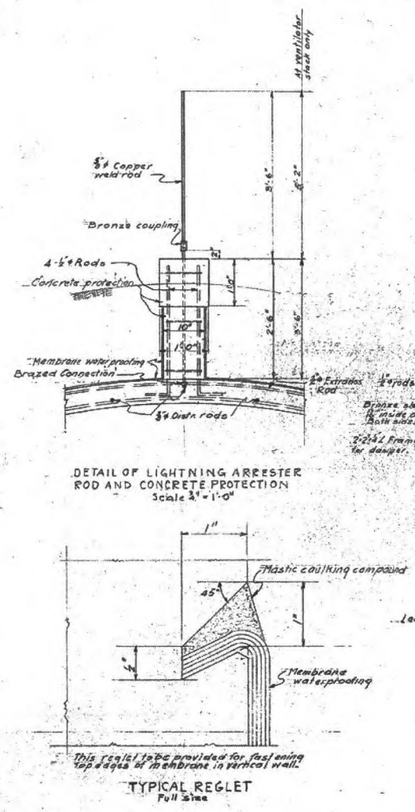
FIGURE V.B.3

DETAILS of REVISIONS	APPROVALS	PRACK & PRACK - ARCHITECTS AND THE CHESTER ENGINEERS
1. Changed partial footing. Added trap section. Changed dist. bar centers as shown. Added pipe sleeve through wall. Added cricket. Added louvered frost line.	ARCHITECT-ENGINEER by [signature] 11/24/41 LONE STAR DEFENSE CORPORATION by [signature] CONSTRUCTING QUARTERMASTER by [signature] FOR THE CHIEF OF ORDNANCE by [signature] Asst. Ch. Engr.	PITTSBURGH, PENNA. TEXARKANA TEXAS
2. Revised Section CC to show frost wall instead of moss footing. Removed frost wall in Section EE. Raised face of wing footing in Section DD. Revised Section to conform to section changes.		REVISIONS 1. 10-28-41 AS 2. 11-4-41 EJ 3. 11-19-41 AS
3. Replaced frost wall with foundation wall lowered wood wall facing strip. Made depth uniform throughout. Added exp. joints.		CONSTRUCTION DIVISION OFFICE of THE QUARTERMASTER GENERAL LONE STAR ORDNANCE PLANT TEXARKANA TEXAS CONTRACT NUMBER W-ORD-516 DA-W-ORD-3
DAY & ZIMMERMANN, INC. REVISIONS ⚠ PROPOSED: 45 MAGAZINES @ 80'-8" x 26'-6" INSIDE, AREA V		AREA S. I. V. W. UNDERGROUND MAGAZINE PLAN, ELEVATIONS, SECTION & DETAILS IGLOO TYPE INSIDE DIM. 26'-6" x [illegible]
		DRAWN BY Toth; CHECKED BY; PLOT N; PRINT NUMBER; DATE 10-20-41; SCALE As Noted; TRACED BY; DRAWING NUMBER 7115 - 1400.4

POOR QUALITY ORIGINAL

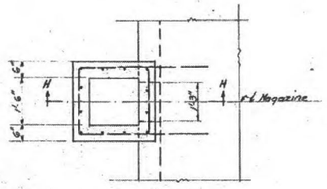


PLAN & DETAILS OF PLATFORM
Scale 1/2" = 1'-0"

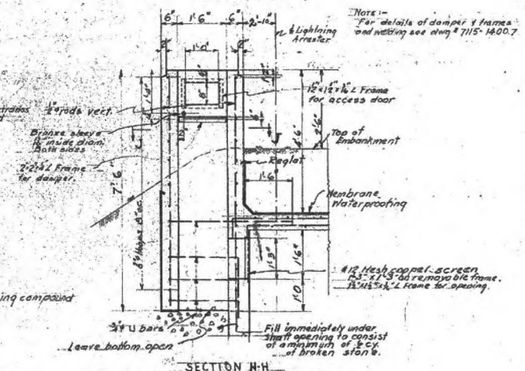


DETAIL OF LIGHTNING ARRESTER ROD AND CONCRETE PROTECTION
Scale 3/4" = 1'-0"

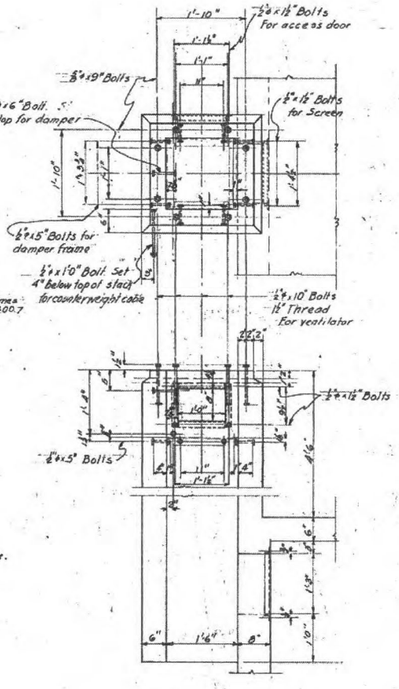
TYPICAL REGLET
Full Size

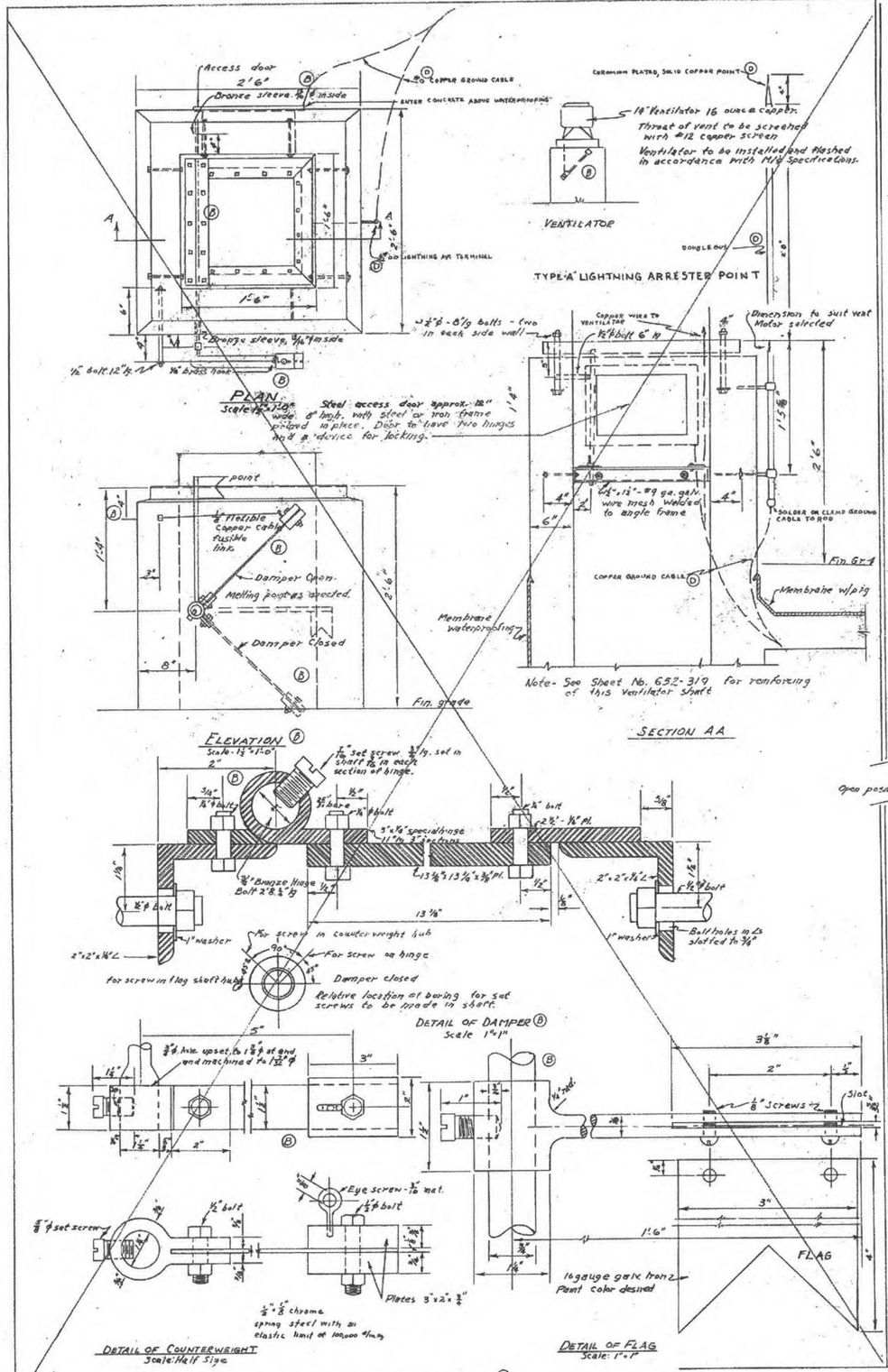


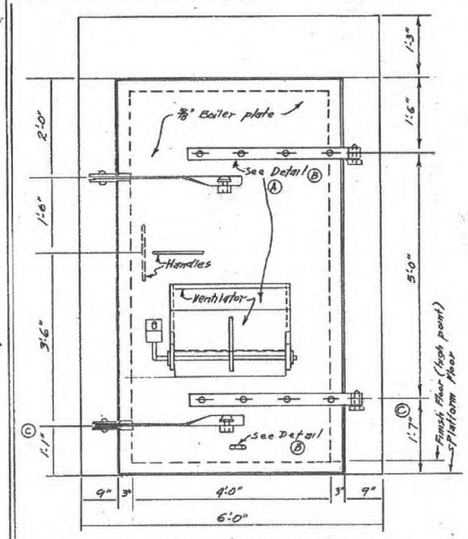
SECTION J-J



SECTION H-H
REAR VENTILATOR STACK
Scale 1/2" = 1'-0"

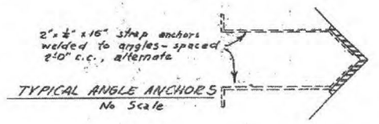

1'-10"
1'-8"
1'-4"
1'-0"
1'-10"
1'-8"
1'-4"
1'-0"
1'-6"
1'-4"
8"
6"
1'-4"
1'-6"
1'-4"
1'-0"
1'-6"
1'-4"
1'-0"
1'-6"
1'-4"
1'-0



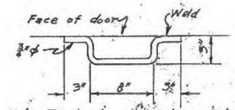


Note - See details for head, jamb and sill sections and for all hardware for operation of door.

ENTRANCE ELEVATION
Scale ¾" = 1'0"

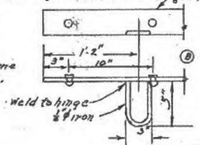


TYPICAL ANGLE ANCHORS
No Scale

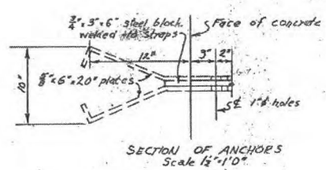


Note - Two handles required - one outside one inside. Mount inside handle vertically, outside horizontally.

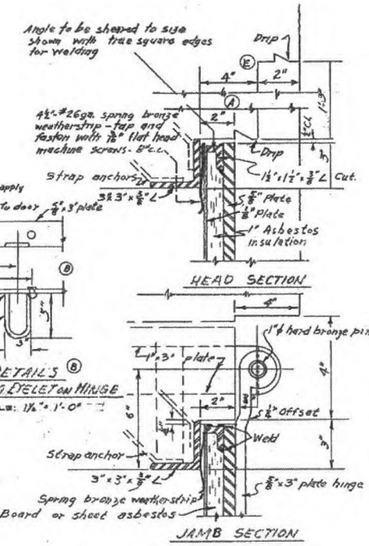
¾" ø HANDLE
Scale 1½" = 1'0"



DETAILS (B) SHOWING EYELET ON HINGE
Scale: 1½" = 1'0"

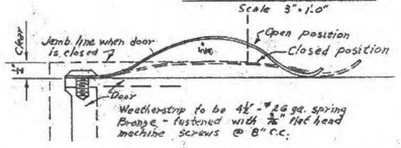


SECTION OF ANCHORS
Scale 1½" = 1'0"

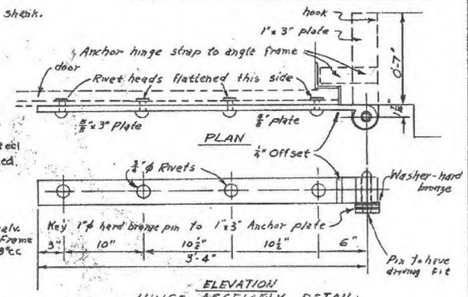


Care shall be taken in construction of this door to assure its proper operation as intended

STEEL DOOR SECTIONS
Scale 3" = 1'0"

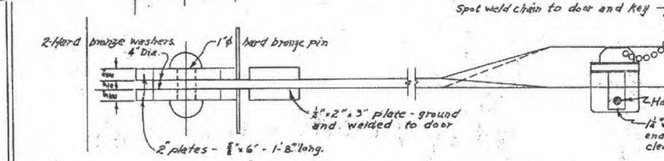


FULL SIZE - BRONZE WEATHER STRIP

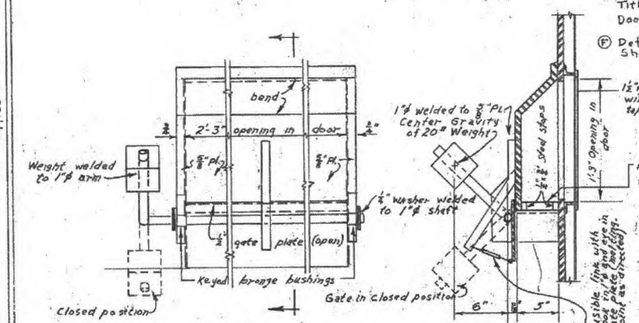


ELEVATION
HINGE ASSEMBLY DETAIL
Scale 1½" = 1'0"

Reproduced from Dept Drawing # 652-3/8 (9-9-41)



DETAIL DOOR LOCK-CLOSER
Scale 3"=1'0"



Note - All joints of plates, etc., in this Ventilator to be continuous tight welds.

DETAIL DOOR VENTILATOR
Scale 1½" = 1'0"

DETAILS OF ENTRANCE DOOR

(E) Old Type Lightning Protection Removed. Title Changed To Apply To Steel Door Only. Eye Plate Detail deleted.

(F) Details of Ventilator Shaft crossed out.

1½"x12" diamond mesh - 9 ga. galv. wire mounted on 1"x1" steel frame tapped to door ⅞" screws @ 8" cc

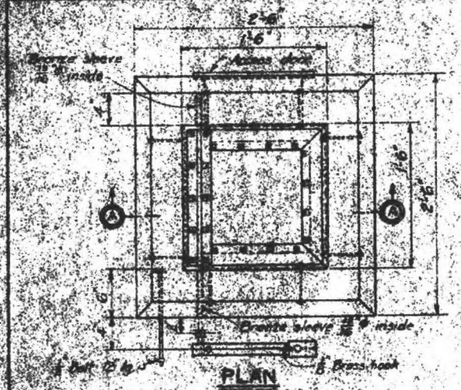
13" opening in door

#12 Copper screen mounted on suitable frame and tapped to ⅞"x⅜" steps

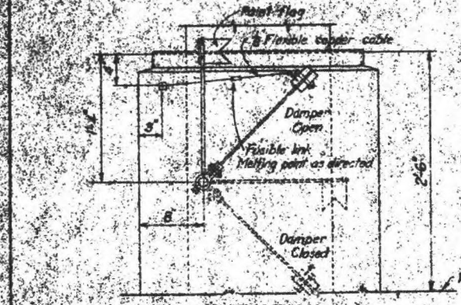
APPROVALS	PRACK & PRACK :: ARCHITECTS AND THE CHESTER ENGINEERS	
ARCHITECT – ENGINEER by ArPrack 10/44	PITTSBURGH, PENNA.	TEXARKANA, TEXAS
LONE STAR DEFENSE CORP by W. B Thompson	CONSTRUCTION DIVISION OFFICE OF THE QUARTERMASTER GENERAL	
CONSTRUCTING QUARTERMASTER by M B Grant Lt Col QMC	LONE STAR ORDNANCE PLANT TEXARKANA, TEXAS CONTRACT NUMBER W ORD-516-QA-W-ORD	
FOR THE CHIEF OF ORDNANCE by Nelson Bennett Lt Col. Ord Dept	AREA 5-TV-W UNDERGROUND MAGAZINE ENTRANCE DOOR DETAILS	
REVISIONS	DRAWN BY	CHECKED BY
TRACED BY	PRINT NUMBER	DATE 10-24-41
		SCALE As Noted
		DRAWING NUMBER 7115 - 1400.6

FIGURE V.B.5

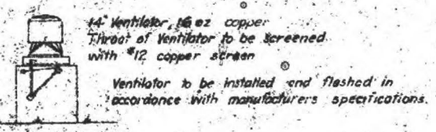
POOR QUALITY ORIGINAL



PLAN
Scale: 1½" = 1'-0"



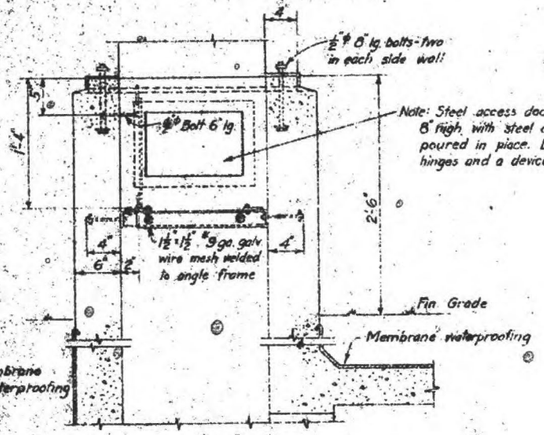
ELEVATION
Scale: 1½" = 1'-0"



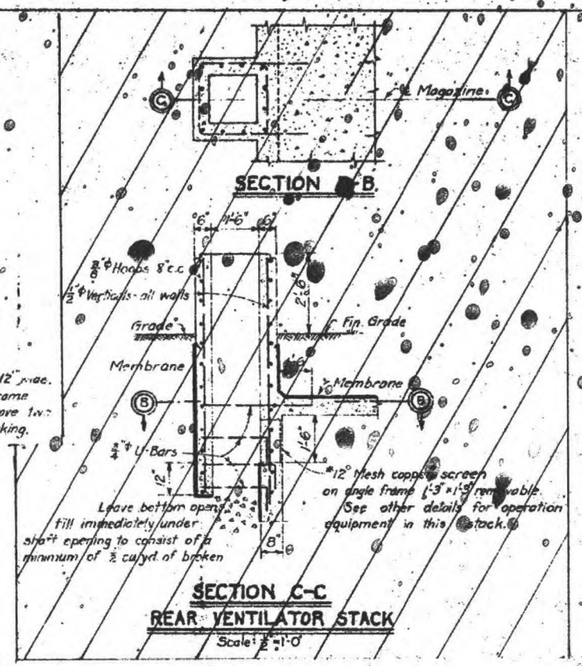
14" Ventilator, 16 oz copper
Throat of ventilator to be screened with #12 copper screen

Ventilator to be installed and flashed in accordance with manufacturers specifications.

VENTILATOR
Scale: ¾" = 1'-0"



SECTION A-A
Scale: 1½" = 1'-0"



SECTION B-B

SECTION C-C
REAR VENTILATOR STACK
Scale: ½" = 1'-0"

Where ventilator stack is to be added to existing magazines, hole for copper screen angle frame to be cut in rear wall.

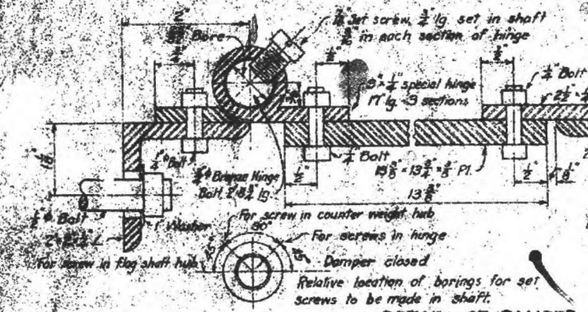
Holes for the lower 3-¾ U-Bars to be cut in rear wall. These bars to be threaded on ends and each anchored against inside face of wall by a hexagonal nut and 3"x¼ washer. Otherwise construction of stack same as indicated for new construction.

General Notes.

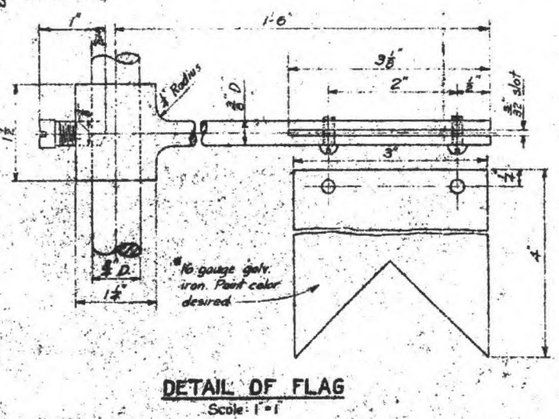
Reinforcement to be welded at intersections and connected by welding to cap of reinforcement in main structure.

Ventilator, screen damper and access door frames to be connected by welding to stack reinforcement.

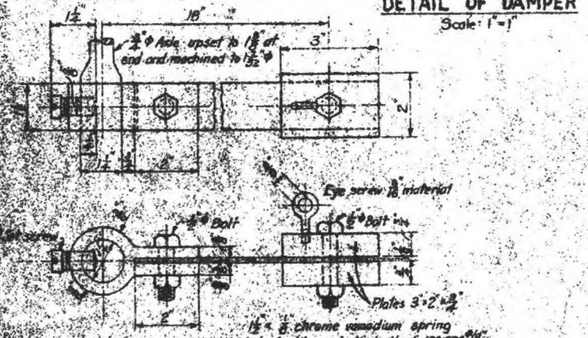
All bronze called for to be Manganese Bronze with an Elastic Limit of 30,000 lbs. per square inch.



DETAIL OF DAMPER
Scale: 1"=1"



DETAIL OF FLAG
Scale: 1"=1"



DETAIL OF COUNTERWEIGHT
Scale: Half Size

FIGURE V.B.6

Reproduced from QMC drawing #657-839

APPROVALS	PRACK & PRACK :- ARCHITECTS AND THE CHESTER ENGINEERS	
ARCHITECT – ENGINEER by Prack	PITTSBURGH, PENNA.	TEXARKANA, TEXAS
LONE STAR DEFENSE CORP. by W.B. Tompkins	REVISIONS	CONSTRUCTION DIVISION OFFICE OF THE QUARTERMASTER GENERAL
CONSTRUCTING QUARTERMASTER by [illegible]		LONE STAR ORDNANCE PLANT TEXARKANA, TEXAS CONTRACT NUMBER W-ORD-516-DA-W-ORD-3
FOR THE CHIEF OF ORDNANCE by [illegible]		AREAS-1, VIEW UNDERGROUND MAGAZINE VENTILATOR & DAMPER DETAILS
	DRAWN BY	CHECKED BY / DATE 10-24-41 / SCALE As Noted
	TRACED BY	PRINT NUMBER / DRAWING NUMBER 7115-1400-7

POOR QUALITY ORIGINAL

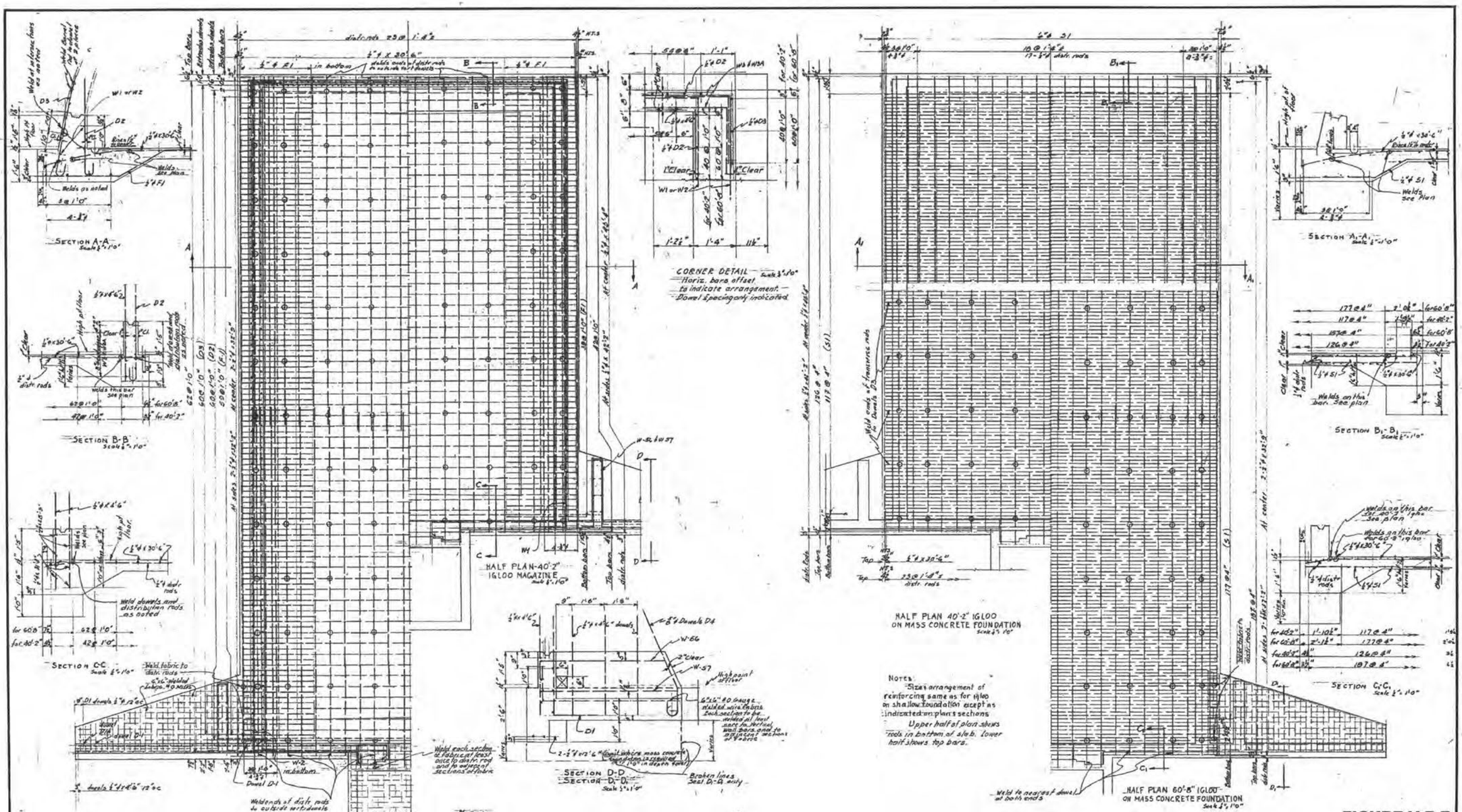
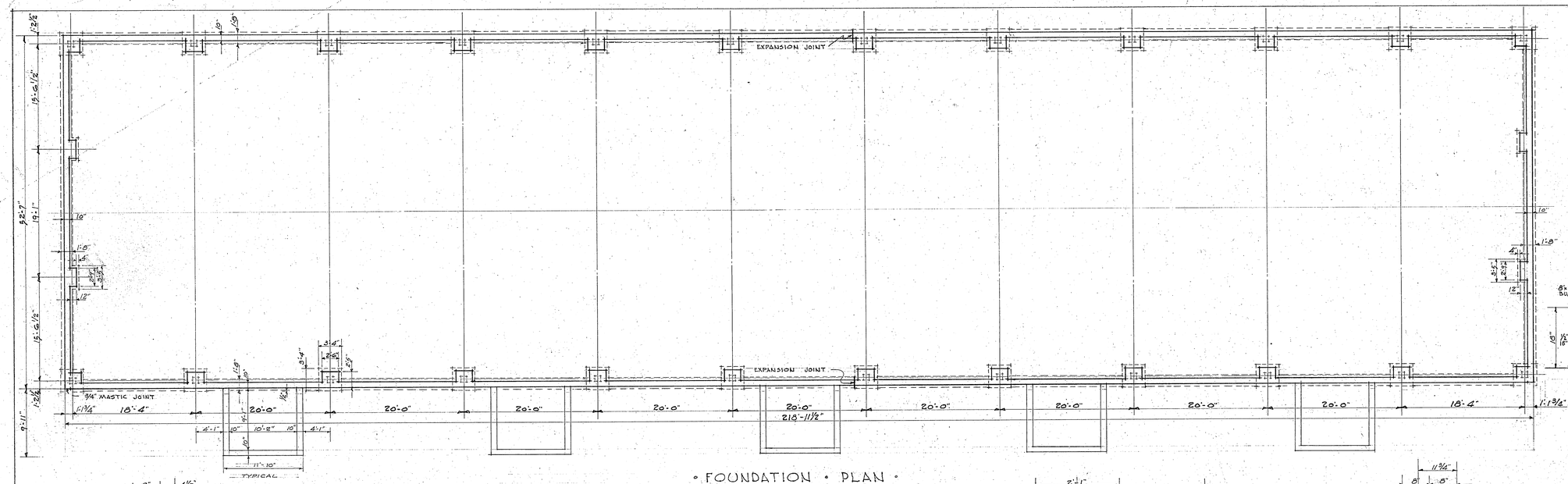


FIGURE V.B.7

DETAILS OF REVISIONS	APPROVALS	PRACK & PRACK :: ARCHITECTS AND THE CHESTER ENGINEERS
	ARCHITECT — ENGINEER by [signature] 10/24/41	PITTSBURGH, PENNA. — TEXARKANA, TEXAS
	LONE STAR DEFENSE CORP. by [signature] Vice Pres.	REVISIONS
	CONSTRUCTING QUARTERMASTER by [signature] Lieut. Q.M.C.	CONSTRUCTION DIVISION OFFICE OF THE QUARTERMASTER GENERAL
	FOR THE CHIEF OF ORDNANCE by Fred M. Shell Asst. Ch. Ord. Depr.	LONE STAR ORDNANCE PLANT TEXARKANA, TEXAS CONTRACT NUMBER W-ORD-516-DA-W-ORD-3
		AREA I, VIEW
		UNDERGROUND MAGAZINE BAR PLACING AND WELDING DETAILS
		INSIDE DIMENSION 26'6" (40'-0" & 60'-8") IGLOO TYPE
		DRAWN BY Toth — CHECKED BY A.L.D. — DATE 8-27-41 — SCALE As Noted
		TRACED BY — DRIVE NUMBER — DRAWING NUMBER 7115-1400-8

POOR QUALITY ORIGINAL



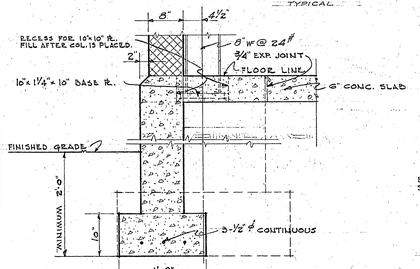
• FOUNDATION • PLAN •

SCALE 1/8" = 1'-0"

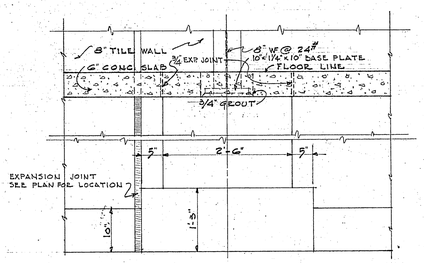
• GENERAL • NOTES •

REINFORCING

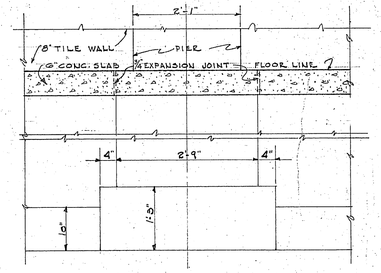
WALL FOOTING - 1-8" x 10" - 5-½" ϕ CONTINUOUS.
10" CONC. WALL -
½" ϕ VERTICAL @ 12" c/c STAG. ½" ϕ HORIZONTAL @ 12" c/c STAG. EACH FACE.
PEDESTALS - BOTH COLUMNS & PIERS - 6 - ⅝" ϕ DOWELS - 6 - ¾" ϕ VERTICAL - ⅜" HOOPS @ 10" c/c.
COLUMN & PEDESTAL FOOTINGS - 8 - ½" ϕ EA. WAY.



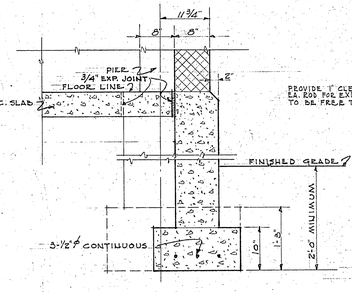
TYPICAL SECTION THRU FRONT & REAR WALLS
SCALE ¾" = 1'-0"



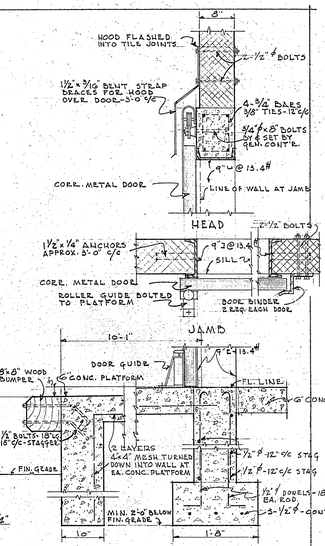
ELEVATION OF TYPICAL COL. FOOTING
SCALE ¾" = 1'-0"



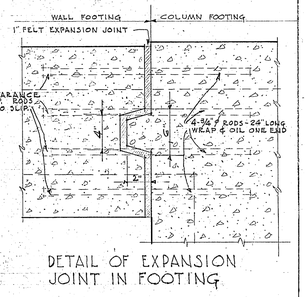
ELEVATION OF TYPICAL PIER FOOTING
SCALE ¾" = 1'-0"



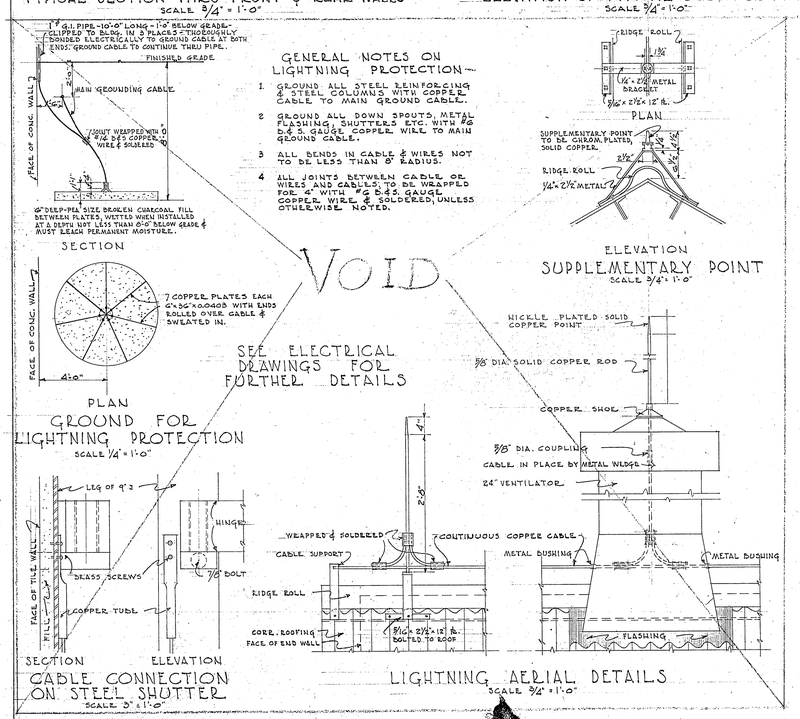
TYPICAL SECTION THRU END WALLS
SCALE ¾" = 1'-0"

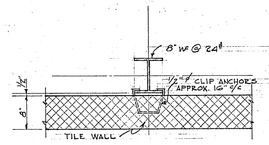


DETAIL OF SLIDING DOOR
SCALE ¾" = 1'-0"

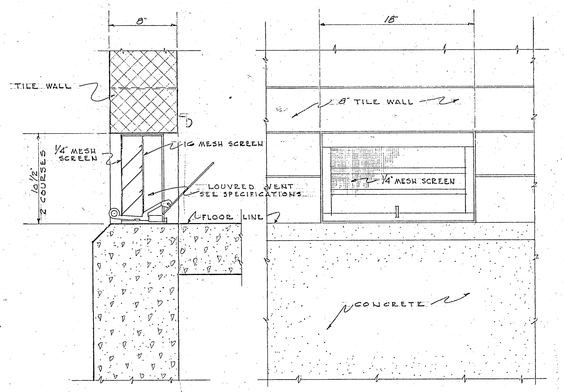


DETAIL OF EXPANSION JOINT IN FOOTING

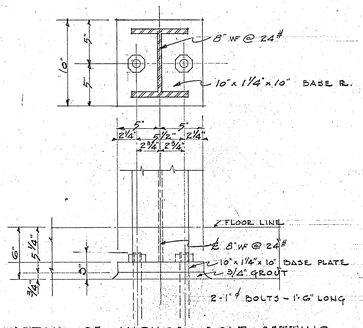




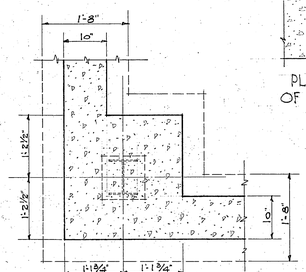
DETAIL OF WALL ANCHORS
SCALE ¾" = 1'-0"



DETAIL OF WALL VENTS
SCALE 1½" = 1'-0"

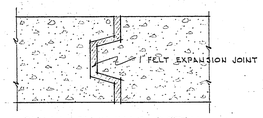


DETAIL OF ANCHOR BOLT SETTING
SCALE 1½" = 1'-0"



PLAN OF TYPICAL CORNER FOOTING
SCALE ¾" = 1'-0"

AREA - "U"



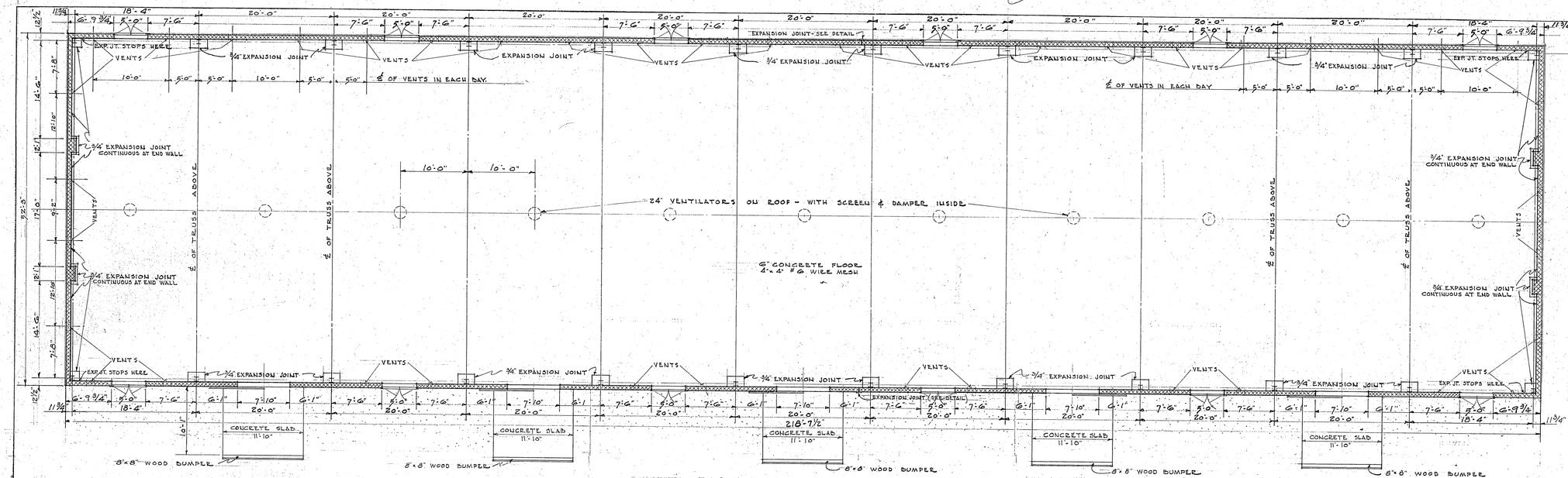
PLAN SHOWING DETAIL OF VERTICAL EXP. JOINT
SCALE 1½" = 1'-0"

DETAILS OF REVISIONS	APPROVALS	PRACK & PRACK ARCHITECTS AND THE CHESTER ENGINEERS — PITTSBURGH, PENNA. — TEXARKANA, TEXAS
10-16-41 EXPANSION JT. BETWEEN FLOOR SLAB & FOUNDATION WALL ADDED. TOP OF PEDESTALS RAISED TO FLOOR LINE; DETAIL OF CONNEC. FOOTING ADDED. ½"x8" PLATE AT EACH BOLT IN WOOD BUMPER ADDED. 10-24-41 EXPANSION JT. BETWEEN FLOOR SLAB & FOUNDATION WALL ALONG BOTH SIDE WALLS OMITTED, ONE VERTICAL EXPANSION JOINT OMITTED, OTHER RELOCATED. PLATE AT EACH BOLT IN WOOD BUMPER OMITTED. DOOR BINDER ADDED. FLAT ANCHORS FOR WOOD OVER DOORS REPLACED BY ½" ϕ BOLTS. DETAIL OF WALL ANCHORS ADDED. 2-10-42 REMOVE 6" STONE FILL FROM DETAILS. 2-23-42 REMOVE FRONT 10" CONC. CURB. ADDED PLATFORM CURBS.	ARCHITECT ENGINEER by W.P. Brearley Jr. LONE STAR DEFENSE CORP. by H.B. Thompson 10/2 CONSTRUCTING QUARTERMASTER by Clinton C. Harvey Capt. Q.M.C. FOR THE CHIEF OF ORDNANCE by J.J. Brennan Jr. 10/2/41	CONSTRUCTION DIVISION OFFICE OF THE QUARTERMASTER GENERAL LONE STAR ORDNANCE PLANT TEXARKANA, TEXAS CONTRACT NUMBER W-ORD-516-DA-W-ORD-3 STANDARD AMMUNITION MAGAZINE FOUNDATION PLAN & DETAILS

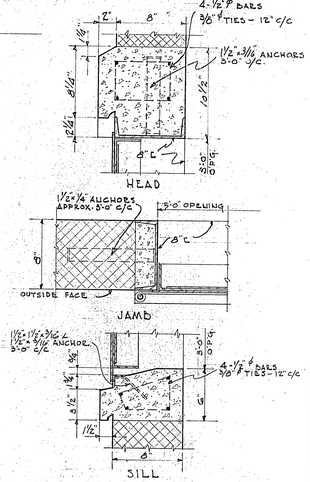
REVISIONS
10-16-41 F.E.L.
10-24-41 F.E.L.
2-23-42 M.I.O.

DRAWN BY	CHECKED BY	DATE	SCALE
F.E.L.	Burgh	10-9-41	AS NOTED
TRACED BY	PRINT NUMBER	DRAWING NUMBER	
		7115-1375.1	

7115-1375.1



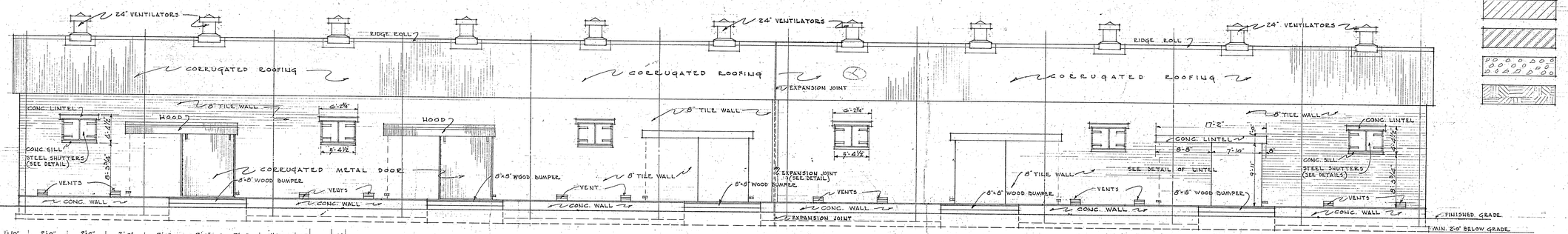
FIRST FLOOR PLAN
SCALE ⅛" = 1'-0"



DETAIL OF STEEL SHUTTERS
SCALE 1½" = 1'-0"

LEGEND

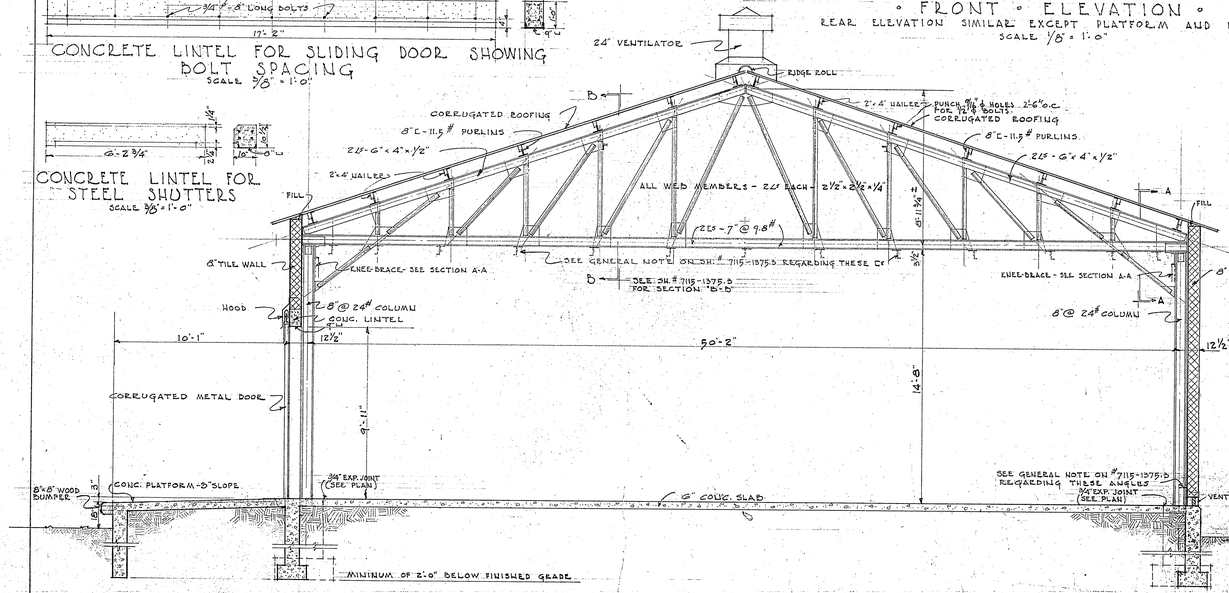
- CONCRETE
- TILE
- METAL
- STONE
- EARTH



FRONT ELEVATION
REAR ELEVATION SIMILAR EXCEPT PLATFORM AND DOORS
SCALE ⅛" = 1'-0"

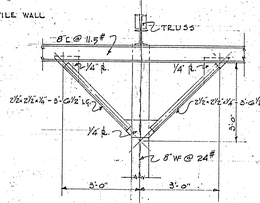
CONCRETE LINTEL FOR SLIDING DOOR SHOWING BOLT SPACING
SCALE ⅜" = 1'-0"

CONCRETE LINTEL FOR STEEL SHUTTERS
SCALE ⅜" = 1'-0"



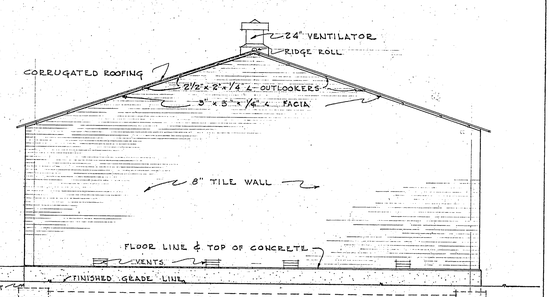
TYPICAL CROSS SECTION
SCALE ¼" = 1'-0"

REFERENCE DWGS:
7115-1377-ORP-FL PLAN, ELEVS. (ALTERATIONS)
7115-1377-IRP-DETAILS
7115-1377-ZRP-RAMP
SK-41-U DRAINAGE



SECTION A-A
SCALE ⅜" = 1'-0"

GENERAL NOTE
ALL 9" ℄ DOOR BUCKS, INCLUDING 9" ℄ IN LINTEL, BY DOOR CONTRACTOR.



RIGHT END ELEVATION
LEFT END ELEVATION OPPOSITE HAND
SCALE ⅛" = 1'-0"

AREA - "U".

DETAILS OF REVISIONS
10-16-41 EXPANSION JOINT BETWEEN FLOOR SLAB & FOUNDATION WALL ADDED.
10-24-41 EXPANSION JOINT BETWEEN FLOOR SLAB & FOUNDATION WALL ALONG BOTH SIDE WALLS OMITTED. ¾" MASTIC JOINTS IN FLOOR SLAB OMITTED. ¾" MASTIC JOINTS BETWEEN PLATFORM & BUILDING, OMITTED. ONE VERTICAL EXPANSION JOINT OMITTED, OTHER RELOCATED.
2-10-42 REMOVED 10" CONC. WALL & GRAVEL. REMOVED STONE FILL FROM UNDER SLAB

APPROVALS

ARCHITECT ENGINEER
by W.B. Breed jr

LONE STAR DEFENSE CORP.
by W.B. Thompson Jr/s

CONSTRUCTING QUARTERMASTER
by Clinton O. Francis
Supt. R.M.S. Ex.

FOR THE CHIEF OF ORDNANCE
by J.J. Green jr
10.1.41

PRACK & PRACK ARCHITECTS AND THE CHESTER ENGINEERS
PITTSBURGH, PENNA. TEXARKANA, TEXAS

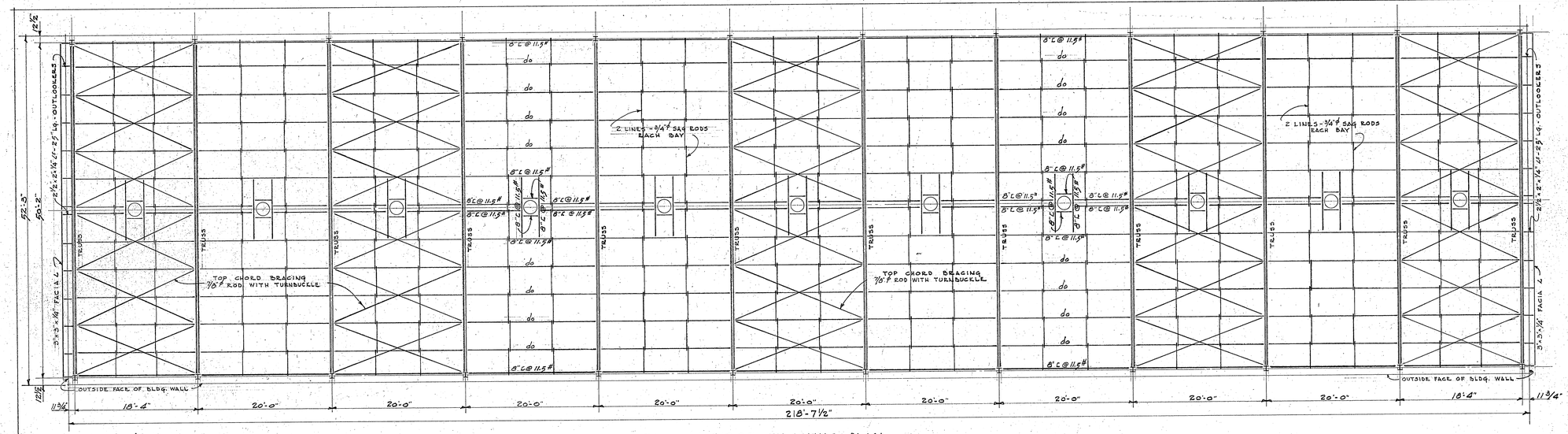
REVISIONS
10-16-41 F.E.L.
10-24-41 F.E.L.
2-10-42 M.J.G.

– CONSTRUCTION – DIVISION –
OFFICE OF THE QUARTERMASTER GENERAL

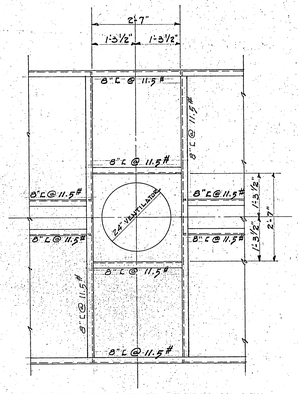
LONE STAR ORDNANCE PLANT
TEXARKANA, TEXAS
CONTRACT NUMBER W-ORD-316-DA-W-ORD-3

STANDARD AMMUNITION MAGAZINE
FLOOR PLAN - ELEVATIONS - SECTION

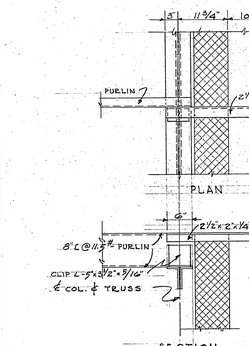
DRAWN BY	CHECKED BY	DATE	SCALE
F.E.L.	Bre	10-9-41	AS NOTED
TRACED BY	PRINT NUMBER	DRAWING NUMBER	
		7115-1375.2	



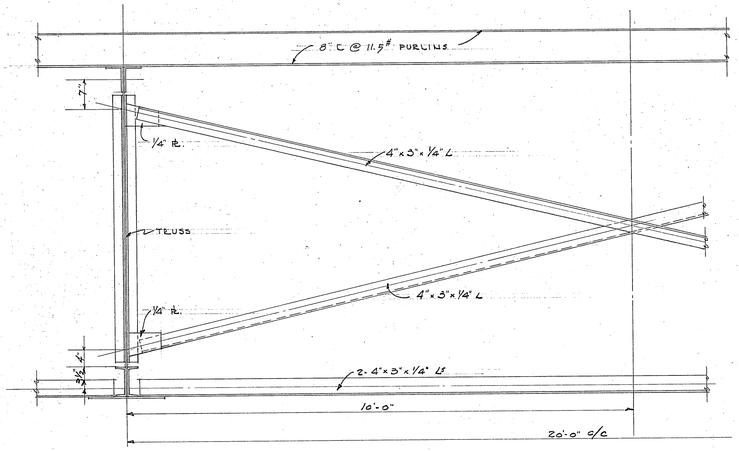
ROOF FRAMING PLAN
SCALE 1/8" = 1'-0"



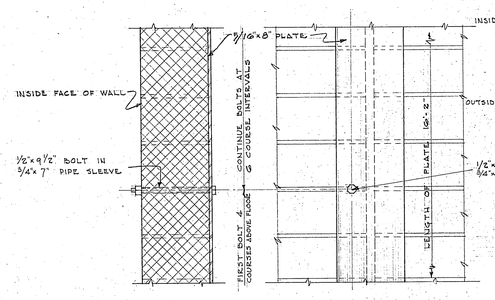
DETAIL OF VENTILATOR FRAMING
SCALE ½" = 1'-0"



DETAILS OF OUTLOOKERS BOTH ENDS OF BLDG.
SCALE ¾" = 1'-0"

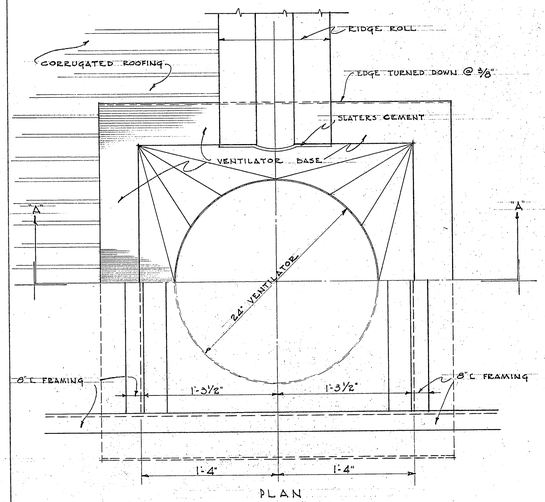


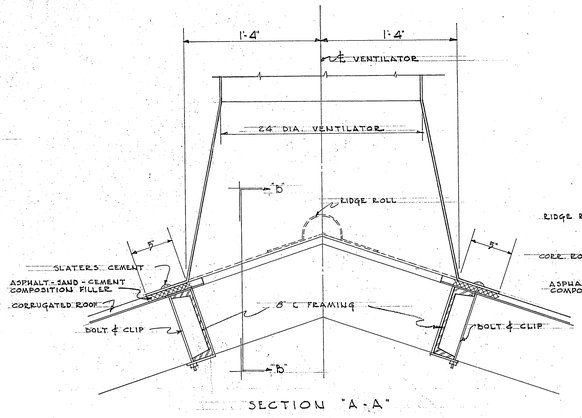
SECTION "B-B"
AS INDICATED ON ½" SCALE CROSS SECTION
SCALE ¾" = 1'-0"

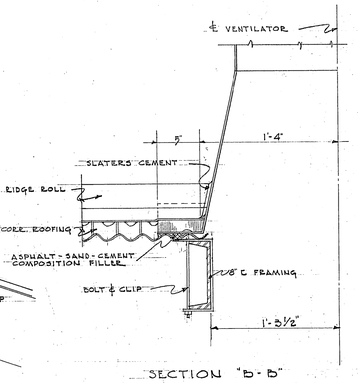


NOTE: EXACT SPACING OF BOLT HOLES TO BE DETERMINED IN FIELD.

DETAIL OF EXPANSION JOINT IN 8" TILE WALL
SCALE 1½" = 1'-0"







DETAIL OF SETTING FOR 24" VENTILATORS
SCALE 1½" = 1'-0"

GENERAL STEEL NOTES

ALL 4"x4"x3/16" OVER VENTS SHOWN ON WISCONSIN BRIDGE & IRON CO'S. DRAWING - SHEET # F-1, CONTRACT # G781 ARE TO BE PLAIN ANGLES, WITHOUT ANCHORS, EXCEPT 6800 FEET, TO WHICH ANCHORS SHALL BE WELDED ON INSIDE.
ALL 6"∠@ 8.2# CEILING CHANNELS TOGETHER WITH THE 5"x3½"x⅜" CONNECTION ANGLES ARE TO BE PLAIN MATERIAL WITHOUT ANY HOLES. THIS ALSO APPLIES TO ALL OF THE 5"x3½"x⅜" ANGLES MAKING UP THE WATCHWAY FRAMES IN CEILING.
THE BOTTOM CHORDS OF ALL ROOF TRUSSES ARE NOT TO BE PUNCHED FOR THE CEILING CHANNEL CONNECTIONS.
THE SAG RODS FOR THE CEILING CHANNELS ARE TO BE FURNISHED AS SHOWN ON THE CEILING FRAMING PLAN.
FOR LINTELS MARKED "A" THE 2½"x2½"x¼" ANGLES ARE TO BE LOOSE AND WITHOUT ANY HOLES.
THE MATERIALS REFERRED TO ABOVE ARE SHOWN ON W.B.&I. CO'S. DRAWINGS - SHEETS # F-1, AND # E-2, CONTRACT # G781.
THE CURB ANGLES 4"x4"x⅜", FOR PLATFORMS ARE TO BE FURNISHED AS SHOWN ON W.B.&I. CO'S. DRAWING # F-1, CONTRACT # G781.
ALL STEEL TO BE GIVEN ONE COAT OF SHOP PAINT.
ALL 2"x2"x¼" SILL ANGLES SHOWN ON W.B.&I. CO'S. DRAWING - SHEET "F-1, CONTRACT # G781, ARE TO BE PLAIN ANGLES, WITHOUT ANCHORS. ANCHORS TO BE SHIPPED LOOSE.

DETAILS OF REVISIONS	APPROVALS	PRACK & PRACK ARCHITECTS AND THE CHESTER ENGINEERS — PITTSBURGH, PENNA. — TEXARKANA, TEXAS
10-16-41 DETAIL OF VENTILATOR SETTING ADDED.	ARCHITECT ENGINEER by W.B.Skeggs Jr.	REVISIONS: 10-16-41 F.E.L.
	LONE STAR DEFENSE CORP. by H.B.Thompson 12/2	CONSTRUCTION DIVISION — OFFICE OF THE QUARTERMASTER GENERAL
	CONSTRUCTING QUARTERMASTER by Timothy C. Chauncey Capt. C.M.P.C., FOR THE CHIEF OF ORDNANCE.	LONE STAR ORDNANCE PLANT — TEXARKANA, TEXAS — CONTRACT NUMBER W-ORD-516-DA-W-ORD-3
	by J.J.Breen 12/3/41	STANDARD AMMUNITION MAGAZINE — ROOF FRAMING PLAN - STEEL DETAILS
		DRAWN BY F.E.L. — CHECKED BY — DATE 10-9-41 — SCALE AS NOTED. — TRACED BY — PRINT NUMBER — DRAWING NUMBER 7115-1375.3

7115-1375.3.

218'-7½"

"A" PANEL
14 Circuit Panel with 100 Amp Sub Main for Panel "B" Enclosed in weather proof housing.

200 Amp. 2 pole Fused Disc. Switch

To Ramp L A 12

3#2-11/2"C. Run under eaves

"B" PANEL
14 Circuit Panel enclosed in weather proof housing.

4x4 posts.

NOTE
See Ramp Dwg. for continuation & complete Lighting

New Ramp between Buildings U1-3 & U1-4. See Dwg. No 7115-1377.2 E.P.

Cut new door opg. to new ramp in this end of Building U1-3

Cut new door opg. to new ramp in this end of Building U1-4

New doors, transoms and frames to be installed in present masonry openings after sliding doors are removed. See details Dwg. No 7115-1377.1 E.P.

New Lighting 200w. each outlet

New Lights

New Wd. opg.

32'-8"

26'-11½"

NOTE
The west bay in Building U1-1 to be remodeled into Locker and Lunch Rooms. See Dwg. No 7115-1377.1 E.P. for plan - elevations and details.

Light outlets this Bay in Bldg U1-1 as required are shown on plan. Dwg. No 7115-1377.1 E.P. Where tie wall occurs under truss in this Bay, omit lights under truss

L-B9 & L-B10 circuits in Bldg U1-1 will serve Locker & Lunch Rooms.

New wood sh.

New Door opg.

Seal

3 way

Cut present wall back to floor slab and extend new platform slab into this point. Form a ½" th. expansion joint between old & new slabs. Smooth off all rough concrete at door openings.

NOTE

New conc. platform

See detail.

12'-0"

NOTE
Remove Steel Shutters on all 18 Shuttered Opgs. and install stationary wood sash in these openings
See Dwg. No 7115-1377.1 E.P.

4x4 posts for fastening doors open.

NOTE
See Drawing No 7115-1377.1 E.P. for details of new frames - doors - transoms & windows

N

TYPICAL FIRST FLOOR PLAN
FOR BUILDINGS U1-1 · U1-3 & U1-4
Scale 1/8" = 1 foot

NOTE:
ALL DOORS ON SOUTH ELEVATION TO REMAIN. CORR. METAL AS SHOWN ON DRAWING No 7115-1375.2

New windows in U-1-1 only. See plan Dwg. No 7115-1377.1 E.P.

Conc. Lintel remains.

Light

Remove present sliding doors, Track & head to remain

New doors, transom and frames

Line up with present opgs.

Light

Stretcher course Brick Lintels (4 courses) supported on 2-6x6x⅜" L's

Steel Shutters on these 12 openings to be removed and new wood sash installed.

EXTEND DOOR HEIGHT

Cement sills

4x4 wood posts

Floor Line

3'-0" Minimum

NORTH ELEVATION
Scale 1/8" = 1 foot

NOTE
Floor Line to Grade, North side 2'-0" on Building U-1-1 4'-0" on Buildings U-1-3 and U-1-4.

PARTIAL ELEVATION OF SOUTH SIDE
Typical for all door openings on South showing new doors, transom and frame to be installed in masonry openings at present door openings after sliding doors are removed.
See Dwg. No 7115-1377.1 E.P. for details

NOTES and REFERENCES
All sliding doors and steel shutters removed to be turned over to Lone Star Defense Corp.
For details of New door and window openings, see Dwg. No 7115-1377.1 E.P.
For details New Ramp between Bldgs. U-1-3 & U-1-4 see Dwg. No 7115-1377.2 E.P.
For alterations in West Bay of Bldg. U-1-1 see Dwg. No 7115-1377.1 E.P.
For Railroads see Dwgs. Nos 7115-184.1 E.P. & 7115-184.2 E.P.

3#2-11/2"C. Run under eaves

14 Circuit Panel Enclosed in weather proof housing

"B"

200 Amp. 2 pole Fused Disc. Switch

"A" 14 Circuit Panel with 100 Amp Sub Main for Panel "B" Enclosed in weather proof housing.

3#3/0-2"C.

Ground

Grade Line

3#3/0-3" Fibre Duct

TYPICAL LIGHTING CIRCUIT DIAGRAM
No Scale

ELECTRICAL
All branch circuits to be sealed off before leaving building.
100w. outlets over doors on exterior.
200w outlets for interior.
Poles, 40' pole - Class #2 for Transformers, Class #4 for balance.
All Light Fixtures, exterior and interior as 3 in these buildings to be Explosion Proof.

Grouse-Hinds Sreuipvent Seal-Off Fitting.

To Panel

Main Service Sw.

Minimum depth 2'-6"

2'-0" Rod

Coupling

ELEC. SERVICE ENTR. DETAIL.

Steel Trusses

Typical of Lighting at ℄ below trusses

Typical of Lighting between Trusses

10'-0"

½" Expansion joint

Drill wall 4" deep and install ⅝ ϕ expansion bolts. Weld ⅜"x3½" rods to bolts. Space 12" o.c.

· TYPICAL · CROSS · SECTION ·
Scale 1½" = 1'-0

REFERENCE DWGS:
7115-1375.2 - ORIGINAL BLDG., FL. PLAN, ELEV.
7115-1377.1 E.P. - DETAILS
7115-1377.2 E.P. - RAMP

12'-0"

Cut present floor back 2'-10" at foundation and extend new slab to this point.

Reinforce slab with 6x6 wire mesh

2-½ϕ rods continuous

Tamped fill of sand or gravel

2'-0" for Bldg U-1-1
4'-0" for Bldgs U-1-3 and U-1-4

Minimum of 3'-0" below finish grade.

8"

SECTION THROUGH NEW NORTH PLATFORMS.

Fence

Patrol Road

New platforms

New Railroad See Dwgs. Nos 7115-184.1 E.P. & 7115-184.2 E.P.

New platforms with gravel roads

U1-1

U1-3

New Ramp

U1-4

T25

Road

NOTE
Present pole

13.2/primary

For Alterations this west bay see Dwg. No 7115-1377.1 E.P.

Primary Wire #6 Hard Drawn, Bare. Pole spacings shall be approx. 125'.

See Dwg. No 7115-1377.2 E.P.

N

PLOT PLAN OF "U1" LINE
Scale 1" = 200'

DETAILS OF REVISIONS	APPROVALS
1 Electrical Work revised and completed. Notes added. 4x4 posts added for fastening doors when open.	ARCHITECT - ENGINEER. By A. Brack 6/13/44
2 Revisions made on Ramp Lighting to conform to Ramp Lighting Layout on Dwg. No 7115-1377.2 E.P.	LONE STAR DEFENSE CORP. By John Le Quinn 6-13-44 DISTRICT ENGINEER
3 Changed Light Fixtures from Dust Proof Type to Explosion Proof Type.	FOR THE CHIEF OF ORDNANCE By [illegible] LT. COL. ORDNANCE

PRACK & PRACK · ARCHITECTS AND THE CHESTER ENGINEERS
PITTSBURGH, PENNA. TEXARKANA, TEXAS

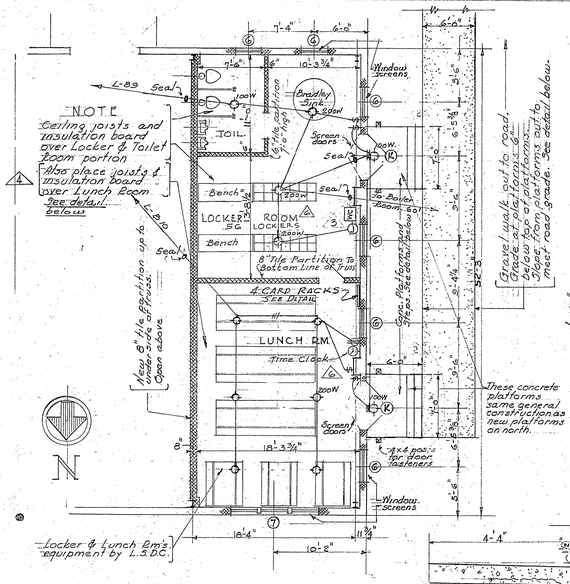
U.S. ARMY ENGINEERS OFFICE
DENISON · TEXAS

LONE STAR ORDNANCE PLANT
TEXARKANA · TEXAS

REVISIONS	
1	4/28/44 V.J.D.
2	7/15/44 V.J.D.
3	7-15-44 REC

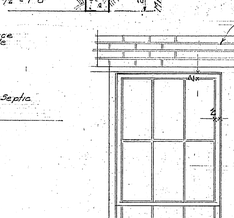
ALTERATIONS TO BUILDINGS U-1-1, U-1-3, U-1-4, AREA "U" [RENOVATION PROGRAM]
PLANS - ELEVATIONS - SECTION - DETAILS

DRAWN BY	APPROVED BY	DATE	SCALE
V.J.D.		6/13-44	As Noted
TRACED BY	PRINT NUMBER	DRAWING NUMBER	7115-1377.0 E.P.

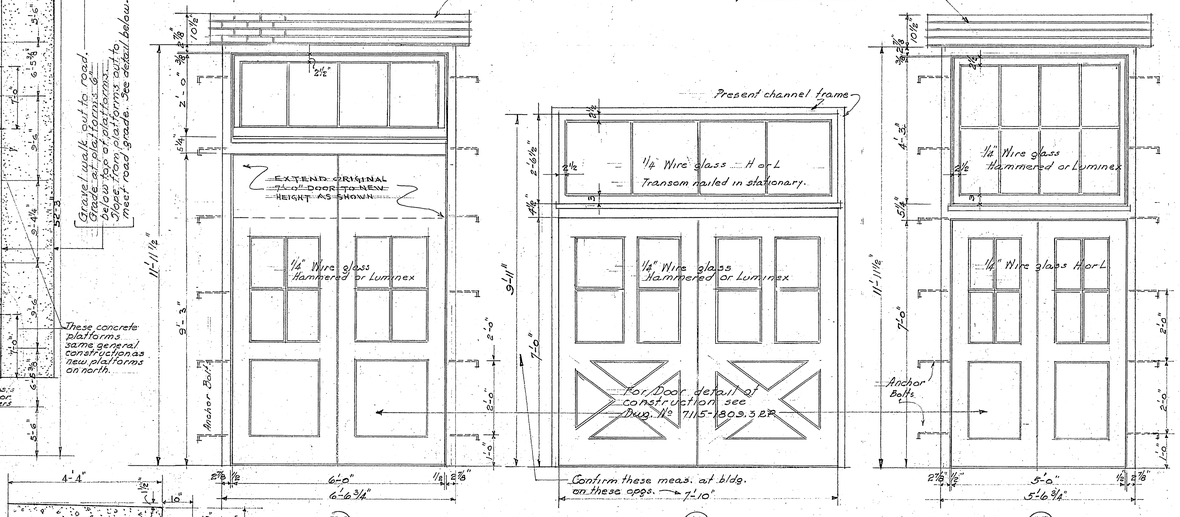


FLOOR PLAN OF WEST BAY IN BUILDING U-1-1 Scale 1/8"=1'-0"

Showing remodeling required to add Locker and Lunch Rooms.

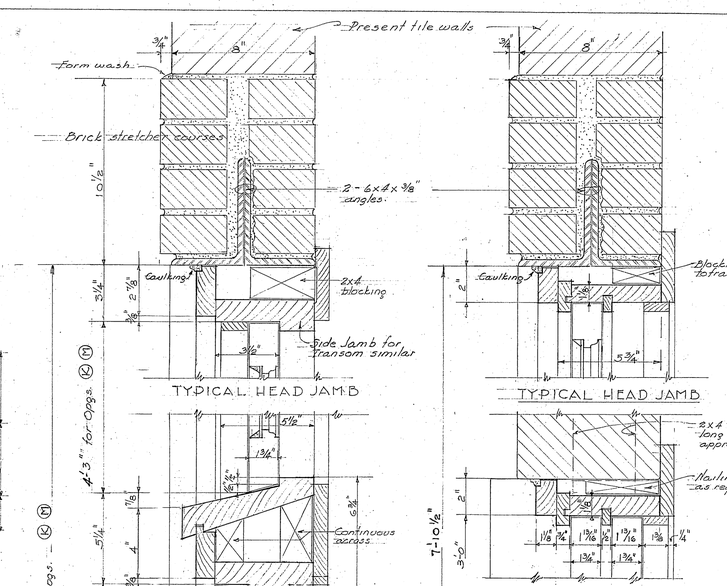


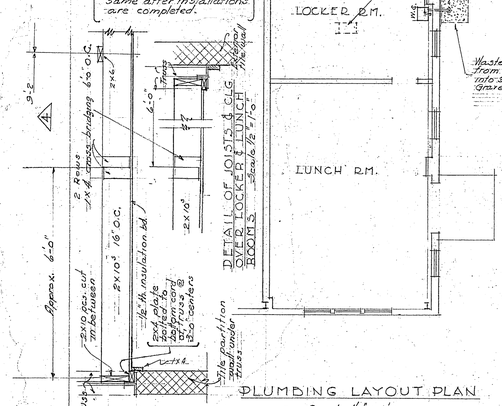
STEPS AT PLATFORMS Scale 1/2"=1'-0"



DOOR DETAILS

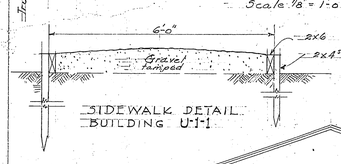
Scale 1/2"=1'-0"



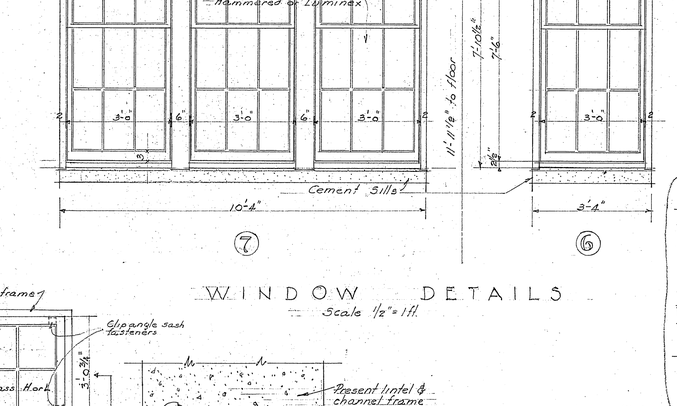


PLUMBING LAYOUT PLAN

Scale 1/8"=1'-0"

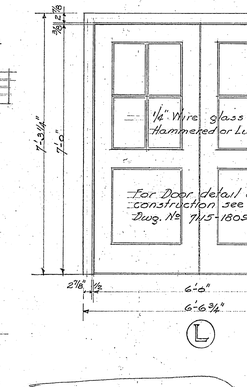


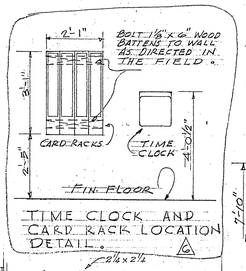
SIDEWALK DETAIL BUILDING U-1-1

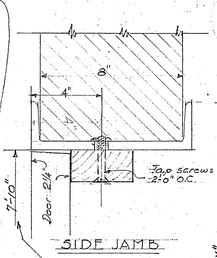


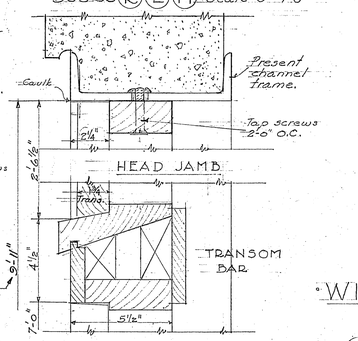
WINDOW DETAILS

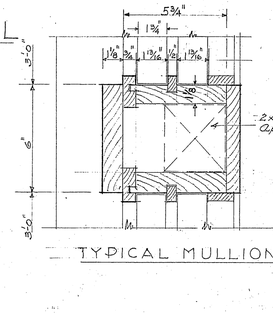
Scale 1/2"=1'-0"

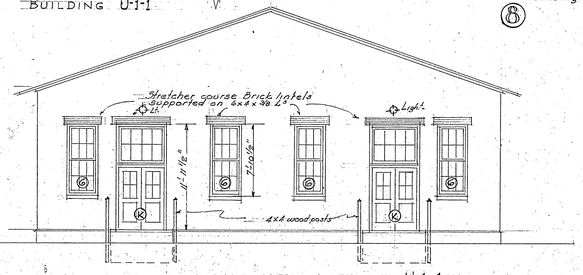








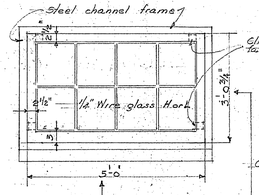




WEST ELEVATION BLDG. U-1-1

Showing new windows and door openings added.

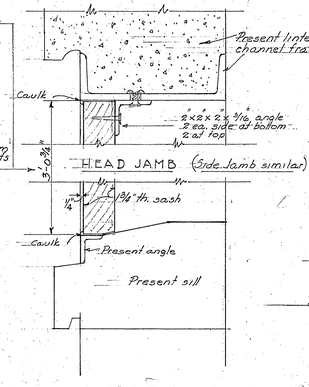
Scale 1/8"=1'-0"



NOTE

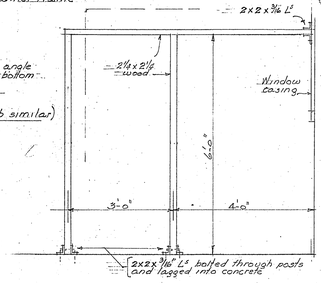
Contractor to confirm these measurements at building.

8

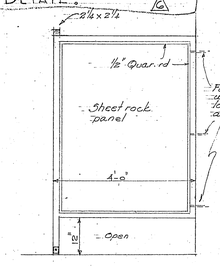


SASH DETAILS FOR OPG. 8

Scale 3"=1'-0"



FRONT



SIDE ELEV.

PLAN

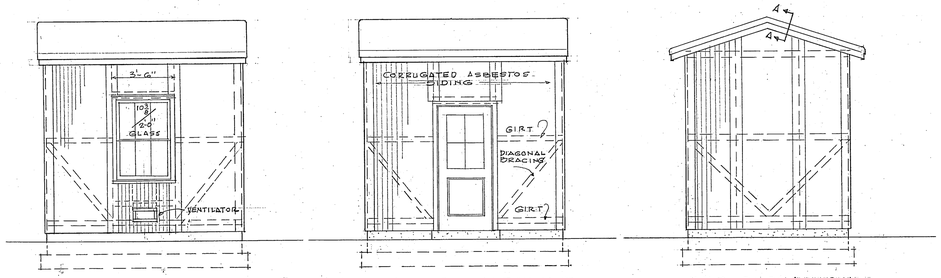
TOILET PARTITIONS

Scale 1/2"=1'-0"

REFERENCE DWGS:

7115-1375.2 — ORIGINAL BLDG., FL. PLAN, ELEV.
7115-1377.0 RP — PLAN, ELEV. (ALTERATIONS)
7115-1377.2 RP — DETAILS OF RAMP

DETAILS OF REVISIONS	APPROVALS	PRACK & PRACK · ARCHITECTS AND THE CHESTER ENGINEERS
1 Electrical Work revised & completed. Notes added. Gravel pit drains added for Water Coolers. 4x4 posts added for fastening doors when open. Water Service entrance relocated.	ARCHITECT-ENGINEER By A. Prack 6/13/44	PITTSBURGH, PENNA. TEXARKANA, TEXAS.
2 Steps to West Platforms revised and detail of same added.	LONE STAR DEFENSE CORP. By [illegible] DISTRICT ENGINEER. By [illegible] FOR THE CHIEF OF ORDNANCE By [illegible] LT. COL. ORDNANCE	REVISIONS: 1 6/28/44 V.J.D; 2 7/6-44 V.J.D; 3 7-15-44 REC; 4 8/2-44 V.J.D; 5 8-17-44 REC; 6 8-24-44 REC
3 Revised electrical wiring at W.C.'s and added junction boxes. Changed size of light in toilet.		U.S. ARMY ENGINEERS OFFICE DENISON · TEXAS
4 Ceiling joists & insulation added over Lunch Room. Details for these joist & slab added.		LONE STAR ORDNANCE PLANT TEXARKANA · TEXAS
5 REMOVED W.C. FROM LUNCH RM. ADDED SWITCH AND RECEPTACLES IN LUNCH RM. & LOCKER RM.		ALTERATIONS TO BUILDINGS U-1-1, U-1-3, U-1-4, AREA "U" [RENOVATION PROGRAM] PLANS - ELEVATIONS - DETAILS.
6 REVISED LOCKERS. ADDED TIME CLOCK & CARD RACK.		DRAWN BY V.J.D. TRACED BY — APPROVED BY — DATE 6/13-44 — SCALE As Noted — PRINT NUMBER — DRAWING NUMBER 7115-1377.1 RP

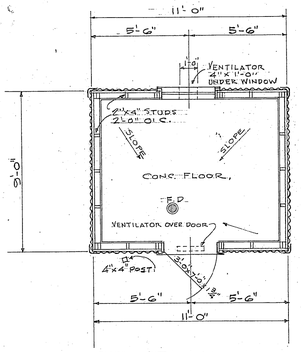


WEST ELEVATION

EAST ELEVATION

END ELEVATION

SCALE ¼"=1'-0"



PLAN

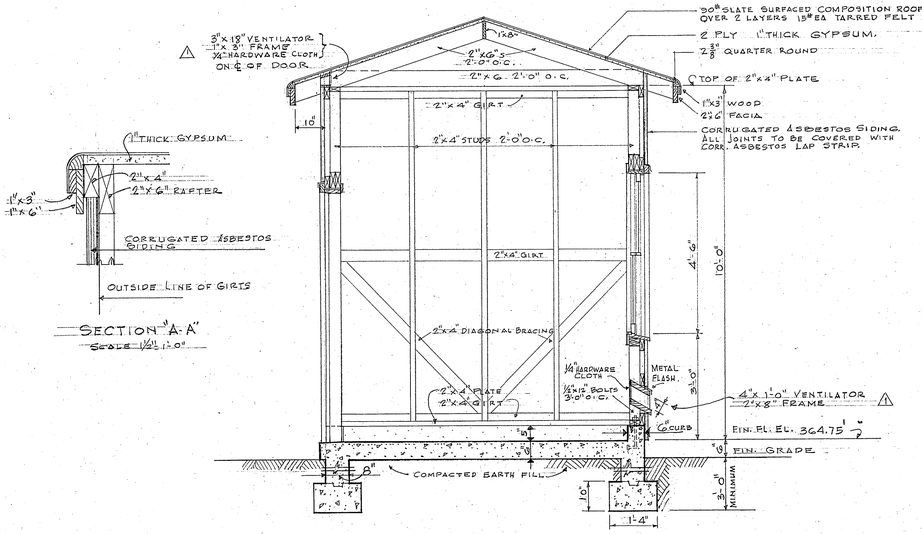
Scale ¼"=1'-0"

BOILER & WATER HEATER HOUSE

HARDWARE LIST

EXTERIOR DOOR 3'-0"x7'-0"x1¾"
1 PR. BUTS 2014½P 4½x4½
1 HOOK TYPE 1601 X 6"
1 LOCK TYPE 27 x BEST CYLINDER
MK-GMK TO AREA U x 300 EXT.
X300 INT. x 210 B. FIN. US-18

1 D.H. WINDOW.
1 SASH LOCK - B1138A US-18
1 SASH LIFT 1201 A US-18
UNIQUE SASH BALANCE.

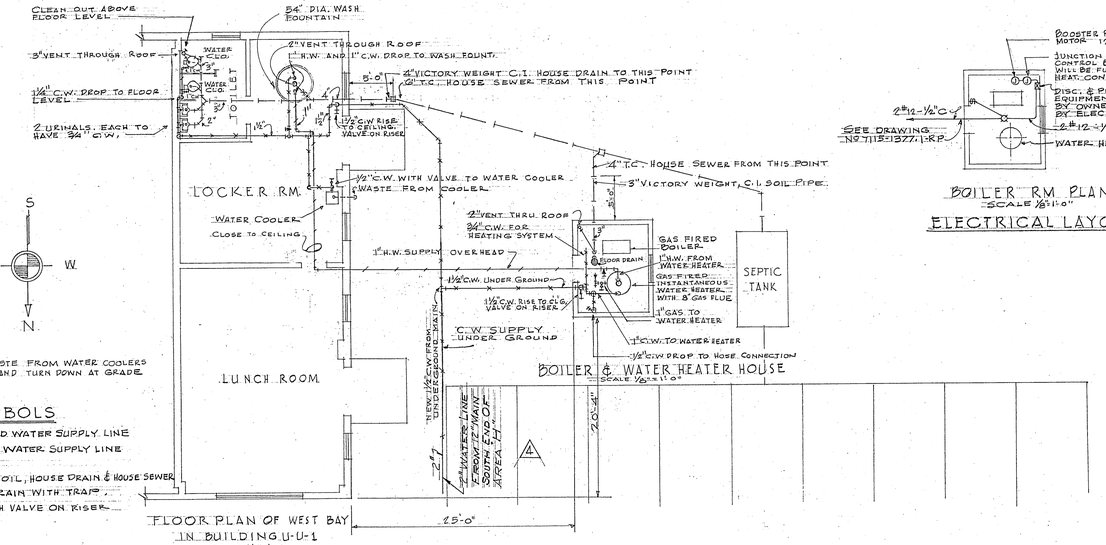


SECTION

Scale ½"=1'-0"

SECTION "A-A"

Scale ½"=1'-0"

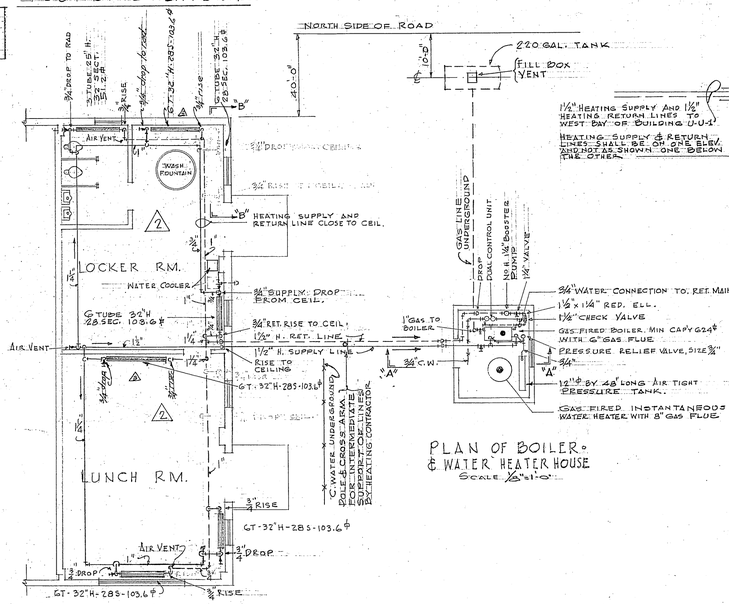


SYMBOLS

C.W. COLD WATER SUPPLY LINE
H.W. HOT WATER SUPPLY LINE
VENT
WASTE, SOIL, HOUSE DRAIN & HOUSE SEWER
FLOOR DRAIN WITH TRAP
DROP WITH VALVE ON RISER

NOTE: PLUMBING WORK SHOWN ON THIS DRAWING SUPERSEDES THAT SHOWN ON DRWG. # 7115-1377.1-RP

PLUMBING LAYOUT



FLOOR PLAN OF WEST BAY IN BUILDING U-U-1

Scale ½"=1'-0"

HEATING LAYOUT

THE GAS FLUES FROM GAS FIRED BOILER, AND WATER HEATER MAY BE CARRIED INDEPENDENTLY THROUGH ROOF. THE HEIGHT TO BE 25'-0" ABOVE THE FLOOR. IF ONE STACK IS USED FOR BOTH (GAS FIRED BOILER AND WATER HEATER) THE STACK SHALL HAVE A FREE AREA OF 9"x 9" AND SHALL BE 25'-0" ABOVE BOILER RM. FLOOR.

HOT WATER SUPPLY AND RETURN LINES FOR HEATING AND HOT WATER SUPPLY FOR DOMESTIC SERVICE SHALL BE INSTALLED OVERHEAD BETWEEN THE TWO BUILDINGS, AND SUPPORTED AT EACH BUILDING WITH A NB 2824 WELDED STEEL BRACKET AS SHOWN ON PAGE No. 866 CEANE CAT. 52.

REFERENCE DRAWINGS

7115-450.3, 7115-1375.0

DETAILS OF REVISIONS	APPROVALS
1 ADDED VENTILATORS TO BOILER & WATER HEATER HOUSE.	ARCHITECT - ENGINEER BY Prack 7-20-44.
2 REVISED PIPING IN LOCKER RM AND LUNCH ROOM	LONE STAR DEFENSE CORP. BY John L. Dunn 7-20-44
3 Moved radiators as built	DISTRICT ENGINEER BY Meulen FOR THE CHIEF OF ORDNANCE BY [illegible] LT. COL. ORDNANCE
4 ADDED NOTE	

PRACK & PRACK - ARCHITECTS AND THE CHESTER ENGINEERS
PITTSBURGH, PENNA. TEXARKANA TEXAS.

U. S. ARMY - ENGINEERS - OFFICE DENISON TEXAS

LONE STAR ORDNANCE PLANT, TEXARKANA, TEXAS

BOILER & WATER HEATER HOUSE GENERAL CONST., PLUMBING, HEATING, ELECTRICAL AREA "U" RENOVATION PROGRAM

REVISIONS	
1	7-20-44 REC
2	8-2-44 REC
3	9-20-44 J.P.
4	12-16-55 TMH

DRAWN BY	APPROVED BY	DATE	SCALE
R.E.C.		7-13-44	AS SHOWN

PRINT NUMBER — DRAWING NUMBER 7115-1377.3-RP

ATTACHMENT V.B –

ARMY ENGINEERING PUBLICATION

CEMP-ET Engineer Pamphlet 1110-345-102	Department of the Army U.S. Army Corps of Engineers Washington, DC 20314-1000	EP 1110-345-102 31 August 1995
	Engineering and Design EXPLOSIVES STORAGE MAGAZINES	
	Distribution Restriction Statement Approved for public release; distribution is unlimited.	

Pamphlet
No. 1110-345-102 31 August 1995

Engineering and Design
EXPLOSIVES STORAGE MAGAZINES

1. Purpose. Appendix A provides a ready reference of explosives storage magazine information such as shape, size, explosive limits, and operational features. It is intended to provide planners and designers sufficient information to select the most suitable standard magazine design to satisfy the user's requirements.

2. Applicability. This pamphlet is applicable to all HQUSACE elements, major subordinate commands, districts, and field operating activities (FOA) having military design and construction responsibilities.

3. References.

a. DoD 6055.9-STD

b. AR 385-60

c. AR 385-64

d. AR 415-17

e. TM 5-1300

4. Discussion. Military installations use magazines, sometimes referred to as igloos, for the storage of ammunition and explosives. Selecting the correct storage capacity, siting, and type of magazine has been a problem to military planners, and especially to those responsible for assuring safety compliance. Investigational work with earth-covered magazines has been concerned with intra relationships within magazine complexes for siting purposes. Numerous full-scale tests performed over a period of several years have established magazine separation criteria that will prevent magazine-to-magazine explosion propagation. These tests formed the basis for the explosive safety standards in AR 385-64 which implements DOD 6055.9-STD requirements. The primary objective of standard magazines is to provide designers and installation planners pre-approved magazines meeting the Department of Defense Explosives Safety Board (DDESB) safety criteria. This pamphlet is structured to

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This pamphlet supersedes DG 1110-3-170, dated June 1986.

provide complete guidance to Army. It does not address those magazines listed in references a and c that were developed by the Naval Facilities Engineering Command.

FOR THE COMMANDER:

1 Appendix
APP A - Explosives
Storage Magazines

ROBERT H. GRIFFIN
Colonel, Corps of Engineers
Chief of Staff

This pamphlet supersedes DG 1110-3-170, dated June 1986.

APPENDIX A

EXPLOSIVES STORAGE MAGAZINES

TABLE OF CONTENTS

	Paragraph	Page
Chapter 1. INTRODUCTION		
General	1-1	A-3
Definitions	1-2	A-3
Separation Distances of Standard Magazines	1-3	A-4
Magazine Grouping Concepts	1-4	A-4
Storage and Outloading Drawings	1-5	A-8
Cost of Magazines	1-6	A-8
Waivers and Exemptions	1-7	A-8
Technical Assistance	1-8	A-8
Chapter 2. STANDARD MAGAZINES		
General	2-1	A-10
Description of Earth-Covered Magazines	2-2	A-10
Standard Magazines	2-3	A-11
Site Adaptation	2-4	A-20
Changes to Standard Design	2-5	A-20
DDESB Approval	2-6	A-20
Specifications	2-7	A-20
Chapter 3. MISCELLANEOUS CONSIDERATIONS		
Earth Cover	3-1	A-21
Waterproofing	3-2	A-21
Drainage Systems	3-3	A-21
Doors	3-4	A-21
Utilities and Power	3-5	A-22
Road - Network	3-6	A-22
Aprons	3-7	A-22
Retaining walls (Wing Walls)	3-8	A-22
Ventilation	3-9	A-22
Security	3-10	A-22
Cathodic Protection	3-11	A-22
Lightning Protection	3-12	A-23
Mixing Standard and Non-Standard Magazines	3-13	A-23

	Paragraph	Page
Chapter 4. NON-STANDARD MAGAZINES		
General	4-1	A-24
Evaluating Non-Standard Magazines	4-2	A-24
Hybrid Magazines	4-3	A-24
Preapproved Non-Standard Magazines	4-4	A-24

LIST OF FIGURES

	Page
Figure 1. Minimum Separation Distances of Standard Magazines	A-5
2. Siting plan - Rear to Front	A-6
3. Siting Plan - Back to Back	
4. Earth-covered Steel Arch Magazine	A-12
5. Magazine, Concrete, Oval-arch, Earth-covered	A-13
6. Magazine, Steel, Semicircular-arch, Earth-covered	A-14
7. Steel and Concrete Box Magazine, Earth-covered	A-15
8. Magazine, Steel, Oval-arch, Earth-covered	A-16
9. Magazine, Mounded Concrete Igloo	A-17
10. Magazine, Stradley Type, Earth-covered	A-18
11. Igloo, Storage, Steel-arch, Earth-covered	A-19
12. Magazine, Concrete Cubicle, Earth-covered	A-25

CHAPTER I

INTRODUCTION

1-1. General. An important element in selecting storage magazines for construction is determining the type of magazine to be used and the siting requirements. AR 385-64 provides clear guidance in this regard. An earth-covered magazine is not designed to resist the damaging effects of its own exploding contents. It is accepted that the donor magazine will be demolished if an internal explosion occurs. Earth-covered magazines are utilized primarily to prevent propagation of an explosion within an adjacent (receiver) magazine. During the design phase, and prior to construction, site plans and non-standard magazine drawings must be submitted to the DDESB for review in accordance with AR 385-60 to assure that the proposed project meets explosives safety standards. only the drawing numbers of standard magazines need be submitted with the site plan since the construction of such magazines are preapproved by the DDESB.

1-2. Definitions.

a. Magazine: Any building or structure, except an operating building, used for the storage of ammunitions and explosives.

b. Standard Magazine: A preapproved magazine of the designation listed in AR 385-64. It is a magazine approved for the storage of 500,000 pounds net explosive weight (NEW) at the separation distances listed in AR 385-64.

c. Non-Standard Magazine: An earth-covered magazine that is not listed in AR 385-64 as being approved by the DDESB. These magazines are limited to a maximum 250,000 pounds NEW at the separation distances listed in AR 385-64.

d. Hybrid Magazine: A magazine that uses components and/or modifications from more than one magazine.

e. Intermagazine Distance: This is the minimum permissible distance between storage magazines. For earth-covered magazines, this distance is intended to provide reasonable protection against the propagation of an accidental explosion by airblast and by fragments.

f. Quantity-Distance: The quantity of explosive material and distance separation relationship that provide defined types of protection.

g. Donor Magazine: Is a magazine which produces the damaging output.

h. Receiver Magazine: Is the magazine away from the donor source which requires protection.

i. Barricaded: Magazines with intervening barrier, natural or artificial, of such type, size, and construction as to limit in a prescribed manner the effect of an explosion on a nearby magazine.

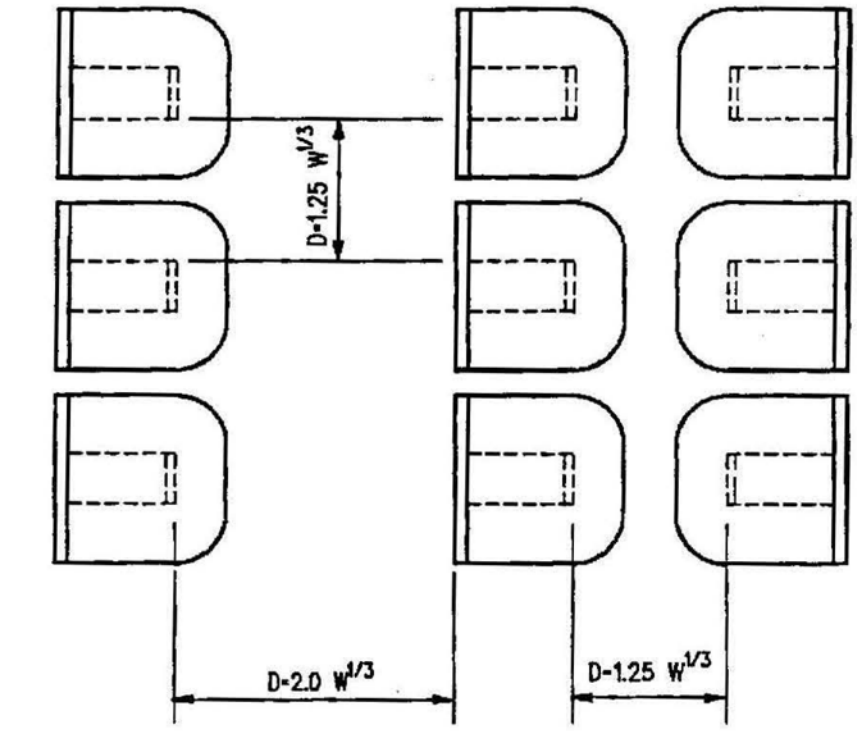
j. Unbarricaded: Magazines without an intervening barrier.

1-3. Separation Distances of Magazines. Separation distance from magazines, commonly referred to as quantity-distance (Q-D), governs many aspects of a project. Stated simply, the more explosive material concentrated at one place, the farther that place has to be from a potential target. AR 385-64 contains tables equating amounts of explosives to the distance that they must be separated from other magazines, other ammunition and explosives handling facilities, public roads, and inhabited buildings. Orientation effects on intermagazine distance can also be found in AR 385-64. The following table and Figure 1 show the Q-D requirements between standard magazines:

Orientation	Minimum Separation for Standard Magazines	Separation for W=500,000 pounds
Side-to-Side	1.25 $W^{1/3}$	100 feet
Rear-to-Front	2.00 $W^{1/3}$	160 feet
Side-to-Front	2.75 $W^{1/3}$	220 feet
Front-to-Front (barricaded)	6.00 $W^{1/3}$	480 feet
Front-to-Front (unbarricaded)	11.00 $W_{1/3}$	880 feet

W = largest net explosive weight (NEW)

1-4. Magazine Grouping Concepts. Magazine grouping concepts are provided in Figures 2 and 3. These concepts are typical layouts found on most Army installations. Magazines may be placed in one row or multiple rows. Siting is generally side-to-side and



HEADWALL

REAR WALL

EDGE OF EARTH COVER

EDGE OF ARCH

W = CHARGE WEIGHT

FIGURE 1. MINIMUM SEPARATION DISTANCES OF STANDARD MAGAZINES

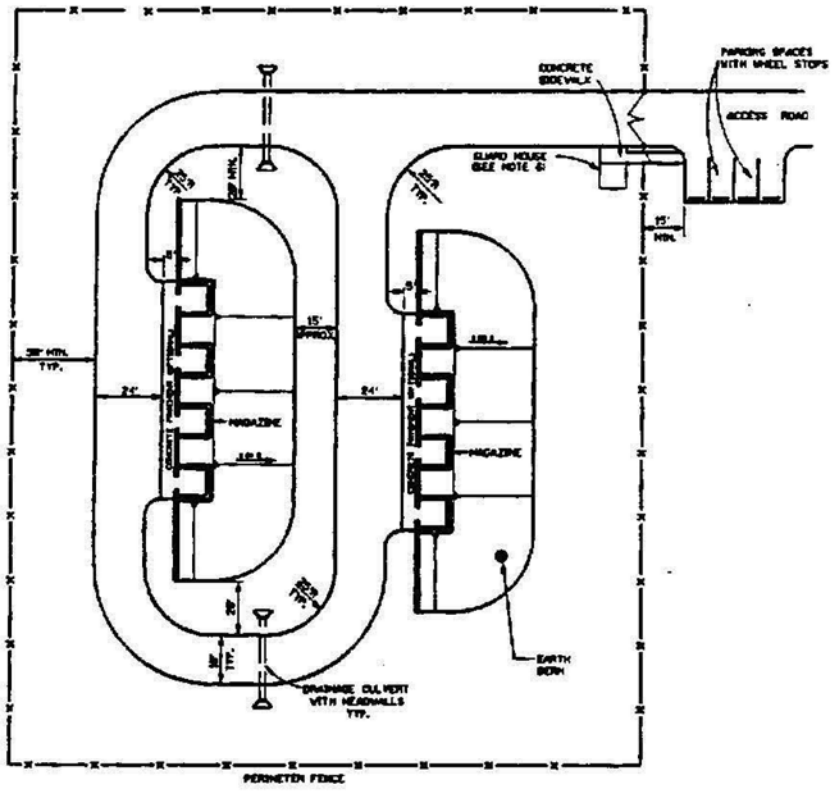


FIGURE 2 - SITING PLAN

REAR TO FRONT

MAGDLDGN

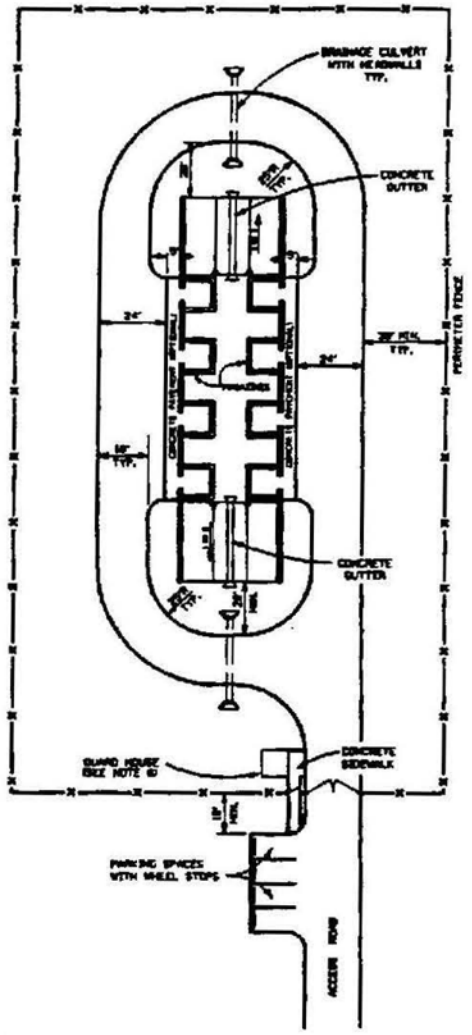


FIGURE 3 - SITING PLAN

BACK TO BACK

rear-to-front. Front-to-front orientation is seldom used because of the excessive intermagazine separation distance required.

1-5. Storage and Outloading Drawings. Storage and outloading drawings for ammunition are provided in U.S. Army Materiel Command drawings 19-48-75-5 published and distributed by the U.S. Army Ammunition Center and School (USADACS). These drawings will assist Army activities and contractors in the effective use of storage to ensure safe, economic and standardized procedures for storing and transporting ammunition commodities. Its Index lists the drawings that depict storage configurations (stacking patterns) of ammunition and components in various types of magazines.

1-6. Cost of Magazines. Construction cost estimates of magazines for programming purposes can be found in AR 415-17.

1-7. Waivers and Exemptions. Waivers, exemptions, and site general construction plan requests pertaining to Army owned facilities will be processed in accordance with AR 385-64. They are, however, discouraged since these waivers permit temporary deviation from the standards.

1-8. Technical Assistance. Users of this pamphlet are encouraged to communicate with the following organizations for technical assistance:

a. Planning Ammunition Facilities:

U.S. Army Defense Ammunition Center and School (USADACS)
ATTN: SMCAC-AV
Savanna, IL 61074-9639
Telephone: DSN 585-8921.

b. Facilities-Related Explosive Safety Matters:

U.S. Army Technical Center for Explosives Safety (USATECS)
ATTN: SMCAC-ES
Savanna, IL 61074-9639
Telephone: DSN 585-8919, commercial (815) 273-8919.

c. Magazine Designs and Criteria:

Headquarters, U.S. Army Corps of Engineers
ATTN: CEMP-ET
20 Massachusetts Avenue, NW
Washington, D.C. 20314-1000
Telephone: 202-761-1436

U.S. Army Engineer Division, Huntsville
ATTN: CEHND-ED-CS
4820 University Drive
Huntsville, AL 35816-1822
Telephone: 205-895-1650.

d. Protective Design Technical Assistance:

U.S. Army Engineer District, Omaha
ATTN: CEMRO-ED-SH
215 North 17th Street
Omaha, NE 68102-4978
Telephone: 402-221-3177

e. Distribution of Magazines (drawings and specifications):

U.S. Army Engineer Division, Huntsville
ATTN: CEHND-ED-ES (Service Section)
106 Wynn Drive
Huntsville, AL 35805-1957
Telephone: 205-955-4782

CHAPTER II

STANDARD MAGAZINES

2-1. General. Standard magazines are preapproved for construction and are mandatory for use within the Department of Defense unless circumstances, such as less storage capacity, require a non-standard design. The advantages of standard designs are:

a. Design costs are saved.

b. obtaining approval from The DDESB is simplified.

c. Less real estate may be required because of certain decreased intermagazine separations permitted when standard magazines are used.

d. The user has confidence in the end product.

e. Flexibility of storage situations exists because magazines can be designed to varying lengths.

f. Because of certain reduced separation distances, less roads, fences, utilities, etc., may be required.

2-2. Description of Earth-Covered Magazines. A typical earth-covered magazine has the following features:

a. A semicircular arch, oval arch, or a rectangular box constructed of reinforced concrete or steel or a combination thereof.

b. A reinforced concrete floor slab, sloped for drainage.

c. A reinforced concrete rear wall.

d. A reinforced concrete headwall that extends at least 2-1/2 feet above the top of the magazine.

e. Reinforced concrete wingwalls on either side of the headwall. The wingwalls may slope to the ground or may adjoin wingwalls from adjacent magazines. The wingwalls may be either monolithic or separated by expansion joints from the headwall.

f. Heavy steel doors in the headwall (either manually operated or motorized).

g. An optional gravity ventilation system.

h. Earth cover over the top, sides and rear of the magazine.

i. Lightning protection and grounding systems.

2-3. Standard Magazines. Standard magazine designs have been developed in coordination with the Department of Defense Explosive Safety Board (DDESB) so that designs would be considered preapproved when called for in construction. The largest sizes are about 25 feet wide. The length can vary, but is usually 80 feet. Smaller magazines have widths ranging from approximately 8 feet to 14 feet, with the length also varying.

a. Drawings approved for new construction. These standard magazines, are for the most part, a complete set of construction drawings with accompanying specifications. The magazines must, however, be site-adapted for local conditions. These magazines designs are approved for storing 500,000 pounds and may be ordered from the U.S. Army Engineer Division, Huntsville.

(1) Semicircular steel arch - 33-15-65 (Figure 4)

(2) Reinforced concrete arch - 33-15-74 (Figure 5)

(3) Semicircular steel arch - 421-80-01 (Figure 6)

(4) Steel and concrete large box - 421-80-02 (Figure 7)

(5) Steel oval arch - 421-80-03 (Figure 8)

b. Older magazines found on Army installations:

(1) Mounded concrete - 33-15-06 (Figure 9)

(2) Atomic blast resistant - 33-15-58

(3) Stradley - 33-15-61 (Figure 10)

(4) Steel arch - AW 33-15-63

(5) Steel arch - AW 33-15-64 (Figure 11)

(6) Steel oval arch - 33-15-73

(7) Semicircular mounded concrete - 652 series

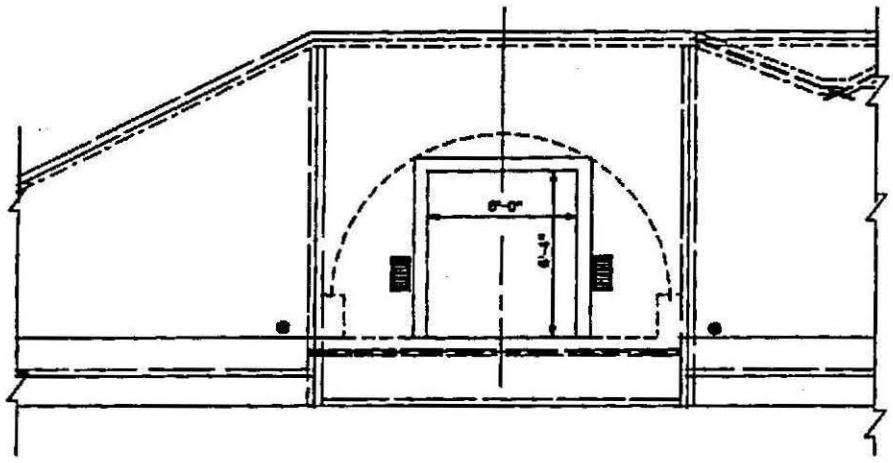


FIGURE 4. EARTH COVERED STEEL ARCH MAGAZINE

DRAWING NUMBER	33-15-65
ISSUE DATE	MARCH 1963
DIMENSIONS	WIDTHS: 8'-0", 10'-0", 12'-0" AND 14'-0" VARIABLE LENGTH TO 27' MAX
DOOR	HINGED, DOUBLE-LEAF 6'-0" x 6'-4"
EXPLOSIVE LIMIT	500,000 LBS. (NEW)
PHYSICAL SECURITY	HIGH SECURITY HASP (MIL-H-29181)
GENERAL FEATURES	1. HEADWALL - 1'-0" THICK REINFORCED CONCRETE 2. BACKWALL - 1'-0" THICK REINFORCED CONCRETE 3. ARCH - 8 GAUGE CORRUGATED STEEL
COMMENT	HEADWALL NOT EQUIVALENT IN STRENGTH TO 33-15-74 OR LATER DEVELOPED STANDARD MAGAZINE
DDESB APPROVAL DATE	15 MARCH 1965

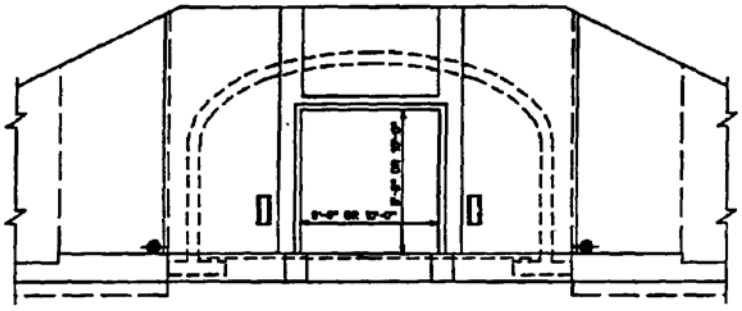


FIGURE 5. MAGAZINE, CONCRETE, OVAL-ARCH, EARTH-COVERED

DRAWING NUMBER	33-15-74
ISSUE DATE	APRIL 1979
DIMENSIONS	25'-0"Wx14'-0"H LENGTH VARIES: 60'-0" TO 90'-0"
DOOR	SLIDING, 8'-0"x8'-0" OR 10'-0"x10'-0"
EXPLOSIVE LIMIT	500,000 LBS. (NEW)
PHYSICAL SECURITY	HIGH SECURITY HASP NOT SPECIFIED
GENERAL FEATURES	1. WALLS - 1'-0" THICK REINFORCED CONCRETE 2. ARCH - 1'-0" THICK REINFORCED CONCRETE 3. PILASTERS - 2'-6"x1'-10" AT DOOR JAMBS
COMMENT	RECOMMENDED FOR NEW CONSTRUCTION. THE 8' VERTICAL WALL PROVIDES EFFICIENT AMMUNITION STORAGE
DDESB APPROVAL DATE	22 JULY 1980

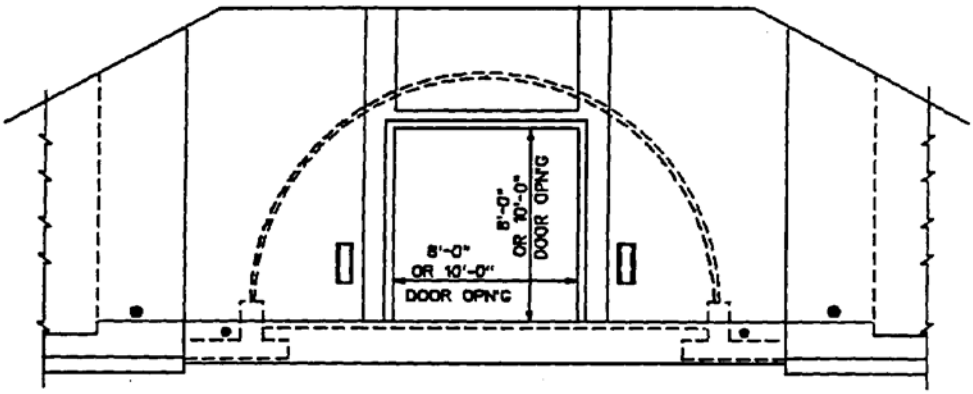


FIGURE 6. MAGAZINE, STEEL, SEMICIRCULAR-ARCH, EARTH-COVERED

DRAWING CODE	421-80-01
ISSUE DATE	MARCH 1963
DIMENSIONS	25'-0"W x 14'-0"H LENGTH VARIES: MAX. 89'-0"
DOOR	SLIDING, 8'-0" x 8'-0" OR 10'-0" x 10'-0"
EXPLOSIVE LIMIT	500,000 LBS. (NEW)
PHYSICAL SECURITY	HIGH SECURITY HASP (MIL-H-29181)
GENERAL FEATURES	1. HEADWALL - 1'-0" THICK REINFORCED CONCRETE 2. REARWALL - 1'-0" THICK REINFORCED CONCRETE 3. ARCH - 1 GAUGE CORRUGATED STEEL FOR 2" DEEP OR 5½" DEEP ARCHES 4. PILASTERS- 1'-10" x 2'-6" AT DOOR JAMBS
DDESB APPROVAL DATE	02 OCTOBER 1987

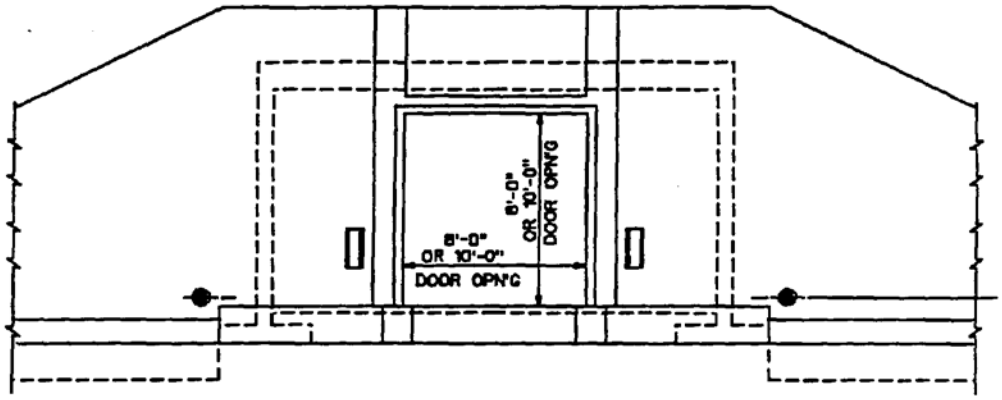


FIGURE 7. STEEL AND CONCRETE BOX MAGAZINE, EARTH-COVERED

DRAWING CODE	STD 421-80-02
ISSUE DATE	JUNE 1993
DIMENSIONS	24'-0"Wx11'-2"H LENGTH VARIES: MAX. 90'-0"
DOOR	SLIDING, 8'-0"x8'-0" OR 10'-0"x10'-0"
EXPLOSIVE LIMIT	500,000 LBS. (NEW)
PHYSICAL SECURITY	HIGH SECURITY HASP (MIL-H-29181).
GENERAL FEATURES	1. ROOF - 1'-6" THICK REINFORCED CONCRETE 2. WALLS - 10" THICK BFR PANELS 3. HEADWALL - 10" THICK BFR PANELS 4. PILASTERS - 2'-0"x2'-6" REINFORCED CONCRETE 5. WINGWALLS - BFR PANELS
COMMENT	BFR (BLAST AND FRAGMENT RESISTANT) PANELS ARE PATENTED
DDESB APPROVAL DATE	22 FEBRUARY 1993

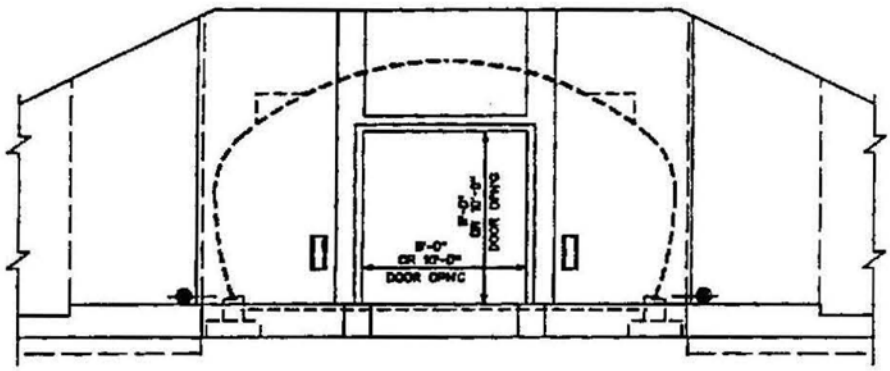


FIGURE 8. MAGAZINE, STEEL, OVAL-ARCH, EARTH-COVERED

DRAWING CODE	STD 421-80-03
ISSUE DATE	APRIL 1993
DIMENSIONS	25'Wx14'-5"H , LENGTH VARIES 21'-0" TO 89'-0"
DOOR	SLIDING, 8'x8' OR 10'x10'
EXPLOSIVE LIMIT	500,000 LBS. (NEW)
PHYSICAL SECURITY	HIGH SECURITY HASP (MIL-H-29181)
GENERAL FEATURES	1. HEADWALL - 1'-0" THICK REINFORCED CONCRETE 2. BACKWALL - 1'-0" THICK REINFORCED CONCRETE 3. ARCH - 1 GA. CORRUGATED PLATE 4. PILASTERS - 2'-6"x1'-10" AT DOOR JAMBS
COMMENT	THIS MAGAZINE REPLACES 33-15-73
DDESB APPROVAL DATE	28 DECEMBER 1992

MAG03S2.DGN

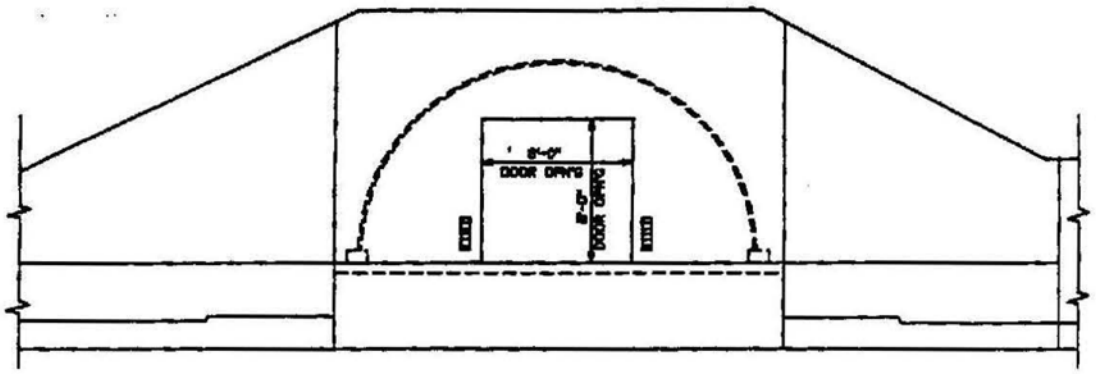


FIGURE 9. MAGAZINE, MOUNDED CONCRETE IGLOO

STANDARD MAGAZINE	33-15-06
ISSUE DATE	AUGUST 1951
DIMENSIONS	26'-6"Wx12'-9"H LENGTH VARIES: 81'-0" MAXIMUM
DOOR	HINGED, DOUBLE-LEAF 8'-0" x 8'-0"
EXPLOSIVE LIMIT	500,000 LBS. (NEW)
PHYSICAL SECURITY	NONE
GENERAL FEATURES	1. HEADWALL- 1'-0" THICK REINFORCED CONCRETE 2. REARWALL - 8" THICK REINFORCED CONCRETE 3. ARCH-THICKNESS VARIES, 6" @ CROWN 1'-4" @ BASE 4. PILASTERS- 1'-6" x 3'-4¾" AT DOOR JAMBS
COMMENT	THIS MAGAZINE SUPERSEDED DWGS 652-686 THRU 652-692 & 33-15-01
DDESB APPROVAL DATE	29 JULY 1955

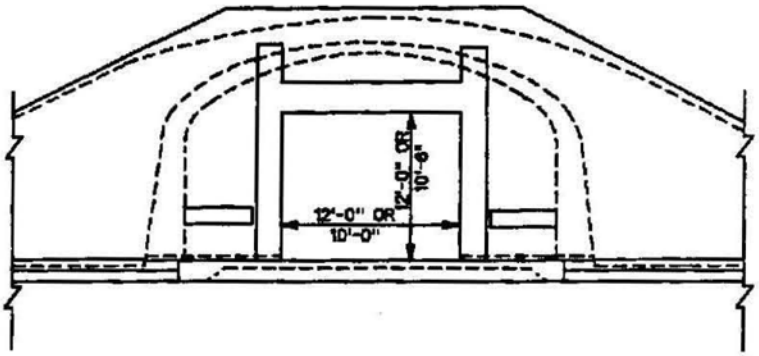


FIGURE 10. MAGAZINE, STRADLEY TYPE, EARTH-COVERED

DRAWING NUMBER	33-15-61
ISSUE DATE	DECEMBER 1959
DIMENSIONS	25'-0"Wx14'-0"Hx80'-0"L
DOOR	SLIDING, 10'-0"x10'-6" OR 12'-0"x12'-0"
EXPLOSIVE LIMIT	500,000 LBS. (NEW)
PHYSICAL SECURITY	NONE
GENERAL FEATURES	1. HEADWALL - 1'-0" THICK REINFORCED CONCRETE 2. REARWALL - 10" THICK REINFORCED CONCRETE 3. PILASTERS - 2'-4"x1'-8" AT DOOR JAMBS
COMMENT	THIS MAGAZINE REPLACES "YURT" MAGAZINE YT-106 THRU YT-111
DDESB APPROVAL DATE	30 DECEMBER 1959

MAG033.DGN

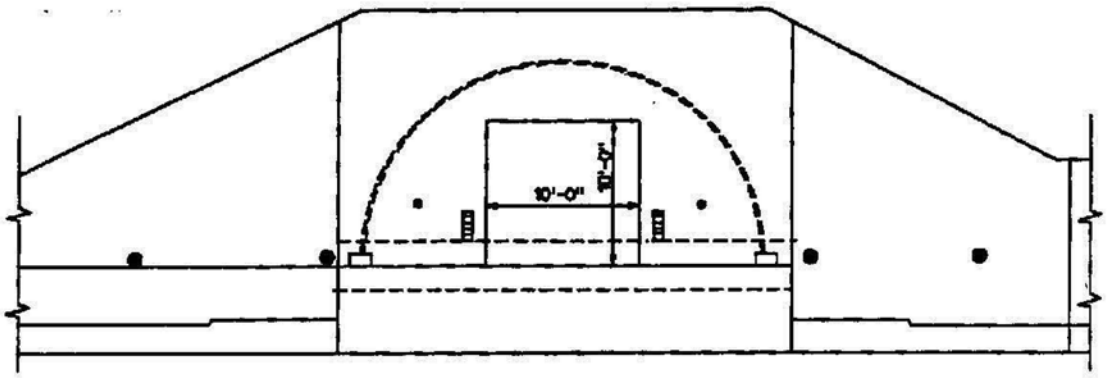


FIGURE 11. IGLOO, STORAGE, STEEL ARCH - EARTH MOUNDED

DRAWING NUMBER	AW 33-15-64
ISSUE DATE	MAY 1963
DIMENSIONS	25' x 14'-4"H x 59'L
DOOR	HINGED, DOUBLE-LEAF 10'x10'
EXPLOSIVE LIMIT	500,000 LBS (NEW)
PHYSICAL SECURITY	NONE
GENERAL FEATURES	1. REAR WALL- 1'-0" THICK REINFORCED CONCRETE 2. ARCH- 1 GA CORRUGATED STEEL 3. HEADWALL- 1'-0" THICK REINFORCED CONCRETE 4. PILASTERS- NONE
COMMENTS	1. HEADWALL NOT EQUIVALENT IN STRENGTH TO 33-15-74 OR LATER DEVELOPED STANDARD MAGAZINES
DDESB APPROVAL DATE	11 MARCH 1966

2-4. Site-Adaptation. Standard magazines are meant to be site-adapted, that is, tailored to the peculiarities at each particular location. For magazines, this tailoring mainly involves the foundation and the drainage system. For instance, if the soil bearing pressures at the construction location is below the design value, then an increase in the footing width is necessary. Also, a deep versus a shallow foundation is influenced by the frost penetration depth at the particular site. Site-adaptation also includes determining magazine length and deciding whether ventilators are required. The protective construction of the magazine (arch, headwall and door) must remain unchanged. The 2-foot minimum earth cover must also be maintained.

2-5. Changes to Standard Designs. changes to standard designs, other than site adaptation, should not be made without coordination with the DDESB. Any change will invalidate the DDESB's approval and result in the magazine being considered non-standard. This may require greater Q-D separations for those magazines in certain situations.

2-6. DDESB Approval. Site plans for construction projects containing magazines must be submitted in accordance with AR 385-60 for review and approval by the DDESB for:

a. New construction.

b. Changes in utilization of facilities or mission affecting Q-D requirements.

c. Major modification to facilities.

2-7. Specifications. Specifications have been developed for each standard design, and are available with the drawings. Users can obtain a set of these specifications for the construction project with a request for the drawings. Deviations from these specifications may compromise the quality of the constructed project, and therefore must not be made. Design analyses may be requested if required.

CHAPTER III

MISCELLANEOUS CONSIDERATIONS

3-1. Earth Cover. Material for earth cover over magazines should be reasonably cohesive (solid or wet clay, or similar types of soil may not be used as they are too cohesive), free from deleterious organic matter, trash, debris, and stones heavier than 10 pounds or larger than 6 inches in diameter. The larger stones should be limited to the lower center of fills and will not be used for earth cover over magazines. Compaction and surface preparation should be provided, as necessary, to maintain structural integrity and avoid erosion. When it is impossible to use a cohesive material, for example, in sandy soil, the earth cover over magazines should be finished with a suitable material to ensure structural integrity. The minimum earth cover over the top of the magazine should be 2 feet, with a slope of 2 horizontal and 1 vertical. periodic maintenance must be performed to ensure restoration of erosion of cover below the 2-foot depth requirement. The earth-cover over and around the magazine is a critical element of the standard design. It provides some confinement and tends to directionalize the explosive force both upward and outward from the door end of the donor magazine. The cover over receiver magazines resists fragment penetrations and provides mass to the arch to resist the blast pressure. Where practical, earth cover should be seeded to prevent soil erosion. Where rainfall is insufficient to maintain grass cover, soil stabilization methods should be used.

3-2. Waterproofing. provisions are made in the standard magazine designs to ensure watertightness of the magazine. The type of magazine (steel or concrete) generally dictates the type of waterproofing used. An elastomeric membrane is most suitable on concrete arches, and a bituminous waterproofing is suitable on steel magazines. Moisture proofing difficulty is increased with steel-arch magazines because of the many lineal feet of joints.

3-3. Drainage Systems. Drainage systems are provided around the magazines to channel the water away from the structure. For concrete magazines, the drainage composite system is recommended. The older sand-gravel filter system is more costly and should be avoided, except for the steel arch where it is recommended due to the corrugated configuration.

3-4. Doors. Magazine doors are either of the swinging or the sliding type. Sliding doors are generally specified on large magazines, and swinging doors on smaller magazines. Doors are

designed to withstand the dynamic forces from an explosion in an adjacent magazine and, therefore, are a critical element of the magazine design. These doors do not provide resistance to the effects of an explosion within the magazine.

3-5. Utilities and Power. The only utility usually required at a magazine site is electricity. This power is needed for lights at individual magazines, for perimeter lighting, and possibly for operation of electronic security equipment.

3-6. Road Network. The road network is not part of the standard design. The user must provide service to each magazine as part of the site adaptation process. vehicle size and wheel loads should be stated in the project development documentation. Forklift loads are usually the most critical. Two-lane roads are seldom required, except at the site entrance.

3-7. Aprons. Each magazine has an apron in front of its door to allow for loading and unloading. The aprons slope away from the door for drainage. Changes to the apron configuration to suit user needs will not compromise the pre-approved status of the standard design.

3-8. Retaining Walls (Wing walls). Retaining walls are for the sole purpose of retaining the earth fill away from the magazine doors. Construction type may vary from reinforced concrete, precast concrete to reinforced-earth systems. The slope of these walls should be 2 horizontal to 1 vertical.

3-9. Ventilation. Standard magazine designs usually include provisions for ventilation. Ventilation is provided by louvered openings in the headwall and ventilator stacks at the rear walls. Magazines intended for weapons storage containing certain active materials must be ventilated. Otherwise, louvers and ventilators are optional. Their necessity and size should be determined during the site adaptation based on material to be stored and geographical location.

3-10. Security. The security at a magazine complex is an integration of physical measures, equipment, and operational procedures. procedures are left to the using agency, since they are beyond the control of the designer. Limited security features included in the standard designs are high security hasp requirements at magazine doors (MIL-H-29181), steel bars at openings, shrouded ventilators, and basic provisions, i.e., steel conduit for electronic security equipment.

3-11. Cathodic protection. Cathodic protection may be required for steel-arch magazines and should be considered in areas where

galvanic action in some types of soils is likely to occur.

3-12. Lightning protection. Standard magazine designs include an integral system of lightning protection. The system consists of air terminals, roof conductors, down conductors, ground connections, and ground, electrically interconnected to form the shortest distance to ground. Lightning protection requirements are clearly described in each magazine specifications.

3-13. Mixing of Standard and Non-Standard Magazines. Mixing of standard and non-standard magazines is not cost effective and, therefore, is discouraged. The element that greatly influence the magazine classification (standard or non-standard) is the headwall and its door. Since the headwall and door cost is a small portion of the overall cost of the magazine, a greater benefit is realized from the increased storage capacity in standard magazines.

CHAPTER IV

NON-STANDARD MAGAZINES

4-1. General. Non-standard earth covered magazines are those not listed in AR 385-64. Non-standard magazines are approved for all quantities of explosives up to 250,000 pounds. Earth cover over the top of these magazines should be equal to or greater than that required for standard magazines.

4-2. Evaluating Non-Standard Magazines. Th 5-1300 should be used to design or evaluate the blast resistance of non-standard magazines. Headwalls and doors of standard magazines are designed for 100 psi overpressure and 22 millisecond load duration (equivalent impulse of 1,100 psi-millisecond). Magazines not classified as standard must be analyzed for this loading to determine whether storage capacity can be increased to 500,000 pounds. A guide prepared by the U.S. Army Engineer Division, Huntsville provides procedures for determining the adequacy of the non-standard headwalls and doors to withstand blast effects from a donor explosive source.[1] The guide is based on TM 5-1300 criteria and magazine tests.

4-3. Hybrid Magazines. Hybrid magazines have been developed and used by installations to meet specific needs. As stated above, these magazines use components from more than one standard magazine. This type of magazine is not considered preapproved for construction and, therefore, requires DDESB approval if it is to be sited as a standard magazine. This magazine type offers no real advantage over standard magazines and their use is discouraged.

4-4. Preapproved Non-Standard Magazine. Magazine 422-15-01 (Figure 12) is a reinforced concrete cubicle magazine which is preapproved for a limited storage of 425 pounds. This magazine is approved for siting at the intermagazine separation distance of standard magazines.

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[1]U.S. Army Engineer Division, Huntsville, HNDED-CS-93-4, "Guide for evaluating Blast Resistance of Non-Standard Magazines", December 1994.

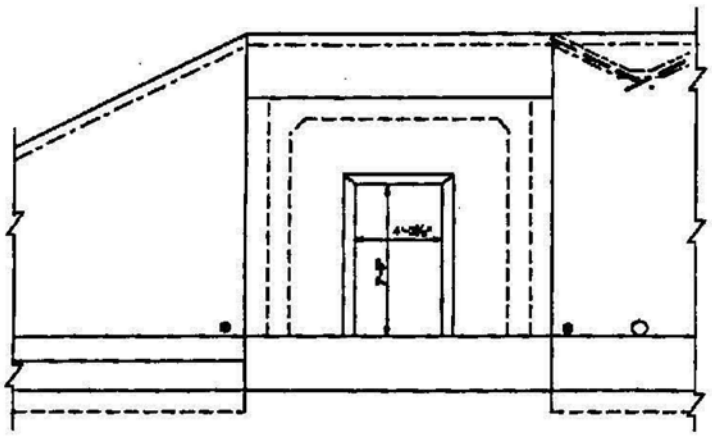

FIGURE 12. MAGAZINE, CONCRETE CUBICLE, EARTH-COVERED

DRAWING CODE	STD 422-15-01
ISSUE DATE	JUNE 1987
DIMENSIONS	10'W x 10'L x 10'H
DOOR	HINGED, SINGLE-LEAF 4'-3½"x7'-3"
EXPLOSIVE LIMIT	425 LBS (NEW)
PHYSICAL SECURITY	HIGH SECURITY HASP (MIL-H-29181)
GENERAL FEATURES	1. WALLS: 1'-0" THICK REINFORCED CONCRETE 2. ROOF: 1'-0" THICK REINFORCED CONCRETE
DDESB APPROVAL DATE	03 MARCH 1988

MAGD04.DGN

Appendix V.C – Tanks and Tank Systems
Not Applicable
40 CFR Part 264 Subpart J applies to owners or operations of facilities that use tank systems for storing or treating hazardous waste. ESD does not use tank systems for storing or treating hazardous waste.

Appendix V.D – Surface Impoundments
Not Applicable
ESD has no surface impoundments.

Appendix V.E – Waste Piles
Not Applicable
ESD has no waste piles.

Appendix V.F – Land Treatment Units
Not Applicable
ESD has no land treatment units.

Appendix V.G – Landfills
Not Applicable
ESD has no landfills.

Appendix V.H – Incinerators
Not Applicable
ESD has no incinerators.

Appendix V.I – Boilers and Industrial Furnaces
Not Applicable
ESD has no boilers or industrial furnaces.

Appendix V.J – Drip Pads
Not Applicable
ESD has no drip pads.

Section V – Engineering Reports

Appendix V.K – Miscellaneous Units (Rocket Motor Ops Building)

40 CFR §264.600-§264.602, and §270.23

1.0 INTRODUCTION

The Rocket Motor Ops Building will be used to prepare materials for processing in the Hybrid Burn Chamber (HBC). The Rocket Motor Ops Building is subject to 40 CFR Part 264 Subpart X (40 CFR §264.600-§264.603) – Miscellaneous Units. 40 CFR §264.601 requires that a miscellaneous unit must be located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of human health and the environment. Site-specific information pertaining to the hydrologic and geologic characteristics, groundwater flows, patterns of land use, precipitation patterns, etc. are required by 40 CFR §264.601 in order to ensure that the site is suitable to ensure protection of human health and the environment. Detailed site-specific information is provided in *Appendix II – Facility Si~~t~~ting Criteria* of the Part B Application.

The Rocket Motor Ops Building will be located towards the southern portion of the main facility property, near the intersection~~s~~ of N Montague Street (now Demil Way) and ~~Pine~~ Cypress Street in Hooks, Texas (Bowie County). The exact location is described in Section II of the Part A Application Form – *Facility Background Information* and in Section II of the Part B Application – *Facility Siting Criteria*. A map of the location is shown in the attachments to the Part A Application Form.

Table 1, *Table of Information Requirements for Miscellaneous Units*, presents the regulatory references for the information required to be submitted for miscellaneous units in 40 CFR §270.23 and 40 CFR §264.600-§264.602 and the section of this document that addresses the specific requirement. Some information is addressed in other portions of this permit application. A statement indicating which section the information can be found in is provided. Any additional information that is not covered in other portions of this permit application is presented in this document.

40 CFR §264.601 states that permit terms and provisions must include those requirements that are appropriate for the miscellaneous unit being permitted. There are no performance standard requirements for preparation buildings. The most applicable performance standards would be 40 CFR Part 264 Subpart I (Use and Management of Containers) and 40 CFR §270.15 (Specific Part

B Information Requirements for Containers). Therefore, the requirements listed in 40 CFR §264.171-§264.177 and in 40 CFR §270.15 are also included in Table 1.

Table 1
Table of Information Requirements for Miscellaneous Units

Regulatory Citation (40 CFR)	Description	Section Requirement is Addressed
§270.23(a)(1)	Physical characteristics, materials of construction, and dimensions of the unit	Section 2.1
§270.23(a)(2)	Description of how the unit will be located, designed, constructed, operated, maintained, monitored, inspected, and closed to comply with the requirements of §264.601 and §264.602	Section 2.1, Section 2.2, Section 5.0, Section 7.0
§270.23(a)(3)	For disposal units, plans for post-closure requirements	N/A
§270.23(b)	Hydrologic, geologic, and meteorologic assessments and land-use maps for the region surrounding the site	Section 1.0
§270.23(c)	Information on potential pathways of exposure and on the potential magnitude and nature of such exposures	Section 3.0
§270.23(d)	For any treatment unit, a demonstration of the effectiveness of the treatment based on laboratory or field data	N/A
§270.23(e)	Additional information determined by the Director to be necessary	N/A
§264.601(a)	Prevention of releases due to migration of waste constituents in the groundwater or subsurface environment	Section 3.2
§264.601(b)	Prevention of releases of due to migration of waste constituents in surface water, or wetlands, or on the soil surface	Section 3.2
§264.601(c)	Prevention of releases due to migration of waste constituents in the air	Section 3.1
§264.602	Monitoring, testing, analytical data, inspections, response, and reporting procedures and frequencies	Section 5.0
§264.171	If a container holding hazardous waste is not in good condition or if it begins to leak, the hazardous waste must be transferred from this container to a container that is in good condition	Section 5.0
§264.172	Hazardous waste must be stored in a container that is compatible with, the hazardous waste to be stored	Section 5.0
§264.173(a)	A container holding hazardous waste must be closed during storage, except when adding or removing waste	Section 5.0
§264.173(b)	A container holding hazardous waste must not be opened, handled, or stored in a manner which may rupture the container or cause it to leak	Section 5.0

Table 1
Table of Information Requirements for Miscellaneous Units (continued)

Regulatory Citation (40 CFR)	Description	Section Requirement is Addressed
§264.174	Inspections	Section 5.0
§264.175(a)	Containment system	N/A, see §264.175(c)
§264.175(b)	Containment system design	N/A, see §264.175(c)
§264.175(c)	Storage areas that store containers holding only wastes that do not contain free liquids do not need to have a containment system	Section 4.0
§264.175(d)	Applicable to waste codes F020, F021, F022, F023, F026, and F027	N/A
§264.176	Containers holding ignitable or reactive waste must be located at least 15 meters (50 feet) from the facility's property line	Section 6.0
§264.177	Incompatible wastes	Section 6.0
§270.15(a)	Containment system description	N/A, see Section 4.0
§270.15(b)	Requirements for storage of wastes that do not contain free liquids	Section 4.0
§270.15(c)	Sketches, drawings, or data showing location of buffer zone for containers holding ignitable or reactive wastes	Section 6.0
§270.15(d)	Incompatible waste requirements	Section 6.0
§270.15(e)	Air emission control equipment	N/A

2.0 DESCRIPTION OF THE ROCKET MOTOR OPS BUILDING

The purpose of the Rocket Motor Ops Building is to prepare materials for processing in the Hybrid Burn Chamber (HBC). The Rocket Motor Ops Building is comprised of two separate sections: the Rocket Motor Prep Area and the Segmenting Area. Energetic materials are transferred from the storage magazines to the Rocket Motor Prep Area of the building via flatbed trucks. Materials are removed from the flatbed trucks via forklift and are transported to the Rocket Motor Prep Area of the building. Within the Rocket Motor Prep Area, the energetic materials are taken out of the packaging. If the rocket motors require segmenting prior to processing, they are placed into cradles and are transported via pallet jacks to the Segmenting Area of the building where they are segmented into smaller pieces using a water-cooled band saw. After they are segmented, they are sent to the HBC for processing.

2.1 Physical Characteristics, Materials of Construction, and Dimensions

The Rocket Motor Ops Building was built in 1942, with modifications planned in 2023. After modifications, the building's footprint will be approximately 407 feet by 70 feet with 16-foot walls. It is a one-story building with poured and polished concrete floors and has no basement. The Rocket Motor Ops Building has two separate areas – the Rocket Motor Prep Area and the Segmenting Area. The two separate areas are connected via enclosed breezeways. The walls of the Rocket Motor Prep Area are concrete and brick. The walls of the Segmenting Area are steel, concrete and brick. The walls on the north and south side of the Segmenting Area are designed to absorb fragments and control effects of potential energetic events. The floors are solid concrete and are designed not to allow for explosives to lodge into cracks. The floors and work surfaces are non-sparking and the facility utilizes grounding mechanisms for all equipment and work surfaces. The building will contain work benches for tools.

A general layout of the Rocket Motor Ops Building is included in *Appendix XIII – Confidential Material*.

2.2 Operation, Monitoring, and Maintenance

2.2.1 Operation

Energetic material prepared for processing in the Rocket Motor Ops Building must be processed in the HBC during the same operating shift. No unprocessed energetic material will be left in the Rocket Motor Ops Building when the HBC is not in operation. Any unprocessed energetic material will be transferred to the storage magazines until the HBC returns to operation.

Operating instructions, start-up and shutdown procedures, preventive maintenance, servicing instructions, and troubleshooting methods will be developed based on manufacturer

recommendations, processing needs, and to ensure protection of human health and the environment.

2.2.2 Monitoring

ESD will have electronic surveillance equipment located throughout the Rocket Motor Ops Building to include at the Rocket Motor Prep Area and the Segmenting Area. Additionally, ESD will have a Human Machine Interface (HMI) that monitors all HBC system readings and operating parameters to ensure safe conditions. HBC process cycles are not allowed to commence if all safe conditions are not met or remedied. The HMI is located in the Range Control Room, which is located to the east of the Rocket Motor Ops Building.

2.2.3 Maintenance

Maintenance will be performed in accordance with the manufacturer recommendations for the specific equipment used within the building. For example, the water-cooled band saw's maintenance will follow the servicing instructions given by the manufacturer. Additionally, any maintenance that needs to be performed as a result of an inspection will be conducted. Any cracks in the flooring will be repaired and sealed.

3.0 PATHWAYS OF EXPOSURE

The possibility for release exists at any facility that handles hazardous wastes. However, multiple precautions have been taken to minimize risks, exposure, and releases. Due to the nature of the wastes (solids containing no free liquids or volatile organic compounds), the manner in which hazardous wastes are stored and handled, the equipment used, the building designs, and the operational practices of the facility, the likelihood of a release of hazardous wastes or hazardous waste constituents is remote. Training on the proper methods of packaging, storing and transporting energetic materials is provided to employees who handle energetic materials. Inspections are conducted on a regular basis to ensure that all areas where energetic materials are stored or handled are safe and that facility operating procedures are being followed.

3.1 Air Pathway of Exposure

One potential pathway of exposure to humans or environmental receptors is through the air. However, the operations within the Rocket Motor Ops Building are not expected to contribute to air emissions from the facility due to their management by the building enclosure. The only activity that could result in airborne contamination would be the use of a water-cooled band saw. However, airborne contaminates generated in the building are expected to be insignificant and managed within the enclosed building. The building's HVAC system filter is designed to collect

the small amount of airborne contaminants resulting from these types of activities and would not result in the release of contaminants outside of the building.

3.2 Surface Water, Groundwater, or Soil Pathways of Exposure

Another potential pathway of exposure to humans or environmental receptors is through surface water, groundwater, or soil. Surface water, groundwater, or soil could be affected if hazardous wastes were spilled or if run-off from hazardous waste areas occurred. However, the potential for exposure from spills and/or runoff is minimized due to the types of materials handled and effective management and handling procedures, as described below.

3.2.1 Spills

The Rocket Motor Ops Building is routinely inspected to ensure that no spillage has occurred. If spillage does occur, the structure is equipped with concrete floors with a raised entrance to prevent the material from leaving the building and contaminating the soil. Any spills in the building will be cleaned up immediately.

3.2.2 Precipitation Run-on or Runoff

The Rocket Motor Ops Building is a covered structure protected from precipitation and has concrete floors with a raised entrance that prevents precipitation or run-on from entering the building.

These measures guard against the release of hazardous waste to the surface water, groundwater, or soil.

4.0 SECONDARY CONTAINMENT

As discussed in *Appendix IV.D – Waste Analysis Plan*, the information used to characterize the energetic materials demonstrates that no free liquids are present. Since the Rocket Motor Ops Building will not have containers with free liquids, secondary containment is not required by 40 CFR §264.175(c) as long as:

- The storage area is sloped or is otherwise designed and operated to drain and remove liquid resulting from precipitation, or
- The containers are elevated or are otherwise protected from contact with accumulated liquid.

The Rocket Motor Ops Building is an enclosed building and there is no possibility of precipitation or run-on entering the building. Additionally, the energetic materials contain no free liquids.

Therefore, there is no potential for liquid spills or leaks. All containers not currently being prepared for processing are kept on pallets in order elevate them above the floor surface in the event of an accumulated liquid, such as condensation, being on the floor.

5.0 INSPECTIONS AND CONTAINER MANAGEMENT

Inspections are described in the Inspection Schedule in *Appendix III.D – Inspection Schedule*. The Rocket Motor Ops Building will be inspected when energetic waste is present. Daily visual inspections (when in operation) will be conducted to look for spills, loose debris, and improperly stored materials.

The frequency of inspections were selected based on regulatory requirements or based on the timeframe determined to be adequate to identify problems in time to correct them before they harm human health or the environment, whichever is shorter. A checklist of inspected items will be created and inspections will be recorded and filed as described in Section 4.0 of *Appendix III.D – Inspection Schedule*.

Containers are inspected for leaks or deterioration caused by corrosion or other factors. In accordance with 40 CFR §264.171, if a container holding hazardous wastes is not in good condition or if it begins to leak, the hazardous waste will be removed from the container and placed into another container that is in good condition. The defective container will not be used to manage hazardous waste until the defect is repaired.

Materials are stored in the original shipping containers which are designed to safely hold the energetic material until they are ready to be prepared for processing. The containers are compatible with their contents and there is no potential for the energetic material to react with the containers. All containers are kept closed until they are ready to be prepared for processing. Containers are not opened, handled, or stored in a manner which may rupture the container or cause it to leak.

6.0 HANDLING OF IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES

Ignitable and reactive waste are handled at this facility and are separated and protected from open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat. “No smoking” signs are conspicuously placed wherever there is a hazard from reactive waste. In accordance with 40 CFR §264.176, the Rocket Motor Ops Building is located at least 15 meters (50 feet) from the facility’s property line. Figure V.A.1 in *Appendix V.A – General Engineering Reports* shows the distance from the Rocket Motor Ops Building to the nearest property line.

The energetic materials are not incompatible with each other. Each type of energetic material is stored in its own sealed container and is not mixed with another type of energetic material.

7.0 CLOSURE

The Rocket Motor Ops Building will be closed to comply with the requirements of 40 CFR §264.601 and §264.602 in a manner that will ensure protection of human health and the environment. The information on closure of the Rocket Motor Ops Building can be found in *Appendix VII.A - Closure Plan*.

8.0 CONSTRUCTION SCHEDULE

The Rocket Motor Ops Building is an existing structure, but modifications began in Spring 2023 to accommodate the HBC installation near the southern portion of the building and to expand the Rocket Motor Ops Building further north. A general construction schedule is included below.

Tasks	Days from Permit Issuance
Permit Issuance	0
Modify southern portion of building to accommodate HBC installation	Currently on-going; will be completed prior to permit issuance
Expand northern portion of the building	Currently on-going; will be completed prior to permit issuance
Construction of interior bays	Currently on-going; will be completed prior to permit issuance
Rocket Motor Ops Building construction complete	Currently on-going; will be completed prior to permit issuance
Rocket motor segmenting equipment installed	1-365 days after permit issuance

9.0 CERTIFICATION

An addendum to this report and the certification statement by Mr. Benjamin Lai, Professional Engineer, State of Texas, are included on the following pages.

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Engineering Report - Miscellaneous Unit: Rocket Motor Ops Building (RMOB)

EnviroSafe Demil, LLC (ESD) - TCEQ RCRA Part B Permit Application

April 9, 2026

1. Engineering Scope, Role, and Assumptions (TCEQ Context)

This report is prepared from a Process Engineering perspective for the TCEQ RCRA Part B Permit Application. The scope covers material flow, hazardous waste handling, operational requirements, process safety considerations, exposure controls, and compliance with 40 CFR 264 Subpart X and applicable Subpart I provisions.

This report is based on information furnished by ESD, including RMOB permit narratives, container-storage information, HBC interface descriptions, supporting facility materials, and available vendor and manufacturer information. This report is intended to accompany, and not directly revise, ESD's underlying base reports.

This engineering report is certified in accordance with 30 TAC §305.50(a)(7) and the sealing requirements in 22 TAC §137.33. which require all engineering work be personally performed or directly supervised by the Texas Professional Engineer.

2. Executive Summary

The Rocket Motor Ops Building (RMOB) is an enclosed preparation building where energetic materials are unpackaged and, if necessary, segmented with a water-cooled band saw prior to transfer to the Hybrid Burn Chamber (HBC) for treatment within the same operating shift. No prepared but unprocessed energetics remain in the RMOB when the HBC is not operating. The RMOB's design and procedures ensure protection of human health and the environment consistent with 40 CFR 264.601.

3. Physical Characteristics and Design Basis

- **Building Configuration:** One-story building (original 1942; modified 2023) with 407 ft × 70 ft footprint and 16-ft walls; poured/polished concrete floors; no basement. Two areas: Rocket Motor Prep and Segmenting, connected via enclosed breezeways.
- **Construction and Protective Features:** Concrete ad brick in the Prep Area, steel, concrete and brick in the Segmenting area, north/south walls in Segmenting are designed to absorb fragments and control potential energetic events. Floors/work surfaces are non-sparking and equipment is grounded.
- **Material Flow:** Offload by forklift; unpack in Prep; move in cradles via pallet jacks to Segmenting; segment via water-cooled band saw; send to HBC for processing. Where segmenting is required, rocket motors are cut using a remotely operated water-cooled band saw. The saw continuously applies a water/cutting-fluid mixture at the cut interface to quench the cut, suppress particulate generation, and minimize the formation of dry energetic dust during segmenting. The Segmenting Area is maintained under negative pressure and is ventilated at approximately four air exchanges per minute, with exhaust air routed through HEPA filtration prior to discharge to the exterior of the building. Segmenting operations are

controlled from the control room through the building's remote monitoring and operating system.

4. Subpart X Performance Demonstration

- **Location, design and closure:** Site suitability is documented in Facility Siting Criteria; and building closure is addressed in the facility Closure Plan for compliance with 40 CFR 264.601-264.602.
- **Container performance standards (Subpart I):** Container condition (§264.171), compatibility (§264.172), closed container handling (§264.173), and inspections (§264.174) are implemented within the RMOB.
- **Subpart X performance basis:** There are no specific performance standards for preparation buildings. The most applicable standards for the RMOB are the container-management requirements in 40 CFR Part 264 Subpart I and the related Part B information requirements in 40 CFR §270.15, including container condition, compatibility, closed-container handling, inspections, and the no-free-liquids secondary-containment exception."

5. Exposure Pathways and Controls

- **Air:** Preparation and segmenting activities occur indoors. The water-cooled band saw is intended to minimize airborne particulate generation, and the building ventilation or HVAC system is intended to control residual airborne material within the enclosed structure. The principal potential air pathway in the RMOB is the rocket-motor segmenting operation. The Segmenting Area is maintained under negative pressure and is ventilated through air exchangers and HEPA filters to remove particulate matter smaller than 5 microns prior to discharge to the atmosphere. Based on this operating configuration, no separate dry energetic dust waste stream is expected from normal segmenting operations, and airborne contaminants are expected to be minimized and controlled within the enclosed building and ventilation system.
- **Surface water, groundwater and soil:** The water/cutting-fluid mixture used during segmenting is not recirculated and is not discharged as wastewater. Instead, liquid from the segmenting operation drains to a central trench system, is removed by an explosion-proof sump pump, passes through nominal 5-micron filtration, and is transferred to holding tanks. The holding-tank contents are then transferred to the HBC/APCS afterburner-quench injection point, where they are introduced into the hot quench stream for thermal treatment as part of the integrated process configuration. Accordingly, the segmenting operation does not result in a wastewater discharge from the RMOB. The RMOB is a covered structure protected from precipitation and equipped with concrete floors and a raised entrance that prevents run-on or precipitation from entering the building. If spillage occurs, the raised entrance and concrete floor prevent material from leaving the building. Environmental protection also relies on immediate cleanup, housekeeping, and controlled handling of coolant or water associated with the segmenting operation.

6. Secondary Containment Determination

No free liquids are stored in RMOB containers. Because the RMOB is enclosed and there is no possibility of precipitation or run-on entering the building, secondary containment is not required under 40 CFR §264.175(c) for these containers. Containers not currently being prepared for processing are kept on pallets to elevate them above incidental accumulated liquid such as condensation. This basis applies to the stored or staged containers themselves.

The no-free-liquids determination in this section applies to energetic-material containers stored or staged in the RMOB; operational liquids associated with the water-cooled band-saw segmenting process are separately captured and managed through the trench, sump, filtration, and holding-tank system described in Section 5 and are not discharged from the RMOB as wastewater. Any operational liquids associated with the water-cooled band saw or housekeeping activities should be handled via defined collection and management procedures.

7. Operation, Monitoring, and Maintenance

- **Operations:** Energetic material prepared for processing in the RMOB must be processed in the HBC during the same operating shift. No unprocessed energetic material will be left in the RMOB when the HBC is not in operation. Where segmenting is required, the water-cooled band saw is operated remotely from the control room, the cut is continuously quenched during operation, and segmenting liquids are collected and managed through the trench/sump/filtration/holding-tank pathway for transfer to the HBC/APCS quench stream. Any unprocessed energetic material will be transferred to the storage magazines until the HBC returns to operation. SOPs (startup, shutdown, PM, troubleshooting) follow manufacturer recommendations. According to information provided by ESD, the segmenting and liquid-management configuration has previously been developed and tested under USG engineer supervision during development and testing activities.
- **Monitoring:** Monitoring: Electronic surveillance equipment is located throughout the Rocket Motor Ops Building, including the Rocket Motor Prep Area and Segmenting Area. The HMI in the Range Control Room monitors HBC system readings and operating parameters to ensure safe conditions, and HBC process cycles are not allowed to commence if safe conditions are not met or remedied. Video surveillance and remote controls allow operators to observe and control segmenting activities from the control room without routine operator presence at the saw during active cutting.
- **Maintenance:** Manufacturer-specified preventative maintenance applies to the band saw and building systems; floor conditions, seals, and other housekeeping-related features should be maintained to preserve safe handling and containment performance.

8. Inspections and Container Management

The RMOB should be inspected whenever energetic waste is present. Daily visual inspections during operation should address spills, loose debris, storage practices, band-saw coolant-management features, floor condition, and housekeeping. Containers should remain closed, compatible, and handled to prevent rupture or leaks; and defective containers should be remediated under §264.171.

9. Ignitable/Reactive/Incompatible Management

Ignitable and reactive waste is separated and protected from open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks, spontaneous ignition sources, and radiant heat. No-Smoking signage is posted where reactive waste hazards exist. The RMOB is located at least 50 feet from the property line, and each type of energetic material is stored in its own sealed container and is not mixed with another type.

10. Construction Status

Construction status: Modifications to the southern portion of the building, expansion of the northern portion, construction of interior bays, and overall RMOB construction were ongoing and

planned to be complete prior to permit issuance; rocket-motor segmenting equipment installation may occur 1-365 days after permit issuance.

11. Closure

Close the RMOB in accordance with 40 CFR 264.601–264.602 and the facility Closure Plan (Appendix VII.A).

Professional Engineer Certification

I certify under penalty of law that this engineering report was prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who will manage the units, or those persons directly responsible for gathering information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Responsible Engineer: Benjamin Lai, P.E.
Texas PE License No.: 115820
Date: April 15, 2026
Seal:

Signature:

Issued by: ONB Engineering Research and Technical Services LLC
Texas Engineering Firm Registration No.: F-28329

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Section V – Engineering Reports

Appendix V.K – Miscellaneous Units (Hybrid Burn Chamber)

40 CFR §264.600-§264.602, and §270.23

1.0 INTRODUCTION

The Hybrid Burn Chamber (HBC) is subject to 40 CFR Part 264 Subpart X (40 CFR §264.600-§264.603) – Miscellaneous Units. *Table V.K – Miscellaneous Units* lists information for the HBC. The HBC is located, designed, constructed, operated, maintained, and will be closed in a manner that will ensure protection of human health and the environment. Site-specific information pertaining to the hydrologic and geologic characteristics, groundwater flows, patterns of land use, precipitation patterns, etc. are required by 40 CFR §264.601 in order to ensure that the site is suitable to ensure protection of human health and the environment. Detailed site-specific information is provided in Section II of the Part B Application in *Appendix II – Facility Sitting Criteria*.

The HBC and the associated air pollution control system will be located towards the southern portion of the main facility property, near the intersections of N Montague Street (now renamed "Demil Way") and ~~Pine~~ Cypress Street in Hooks, Texas (Bowie County). The exact location is described in ~~Section II of the Part A Application Form – *Facility Background Information* and in~~ Section II of the Part B Application – *Facility Siting Criteria*. ~~A map of the location is shown in the attachments to the Part A Application Form.~~

Table 1, *Table of Information Requirements for Miscellaneous Units*, presents the regulatory references for the information required to be submitted for miscellaneous units in 40 CFR §270.23 and 40 CFR §264.600-§264.602 and the section of this document that addresses the specific requirement. Most of the information for this miscellaneous unit is addressed in other portions of this permit application. For information that is addressed in another portion of this permit application, a statement indicating which section the information can be found in is provided. Any additional information that is not covered in other portions of this permit application is presented in this document.

Table 1
Table of Information Requirements for Miscellaneous Units

Regulatory Citation (40 CFR)	Description	Section Requirement is Addressed
§270.23(a)(1)	Physical characteristics, materials of construction, and dimensions of the unit	Section 2.6
§270.23(a)(2)	Description of how the unit will be located, designed, constructed, operated, maintained, monitored, inspected, and closed to comply with the requirements of §264.601 and §264.602	Section 1.0
§270.23(a)(3)	For disposal units, plans for post-closure requirements	N/A
§270.23(b)	Hydrologic, geologic, and meteorologic assessments and land-use maps for the region surrounding the site	Section 1.0
§270.23(c)	Information on potential pathways of exposure and on the potential magnitude and nature of such exposures	Section 4.0
§270.23(d)	For any treatment unit, a demonstration of the effectiveness of the treatment based on laboratory or field data	Section 2.8
§270.23(e)	Additional information determined by the Director to be necessary	N/A
§264.601(a)	Prevention of releases due to migration of waste constituents in the groundwater or subsurface environment	Section 4.2
§264.601(b)	Prevention of releases of due to migration of waste constituents in surface water, or wetlands, or on the soil surface	Section 4.2
§264.601(c)	Prevention of releases due to migration of waste constituents in the air	Section 4.1
§264.602	Monitoring, testing, analytical data, inspections, response, and reporting procedures and frequencies	Section 2.7 Section 6.0

2.0 DESCRIPTION OF THE HYBRID BURN CHAMBER SYSTEM

Energetic materials are transferred from the storage magazines to the Rocket Motor Ops Building, where they are prepared for processing in the HBC. The HBC provides demilitarization for numerous munition items such as rocket motors, flares, smoke munitions, and other munitions that are ignitable and non-mass detonating. Munitions are processed in campaigns – a campaign is where multiple batches of the same munition are processed through the HBC in a consecutive time period. For example, a certain type of munition will be processed through the HBC for several days to several months, depending on the amount of munitions needing to be processed. After the materials are prepared for processing, they are transferred through the Rocket Motor Ops Building to the feed sled of the HBC. The HBC system is a contained burn system followed by air pollution control equipment. The HBC is manufactured by Tex-Fab, Inc. and is a custom built chamber with a design capacity of 250 pounds Net Explosive Weight (NEW). Precision Partners Industrial Development Group (PPIDG) is providing the APCS equipment. A process flow diagram is included in Figure V.K.1.

The HBC system initial concept was designed by El Dorado Engineering (EDE). EDE has designed other thermal treatment facilities which are currently in operation. Examples of these facilities include the Ammonium Perchlorate Rocket Motor Destruction (ARMD) facility at Letterkenny Army Depot in PA and the Camp Minden M6/CBI Bulk Propellant facility at Camp Minden, LA. EDE designs have proven control technologies. The ESD HBC system is a hybrid-like version of the EDE ARMD and Camp Minden designs.

Contained burn technology can be thought of as "open burning indoors." This proven technology provides a modern and environmentally responsible alternative to replace open burning. These robust systems are designed to be simple, safe, and flexible from an operations standpoint, while limiting pollution and potentially harmful emissions which are a concern from open burning operations.

Materials are prepared in batches and are ignited in a manner similar to traditional open burning operations, maintaining simplicity and flexibility. The exhaust gasses, however, are contained and cleaned prior to release to protect human health and the environment. The design of the air pollution control system (APCS) to scrub the off gases is tailored to the chemistry of the materials being processed.

The basic components of the contained burn system include the feed system, the HBC, an ignition system and an APCS. Ancillary systems include an HBC wash system and utilities. The

components and systems presented in the following sections are used to achieve energetic destruction and pollution abatement.

2.1 Feed System

The feed system design is customized based on the type and quantity of material to be processed to maximize throughput, process material type flexibility, and minimize personnel handling of the process feed material, thus minimizing risk. Each batch is limited to 250 pounds Net Explosive Weight (NEW) through the feed system. All feeding into the HBC is performed by operators in the control room (Range Control) which is separated from the HBC by a substantial barricade wall designed to prevent injury to operators. Safety systems throughout the HBC include a series of interlocks and alarms for abnormal conditions.

The feed system operates in a batch feed mode. Bulk materials are prepared for processing and are placed into a removable burn pan. Rocket motor components or other items that create thrust when burned are secured using a holding fixture to restrain the motor during firing. The burn pan or rocket motor is then remotely loaded into the HBC using an automated loading system. The material is ignited remotely. After thermal processing is complete, the burn pan is remotely extracted from the HBC.

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2.2 Hybrid Burn Chamber (HBC)

The HBC is a steel pressure vessel specially designed and sized to contain the exhaust products generated from burning. It is designed to ensure both the safety of personnel and to protect equipment in the case of a maximum credible event. It is sized to provide proper combustion of the process materials and to withstand the process operating pressures and temperatures.

~~The HBC is a steel pressure vessel specially designed and sized to contain the exhaust products generated from burning. It is designed to ensure both the safety of personnel and to protect equipment in the case of a maximum credible event. It is sized to provide proper combustion of the waste materials and to withstand the process operating pressures and temperatures.~~

2.3 Ignition System

An electrically actuated ignition source is incorporated in the contained burn system so that materials loaded for processing can be ignited remotely by an operator. The ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is operational. Once the chamber is closed and ignition initiated, the operators have no further active control.

~~An electrically actuated ignition source is incorporated in the contained burn system so that materials loaded for processing can be ignited remotely by an operator. The ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is operational. Once the chamber is closed and ignition initiated, the operators have no further active control.~~

2.4 Air Pollution Control System (APCS)

After processing of the energetic materials within the HBC, emissions are exhausted through a series of air pollution control equipment that make up the APCS. The APCS is tailored to the exact waste profile being processed. The APCS is designed to achieve low/non-detectable emission levels~~ and is made up of the following components~~.

The pressure and flow of the gas will be regulated by an isolation butterfly valve and associated pressure bypass valve at the outlet of the HBC. The HBC gas will be evacuated from the top of the chamber directly into a thermal oxidizer (also known as an afterburner) for VOC destruction where the gas temperature will be increased to 1,400ºF to 2,100ºF for 2 seconds of residence time to provide effective thermal oxidation of VOCs.

The hot flue gas will then be quenched by water injection down to approximately 750ºF and will enter the reaction duct. In the reaction duct, dry sorbent (hydrated lime) and aqueous ammonia (19% solution) are injected into the gas stream to mix prior to distribution through the ceramic filter housings. At the ceramic filter housings, the process PM and reacted sorbent containing captured HCl and SOx are filtered out of the gas stream directly on the outer surface of the ceramic filters and discharged from the filter housing waste hopper. The catalyst in the filters will react with the NOx and ammonia resulting in NOx destruction. The clean gas exits the filter housings and flows through the high temperature induced draft fan and out the stack. (Note that NOx and

Commented [MS1]: After the application was submitted, ESD decided to use a different APCS design in order to better treat the expected emissions. The application and Trial Burn Plan have been updated with the new APCS design.

SOx are not regulated by the RCRA permit, but are mentioned in this document because it is part of the system's emissions treatment capability).

Mechanisms of Removal

A description of the devices in the APCS that remove certain pollutants is provided in Table 2.

2.4.1 Thermal Oxidizer (Afterburner)

A down-fired natural gas direct-fired thermal oxidizer is provided and includes a certified combustion management system. The system increases gas temperatures to 1,400°F to 2,100°F for approximately 2 seconds of residence time to achieve thermal oxidation. This design enhances the effectiveness of the oxidation process while allowing any particulate matter to stay suspended in the gas stream for removal at the ceramic filters.

2.4.2 Ammonia Injection System

Note that NOx will not be regulated by the RCRA permit, but is mentioned in this document because it is part of the system's emissions treatment capability.

To control NOx with the catalytic ceramic filters, aqueous ammonia (19% by weight.) is injected directly into the flue gas inlet duct upstream from the dry sorbent injection (DSI) point. The ammonia system utilizes a metering pump with pulse dampener and pressure transmitters to ensure proper system operation. Ammonia is atomized using compressed air at the nozzle to ensure proper mixing with NOx in the flue gas. All wetted components are chemical resistant plastic and 316 grade stainless. The pump skid is contained in an impact resistant steel structure with a spill containment and plastic spray shields.

Table 2
Mechanisms of Removal

POLLUTANT	REMOVED BY	MECHANISM OF REMOVAL
CO	Thermal oxidizer	Combustion: $2CO + O_2 \rightarrow 2CO_2$
POHCS	Thermal oxidizer	Combustion: $C_xH_yO_zN_n + (x + \frac{y+2n}{4} - z)O_2 \rightarrow xCO_2 + \frac{y}{2}H_2O + nNO$
DIOXINS/FURANS	Thermal oxidizer Ceramic filter	Combustion: $C_xH_yO_zCl_n + \left(x + \frac{y-n}{4} - z\right)O_2 \rightarrow xCO_2 + \frac{y-n}{2}H_2O + nHCl$ Catalyst in ceramic filter promotes oxidation of dioxin/furans at the operating temperatures
NO_X*	Ammonia injection	Chemical Reaction: $4NH_3 + 4NO + O_2 \rightarrow 4N_2 + 6H_2O$ $4NH_3 + 2NO_2 + O_2 \rightarrow 3N_2 + 6H_2O$ $8NH_3 + 6NO_2 \rightarrow 7N_2 + 12H_2O$ $2NH_3 + NO + NO_2 \rightarrow 2N_2 + 3H_2O$
HCL	Dry sorbent injection	Chemical Reaction: $Ca(OH)_2 + 2HCl \rightarrow 2H_2O + CaCl_2$
PM	Ceramic filter	Barrier filtration on surface of ceramic filter
METALS	Ceramic filter	Condensable metals are filtered at the ceramic filter and are collected as PM

** Note that NOx will not be regulated by the RCRA permit, but is mentioned in this document because it is part of the system's emissions treatment capability.*

~~*2.4.1 Afterburner*~~

~~The purpose of the high temperature afterburner is to raise the temperature of the exhaust gases to provide complete combustion of any partially reacted species, volatile or semi-volatile organic compounds, or carbon monoxide. EDE's afterburner is designed to heat the exhaust up to the required minimum setpoint temperature with a minimum residence time of two seconds.~~

2.4.3 Dry Sorbent Injection (DSI) System

Dry sorbent is stored in supersacks with a capacity of 1,100 lbs. Supersacks of fresh sorbent are loaded on the bag unloader system designed to inject sorbet into the flue gas duct within the operating injection range of 10-40 lbs/hr. The bag unloader system has a screw feeder to control the feedrate and a compressed air venturi to convey sorbent to the injection point. Supersack vibrators keep the fresh sorbent flowing out of the supersack. The bag unloader system uses weight sensors and alarms to notify operators that a supersack change is required.

2.4.4 Ceramic Filter Housing and Elements

Note that NOx will not be regulated by the RCRA permit, but is mentioned in this document because it is part of the system's emissions treatment capability.

The prefabricated filter housings include the tube sheet, reverse air pulse filter cleaning system, inlet/outlet duct connection flanges, housing body, hopper, insulation, and cladding. The filter housing is welded internally to eliminate air or water leakage into the housing while under negative pressure during operation.

The filter elements in this system are embedded with a catalyst for selective catalytic reduction (SCR) of NOx, using the filter ceramic as the catalyst substrate. The PM filtration at the surface serves to protect the catalyst active material. The catalyst has best efficiency between 500 °F – 775 °F, but can operate outside of this temperature range at lower efficiency. The CFA Cerafil catalytic ceramic filters have been proven to operate for over 10 years without replacement. Due to the mechanism of the filters, both the embedded catalyst and the mechanical integrity of the filter, do not observe meaningful performance degradation for the life of the filter. This significantly reduces the cost, downtime and risk observed when compared against traditional SCR catalyst and fabric filter bags which often require replacement in <3 years.

2.4.5 Waste Collection and Handling

The spent sorbent material temperature at the discharge of the filter housing hoppers will be approximately 600ºF. The sorbent wastes quickly cools as it passes through a rotary air lock to be collected in waste hoppers for disposal.

2.4.6 ID Fan

The 150-HP high temperature induced draft (ID) fan features a direct drive configuration for improved performance. It includes integrated vibration and temperature sensors for enhanced monitoring. This design ensures efficient operation and reliable performance at all times during operation.

2.4.7 Stack

The exhaust system features a 60-foot carbon steel stack supported by a blind flange, complete with EPA test ports and CEMS port.

2.4.8 Stack Gas Monitoring - CEMS

Stack gas is continuously monitored using a Fourier Transform Infrared spectroscopy (FTIR) based Continuous Emissions Monitoring System (CEMS). The CEMS measures the following for regulatory compliance:

- Carbon monoxide (CO)
- Oxygen (O_2) by Zirconium Oxide
- Water (H_2O)

The CEMS measures the following for process control:

- Ammonia (NH_3) (Ammonia slip serves as the broken filter detection system)
- Hydrogen Chloride (HCl)

The CO and O_2 CEMS will be installed, calibrated, maintained, and continuously operated in compliance with Performance Specification 4B.

The primary functions of the CEMS are to:

- Continuously measure, display, and record the gas concentrations in the stack, and activate alarms

Additionally, the CEMS performs these important functions:

- Monitors CEMS operational status, and
- Performs calibration of monitoring systems.

More information on the CEMS is included in Attachment V.K – HBC.

2.4.9 Instrumentation and Control

All instrumentation for process monitoring is included, such as thermocouples, flow monitors, and pressure transmitters. The control room contains the Main Programmable Logic Controller (PLC) and HMI interface for operator input. This PLC will directly communicate with three Remote Input/Output (RIO) panels located in the field to control the APC and Wash System equipment. System design ensures the timely reporting of abnormal conditions and alarms and ensures proper process flow. These components are assembled inside National Electrical Manufacturer Association (NEMA) 4X outdoor-rated cabinets for durability. This ensures reliable process control and monitoring in all environments.

2.4.10 Monitoring of Process Conditions and Safey Interlocks

The HBC does not utilize a traditional automatic waste feed cutoff (AWFCO) system. However, the ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is within the appropriate operating ranges. A Human Machine Interface (HMI), which is a series of computers and monitors, displays information on the temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. HBC process cycles are not allowed to commence if all safe conditions are not met or remedied.

The firing sequence requires a permissive from the APCS that indicates the parameters within the APCS are within the required setpoints (thermal oxidizer is ready to receive gases for treatment, DSI and ammonia systems are working, pressure throughout the system is within setpoints, etc.). Once the position switch on the HBC door is activated saying the door is closed, and verified through a manual switch at the chamber, the ignition sequence is allowed to begin. Operators have individual keys and must return to the control room to place their key into the key interlock mechanism to allow firing of the rocket motor. At this point, the keys are captive in the firing switch. The sequence of opening the door for another cycle cannot be completed until pressure has reduced to ambient in the chamber. This indicates that all the gas has been evacuated and treated through the APCS. If there are out of spec readings, or the APCS has become faulted, the keys are unable to be removed, and the cycle cannot be repeated. The error will need to be corrected to unlock the keys and allow the door to be opened for another cycle.

~~*2.4.2 Evaporative Quench*~~

~~An evaporative quench system is used to cool the exhaust gases downstream of the afterburner to the required temperature for subsequent pollution control elements, such as low temperature filtration units (e.g., baghouse). The evaporative quench operates by the controlled spray of water into the exhaust gas stream, which is metered to cool the gases to the desired temperature setpoint. The gas cooling system is designed with a well proven automated cleaning system and designed specifically for challenging applications to prevent bridging or plugging with particulate.~~

~~*2.4.3 Cyclone Separator*~~

~~A cyclone separator is used to remove larger particulate matter. Particulate is collected below the cyclone's hopper in a sealed disposable drum for convenient disposal.~~

~~*2.4.4 Dry Sorbent Injection*~~

~~A dry sorbent injection system is used when processing materials which produce significant quantities of acid gases. The dry sorbent injection system injects metered powdered caustic material upstream of the baghouse to remove and neutralize acid gases. Neutral salts are then collected as solid particulate in the baghouse. This system is not operational when processing materials which do not produce significant amounts of acid gas.~~

~~*2.4.5 Baghouse*~~

~~The baghouse is a fabric-filtration collector, used for efficient particulate cleansing of the gas stream. The baghouse is automatically cleaned via a reverse pulse air jet to ensure proper operation and low maintenance. Particulate is collected below the hopper in a sealed drum for convenient disposal.~~

~~*2.4.6 HEPA Filter*~~

~~A high efficiency particulate air (HEPA) filter is located downstream of the baghouse to provide ultra-high efficient >99.9 % particulate filtration. This also acts as a guard for downstream equipment (e.g., SCR) in the unlikely case a bag ruptures upstream. This removes particulate matter to levels below what normally exist in a home or office. This type of filtration is used in manufacturing clean rooms and hospitals.~~

~~*2.4.7 Selective Catalytic Reduction (SCR) System*~~

~~A selective catalytic reduction (SCR) system utilizes ammonia injection with a proprietary catalyst formulation to achieve better than 90% NOx reduction. The proprietary design used by EDE provides high activity catalyst and low pressure drop resulting in more efficient NOx removal with lower energy consumption when compared to other commercial SCR NOx control technologies.~~

~~The catalyst provides for efficient removal of NOx at relatively low temperatures. This approach also provides an extra benefit of reducing dioxin or furan emissions, if they are present, which are actually reacted and eliminated by the catalyst in this system rather than collected as with other alternative technologies.~~

~~*2.4.8 Induced Draft Fan/Stack*~~

~~The induced draft (ID) fan provides negative pressure throughout the entire system and draws exhaust gases through the pollution control system to exit out the stack. When the fan is placed at the end of the equipment train, all vessels, joints, and equipment operate at negative pressure to minimize fugitive emissions. The gases are exhausted through a stack of appropriate height to protect personnel. The stack also includes sampling ports for continuous or periodic emission sampling.~~

2.5 HBC Wash System

This system provides for automated remote washing of the interior of the chamber to periodically remove ash or condensate materials from the chamber. The spray water is drained from the HBC and passes through a neutralization system to neutralize any acid present. A downstream filter press system will then remove any solids from the chamber or from the neutralization process. The filtered liquid stream can then be re-used for future HBC wash cycles or pumped into storage tanks where it is characterized prior to final disposal off-site.

~~This system provides for automated remote washing of the interior of the chamber to periodically remove ash or condensate materials from the chamber. The spray water is drained from the HBC and passes through a neutralization system to neutralize any acid present and a filter press system to remove solids. The filtered liquid stream can then be re-used for future HBC wash cycles or pumped into the evaporative quench system. Non-reused products from the wash process are characterized prior to final disposal off-site.~~

2.6 Physical Characteristics, Materials of Construction, and Dimensions

The HBC is a steel pressure vessel specially designed and sized to contain the exhaust products generated from burning. The specific design information for the HBC is considered CONFIDENTIAL information and more details, including a process flow diagram, are contained in *Appendix XIII – Confidential Material*. Non-confidential information is shown in Attachment V.K – HBC.

2.7 Operation, Monitoring, and Maintenance

Standard operating procedures will be developed by the facility, ~~and~~ the manufacturer for the HBC, and the manufacturers for the associated air pollution control system (APCS). As part of the design process, the manufacturer is expected to perform a design hazards analysis on the unit and the anticipated operations. This analysis will identify scenarios that could result in a safety incident. From this design hazard analysis, appropriate administrative controls, procedures, and training will be identified and used in developing the standard operating procedures.

Operation

Operation for both the HBC and the associated APCS is performed in accordance with the manufacturer recommendations. Operating instructions, start-up and shutdown procedures, preventive maintenance, servicing instructions, and troubleshooting methods are based on manufacturer recommendations, processing needs, and ensure protection of human health and the environment.

The HBC feed process is fed by batch. Items are fed to the chamber and are allowed to consume themselves (in the manner in which they were originally designed) inside of the chamber. When operating conditions are within the specified ranges, the items are then removed to be replaced by the next batch or item. If conditions are incorrect for another batch based on the chamber sensors or APCS sensors, the batch is not fed or processed until conditions are remedied.

After being processed, the output stream from the HBC consists of inert motor casings and some recyclable materials. The inert motor casings are sent to an appropriate landfill off-site and recyclable materials are sent off-site for recycling.

A general overview of normal operation is provided below:

1. Materials are prepared for processing and placed into a burn pan or holding fixture.
2. The material to be processed for a given burn cycle is remotely loaded into the HBC.
3. The ignition source is activated remotely to promote combustion of the materials.
4. The materials burn inside the HBC which contains the exhaust gases.
5. The exhaust gases are metered through the APCS via induced draft from the ~~(~~ID~~)~~ fan and the HBC vent valve which meters exhaust gas flow.
6. When HBC pressure is confirmed to be negative relative to ambient, the HBC loading door is remotely opened. Fresh air is drawn into the HBC by the ID fan.
7. The processed materials can be inspected remotely via closed circuit television (CCTV).
8. Operators are allowed to remove the burn pan or rocket motor case from the loading system and place the next load for processing.

9. The cycle is repeated.

Monitoring

~~Since the HBC is subject to 40 CFR Part 264 Subpart X (40 CFR §264.600-§264.603) – Miscellaneous Units, other requirements for 40 CFR Part 264 Subpart O (Incinerators) or 40 CFR Part 63 Subpart EEE (HWC MACT) do not apply. However, c~~Continuous process monitoring, including monitoring of the operating parameter limits (OPLs) discussed in Section 3.0, is conducted through the Human Machine Interface (HMI) located in the Range Control room. A series of computers and monitors displays information on the temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. By procedure, HBC process cycles are not allowed to commence if all safe conditions are not met or remedied.

Maintenance

Maintenance for both the HBC and the associated APCS is performed in accordance with the manufacturer recommendations.

2.8 Effectiveness of Treatment

Based on experience with similar techniques conducted at other facilities, there are no explosive components left after processing and the remaining material is no longer considered to carry the reactive waste code.

3.0 EMISSIONS TESTING AND COMPLIANCE STRATEGY

The HBC is not an incinerator and there is no controlled flame combustion. The HBC operation most closely resembles open burning/open detonation, but is more environmentally responsible. As opposed to open burning/open detonation, the HBC has the advantage of containing and cleaning the exhaust gases. ~~Since ESD's technologies are~~The HBC is non-incineration, and ESD is applying for a ~~(~~RCRA 40 CFR Part 264 Subpart X permit. After discussions with TCEQ, TCEQ recommends that the emission limits and relevant operating parameter limits (OPLs) of ~~) as opposed to incineration (40 CFR Part 264 Subpart O), the requirements of~~ 40 CFR Part 63 Subpart EEE (HWC MACT) ~~do not apply~~would be most appropriate for the HBC and its APCS.

Tables V.K.2, V.K.3, V.K.4, and V.K.5 provide compliance information for the HBC. ESD will conduct a ~~performance verification test~~Trial Burn Test on the HBC and the associated APCS in order to prove compliance with the emission limitations specified in Table V.K.4. The constituent feedrate limits and select operating parameter limits (OPLs) will be established based on performance ~~verification testing data~~during the Trial Burn. Other ~~and the operating parameter~~

~~limits (~~OPLs~~)~~ will be based on manufacturer's recommendations or ~~design and safety information~~will be as specified in the HWC MACT rule. These limits will ensure compliance with the emission limitations.

The constituent feedrate limits specified in Table V.K.3 will be in effect during the shakedown period (no more than 720 hours of operating before the ~~performance verification~~Trial Burn T~~t~~est)~~, during the performance verification test,~~ and during the period of time after the Trial Burn Test ~~performance verification test~~ until the permit can be modified to reflect the results of the Trial Burn Test~~performance verification test~~. The constituent feedrate limits will be updated in Table V.K.2 based on performance ~~verification testing~~during the Trial Burn Test and the permit will be modified to include the new constituent feedrate limits. ~~these constituent feedrate limits will be implemented at the time the performance verification test report is submitted.~~

A ~~performance verification test plan~~Trial Burn Plan outlining ~~will outline~~ the purpose of the test, the operating conditions of the test, and the basis for how the constituent feedrate limits and OPLs will be established is included in Attachment V.K – Trial Burn Plan. ESD will conduct the ~~performance verification test~~Trial Burn Test before the HBC operates a total of 720 hours (shakedown period).

4.0 PATHWAYS OF EXPOSURE

The possibility for release exists at any facility that handles hazardous wastes. However, multiple precautions have been taken to minimize risks, exposure, and releases. Due to the nature of the wastes, the manner in which hazardous wastes are stored and handled, the equipment used, the building designs, and the operational practices of the facility, the likelihood of a release of hazardous wastes or hazardous waste constituents is remote. Training on the proper methods of packaging, storing and transporting energetic materials is provided to employees who handle energetic materials. Inspections are conducted on a regular basis to ensure that all areas where energetic materials are stored or handled are safe and that facility operating procedures are being followed.

4.1 Air Pathway of Exposure

One potential pathway of exposure to humans or environmental receptors is through the emissions of hazardous constituents from the HBC into the air. However, because the extensive APCS equipment is designed to provide minimum removal efficiencies of 99.9% for particulate matter, ~~98% for NOx,~~ 99% for CO, 99.99% for VOCs, ~~99~~90% for HCl, ~~90% for SO_2,~~ and 99.99% for metals, these potential effects are minimized to the maximum extent possible. Additionally, the

facility operates under an air Permit by Rule (PBR) issued by the Texas Commission on Environmental Quality (TCEQ) Air Permits Division.

4.2 Surface Water, Groundwater, or Soil Pathways of Exposure

Another potential pathway of exposure to humans or environmental receptors is through surface water, groundwater, or soil. Surface water, groundwater, or soil could be affected if hazardous wastes were spilled or if run-off from hazardous waste areas occurred. However, the potential for exposure from spills and/or runoff is minimized due to the types of materials handled and effective management and handling procedures, as described below.

Spills

The energetic materials sent to the HBC are not in liquid form. They are solid parts or powders that are enclosed in additional packaging. The HBC concrete pad is routinely inspected to ensure that no spillage has occurred. If spillage does occur, the concrete pad prevents the material from contaminating the soil. Any spills will be cleaned up immediately.

Precipitation Run-on or Runoff

The feed system for the HBC is enclosed within the Rocket Motor Ops Building, preventing precipitation from entering the feed system. The HBC unit is an enclosed vessel (the exterior of the vessel is exposed to the elements) that is set into a large concrete foundation that provides support and completely contains the footprint of the HBC. ~~The HBC is set into a large concrete foundation that completely contains the chamber. The HBC APCS has a concrete pad with an apron to capture rainwater runoff through a filter.~~ These measures guard against the release of hazardous waste to the surface water, groundwater, or soil.

5.0 SECONDARY CONTAINMENT

As discussed in *Appendix IV.D – Waste Analysis Plan*, the information used to characterize the energetic materials demonstrates that no free liquids are present. Therefore, there is no potential for liquid spills or leaks and secondary containment is not a concern.

As ~~previously~~ mentioned in Section 4.2, the HBC vessel is set into a large concrete foundation that completely contains the footprint of the HBC ~~chamber~~. ~~The HBC APCS has a concrete pad with an apron to capture rainwater runoff through a filter.~~

The process tanks do not contain hazardous waste or hazardous liquid; however, the ammonia feed tank which provides ammonia to the APCS, has secondary containment.

6.0 INSPECTIONS

Inspections related to the HBC and APCS are described in the Inspection Schedule in *Appendix III.D – Inspection Schedule*. The inspections cover the following components:

- Hybrid Burn Chamber
- Air Pollution Control System
- Monitoring Equipment
- Operational and Structural Equipment
- Safety and Emergency Equipment

The frequency of inspections were selected based on regulatory requirements or based on the timeframe determined to be adequate to identify problems in time to correct them before they harm human health or the environment, whichever is shorter. A checklist of inspected items will be created and inspections will be recorded and filed as described in Section 4.0 of *Appendix III.D – Inspection Schedule*.

7.0 HANDLING OF IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES

Ignitable and reactive waste are handled at this facility and are separated and protected from open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat. "No smoking" signs are conspicuously placed wherever there is a hazard from reactive waste. In accordance with 40 CFR §264.176, the HBC is located at least 15 meters (50 feet) from the facility's property line. Figure V.A.1 in *Appendix V.A – General Engineering Reports* shows the distance from the HBC to the nearest property line.

The energetic materials are not incompatible with each other. Each type of energetic material is stored in its own sealed container and is not mixed with another type of energetic material.

8.0 CLOSURE

The HBC will be closed to comply with the requirements of 40 CFR §264.601 and §264.602 in a manner that will ensure protection of human health and the environment. The information on closure of the HBC can be found in *Appendix VII.A - Closure Plan*.

9.0 CONSTRUCTION SCHEDULE

A general construction schedule is included below.

Tasks	Days from Permit Issuance

Permit Issuance	0
HBC installation	1-365 days
APCS installation	1-365 days
Ancillary equipment installation	1-365 days
HBC construction complete	365 days

Table V.K.2. Maximum Constituent Feed Rates
Hybrid Burn Chamber (HBC)

[RESERVED - TO BE UPDATED AFTER THE PERFORMANCE VERIFICATION TEST]

The total feed rate of constituents shall not exceed the following limitations. The limitations are based upon the emission limits shown in Table V.K.4. The removal efficiencies demonstrated during the performance verification test were used to determine the maximum allowable constituent feedrate. Constituent concentration information (see note a) is used to ensure that the maximum allowable feed rate is not exceeded.

Constituent	**Maximum Allowable Feed Rate In All Feedstreams Hourly Basis (g/hr)**	**Maximum Allowable Feed Rate in All Pumpable Feedstreams Hourly Basis (g/hr)**	**Maximum Allowable Feed Rate in All Feedstreams Annual Basis (T/yr)**
Ash	[RESERVED]	Not applicable[b]	[RESERVED]
Chlorine	[RESERVED]	Not applicable[b]	[RESERVED]
Lead	[RESERVED]	Not applicable[b]	[RESERVED]

Notes:

[a] Military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS). The U.S. Government provides information about the munitions to disposition. Documentation from manufacturers, suppliers, or reliable resources will be used to characterize industrial munitions.

[b] No pumpable wastes are fed.

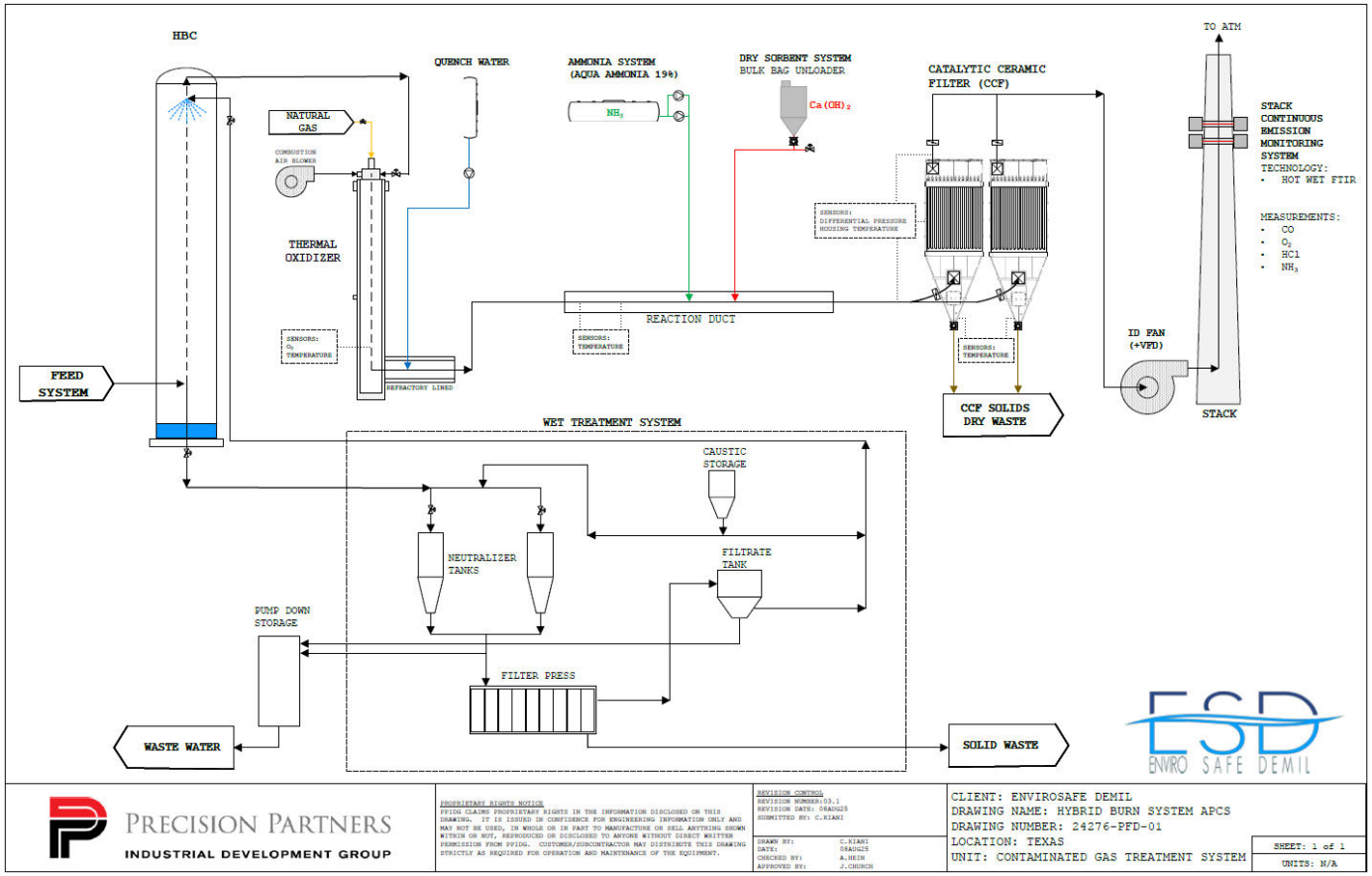

Figure V.K.1
Process Flow Diagram

Table V.K.2. – Miscellaneous Unit Permit Conditions, Monitoring, and Automatic Feed Cutoff Systems – Hybrid Burn Chamber, Permit Unit #101 (HBC)

Parameter	Monitoring Basis	Monitoring Device	Device Location	Permit Limit	AWFCO[a]	Basis for Establishing OPL
Established Based on Trial Burn Test Results						
Maximum Total Feedrate	HRA	*Operating logs;* Constituent information [b]	HMI display	Reserved	Yes, See note a	Trial Burn Results
Maximum Total NEW Feedrate	HRA	*Operating logs;* Constituent information [b]	HMI display	Reserved	Yes, See note a	Trial Burn Results
Maximum Ash Feedrate	12-HRA	*Operating logs;* Constituent information [b]	HMI display	Reserved	Yes, See note a	Trial Burn Results
Maximum Total Chlorine/Chloride Feedrate	12-HRA	*Operating logs;* Constituent information [b]	HMI display	Reserved	Yes, See note a	Trial Burn Results
Maximum LVM Feedrate (As, Be, Cr, Sb, Co, Mn, Ni)	12-HRA	*Operating logs;* Constituent information [b]	HMI display	Reserved	Yes, See note a	Trial Burn Results
Maximum SVM Feedrate (Cd, Pb, Se)	12-HRA	*Operating logs;* Constituent information [b]	HMI display	Reserved	Yes, See note a	Trial Burn Results

Notes:

[a] The HBC does not utilize a traditional automatic waste feed cutoff (AWFCO) system. However, the ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is within the appropriate operating ranges. A Human Machine Interface (HMI) displays information on the temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. HBC process cycles are not allowed to commence if all safe conditions are not met or remedied.

[b] Military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS). The U.S. Government provides information about the munitions to disposition. Documentation from manufacturers, suppliers, or reliable resources will be used to characterize industrial munitions.

[c] The OPLs for the dry scrubber are required for HCl/Cl_2 compliance. These OPLs will only be in effect when feeding chlorinated munition campaigns. When feeding non-chlorinated munition campaigns, these OPLs will not be applicable. See Section 2.7.4 of the Trial Burn Plan.

[d] These OPLs were not established based on the trial burn results. See Table 2-3 of the Trial Burn Plan for more information on the basis – either manufacturer recommendations or regulatory guidance.

[e] The OPL value was determined during system tuning and was based on the manufacturer's written specifications and recommendations for installation, operation, and adjustment of the system.

[f] ESD will use the maximum theoretical emission concentration (MTEC) approach to document ongoing compliance with the mercury emission standard per 40 CFR §63.1207(m)(1).

Definitions:

Instantaneous as defined in 40 CFR 266.102(e)(6)(i)(A) shall mean a value which occurs at any time. A value shall be determined by the monitoring device no less than every 15 seconds.

Continuous monitor is one which continuously samples or measures the regulated parameter without interruption, and evaluates the detector response at least once each 15 seconds, and computes and records the average value at least every 60 seconds. *Hourly Rolling Averages* (HRAs) and *12-Hour Rolling Averages* shall be calculated in accordance with the requirements in 40 CFR 63.1209.

Table V.K.2. – Miscellaneous Unit Permit Conditions, Monitoring, and Automatic Feed Cutoff Systems – Hybrid Burn Chamber, Permit Unit #101 (HBC)

Parameter	Monitoring Basis	Monitoring Device	Device Location	Permit Limit	AWFCO[a]	Basis for Establishing OPL
Established Based on Trial Burn Test Results						
Maximum Stack Gas Flowrate	HRA	Hot wire anemometer	Stack	Reserved	Yes, See note a	Trial Burn Results
Minimum Afterburner Temperature	HRA	Thermocouple	Afterburner	Reserved	Yes, See note a	Trial Burn Results
Minimum Dry Sorbent (Calcium Hydroxide) Feedrate [c]	HRA [c]	Supersack weight transmitter	Dry sorbent injection system	Reserved	Yes, See note a	Trial Burn Results
Brand / Type of Sorbent [c]	Purchase records [c]	Purchase records	Purchase records	Reserved	Yes, See note a	Trial Burn Results
Maximum Ceramic Filter Housing Inlet Temperature	HRA	Thermocouple	Inlet to Ceramic Filter Housing	Reserved	Yes, See note a	Trial Burn Results

Notes:

[a] The HBC does not utilize a traditional automatic waste feed cutoff (AWFCO) system. However, the ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is within the appropriate operating ranges. A Human Machine Interface (HMI) displays information on the temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. HBC process cycles are not allowed to commence if all safe conditions are not met or remedied.

[b] Military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS). The U.S. Government provides information about the munitions to disposition. Documentation from manufacturers, suppliers, or reliable resources will be used to characterize industrial munitions.

[c] The OPLs for the dry scrubber are required for HCl/Cl_2 compliance. These OPLs will only be in effect when feeding chlorinated munition campaigns. When feeding non-chlorinated munition campaigns, these OPLs will not be applicable. See Section 2.7.4 of the Trial Burn Plan.

[d] These OPLs were not established based on the trial burn results. See Table 2-3 of the Trial Burn Plan for more information on the basis – either manufacturer recommendations or regulatory guidance.

[e] The OPL value was determined during system tuning and was based on the manufacturer's written specifications and recommendations for installation, operation, and adjustment of the system.

[f] ESD will use the maximum theoretical emission concentration (MTEC) approach to document ongoing compliance with the mercury emission standard per 40 CFR §63.1207(m)(1).

Definitions:

Instantaneous as defined in 40 CFR 266.102(e)(6)(i)(A) shall mean a value which occurs at any time. A value shall be determined by the monitoring device no less than every 15 seconds.

Continuous monitor is one which continuously samples or measures the regulated parameter without interruption, and evaluates the detector response at least once each 15 seconds, and computes and records the average value at least every 60 seconds. *Hourly Rolling Averages* (HRAs) and *12-Hour Rolling Averages* shall be calculated in accordance with the requirements in 40 CFR 63.1209.

Table V.K.2. – Miscellaneous Unit Permit Conditions, Monitoring, and Automatic Feed Cutoff Systems – Hybrid Burn Chamber, Permit Unit #101 (HBC)

Parameter	Monitoring Basis	Monitoring Device	Device Location	Permit Limit	AWFCO[a]	Basis for Establishing OPL
Not Established Based on Trial Burn Results [d]						
Maximum Ceramic Filter Differential Pressure	HRA	Differential pressure transmitter	Inlet and outlet of Ceramic Filter	20 in w.g.	Yes, See note a	Manufacturer's Recommendation
Leak Detection System: - FTIR CEMS (ammonia slip)	Instantaneous	FTIR CEMS	Stack	Manufacturer Specification [e]	Yes, See note a	Manufacturer Specification [e]
Minimum Carrier Fluid Backpressure [c]	HRA [c]	*Venturi Pressure Sensor*	Outlet of DSI system	0.5 psi	Yes, See note a	Manufacturer's Recommendation
Maximum Mercury Feedrate [f]	12-HRA	*Operating logs:* Constituent information [b]	HMI display	MTEC [f]	Yes, See note a	MTEC [f]
Maximum Stack Gas Carbon Monoxide (CO) Concentration	HRA	FTIR CEMS	Stack	100 ppmdv @ 7% O_2	Yes, See note a	Limit specified in the HWC MACT Rule
Stack Gas Oxygen (O_2) Concentration	HRA	FTIR CEMS (to correct CO to 7% oxygen)	Stack	N/A	N/A	N/A

Notes:

[a] The HBC does not utilize a traditional automatic waste feed cutoff (AWFCO) system. However, the ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is within the appropriate operating ranges. A Human Machine Interface (HMI) displays information on the temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. HBC process cycles are not allowed to commence if all safe conditions are not met or remedied.

[b] Military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS). The U.S. Government provides information about the munitions to disposition. Documentation from manufacturers, suppliers, or reliable resources will be used to characterize industrial munitions.

[c] The OPLs for the dry scrubber are required for HCl/Cl_2 compliance. These OPLs will only be in effect when feeding chlorinated munition campaigns. When feeding non-chlorinated munition campaigns, these OPLs will not be applicable. See Section 2.7.4 of the Trial Burn Plan.

[d] These OPLs were not established based on the trial burn results. See Table 2-3 of the Trial Burn Plan for more information on the basis – either manufacturer recommendations or regulatory guidance.

[e] The OPL value was determined during system tuning and was based on the manufacturer's written specifications and recommendations for installation, operation, and adjustment of the system.

[f] ESD will use the maximum theoretical emission concentration (MTEC) approach to document ongoing compliance with the mercury emission standard per 40 CFR §63.1207(m)(1).

Definitions:

Instantaneous as defined in 40 CFR 266.102(e)(6)(i)(A) shall mean a value which occurs at any time. A value shall be determined by the monitoring device no less than every 15 seconds.

Continuous monitor is one which continuously samples or measures the regulated parameter without interruption, and evaluates the detector response at least once each 15 seconds, and computes and records the average value at least every 60 seconds. *Hourly Rolling Averages* (HRAs) and *12-Hour Rolling Averages* shall be calculated in accordance with the requirements in 40 CFR 63.1209.

Table V.K.3. – Maximum Constituent Feedrates [a]

Hybrid Burn Chamber, Permit Unit #101 (HBC)

The total feedrate of constituents shall not exceed the following limitations until a Trial Burn has been conducted demonstrating higher feedrates may be achieved and still meet the emission limits. Constituent concentration information (see note a) is used to ensure that the maximum allowable feedrate is not exceeded.

Constituent	Maximum Allowable Feedrate In All Feedstreams Hourly Basis (lb/hr)
Ash	124 lb/hr
Total Chlorine/Chloride	175 lb/hr
LVM (As, Be, Cr, Sb, Co, Mn, Ni)	4.26 lb/hr
SVM (Cd, Pb, Se)	5.05 lb/hr
Mercury	MTEC [b]

Notes:

[a] Military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS). The U.S. Government provides information about the munitions to disposition. Documentation from manufacturers, suppliers, or reliable resources will be used to characterize industrial munitions.

[b] ESD will use the maximum theoretical emission concentration (MTEC) approach to document ongoing compliance with the mercury emission standard per 40 CFR §63.1207(m)(1).

Table V.K.4. – Maximum Allowable Emission Rates
Hybrid Burn Chamber, Permit Unit #101 (HBC)
~~**Hybrid Burn Chamber (HBC)**~~

Constituent	Maximum Allowable Emission Concentration [a]	Units
Particulate Matter (PM)	0.08	gr/dscf, corrected to 7% O_2
Dioxins/Furans (PCDD/PCDF)	0.11	ng TEQ/dscm [b], corrected to 7% O_2
Mercury	8.1	µg/dscm, corrected to 7% O_2
Semivolatile Metals (SVM includes cadmium, lead, and selenium) [c]	10	µg/dscm, corrected to 7% O_2
Low Volatile Metals (LVM includes antimony, arsenic, beryllium, chromium, cobalt, manganese, and nickel) [c]	23	µg/dscm, corrected to 7% O_2
Carbon Monoxide (CO) [d]	100	ppmv, dry, corrected to 7% O_2
Total Hydrocarbons (THC as propane) [d]	10	ppmv, dry, corrected to 7% O_2
Hydrogen Chloride/Chlorine gas (HCl/Cl_2) (expressed as a chloride (Cl^-) equivalent)	21	ppmv, dry, corrected to 7% O_2

Notes:

[a] As noted in Section 3.0, the HBC is not an incinerator. ESD is applying for a RCRA 40 CFR Part 264 Subpart X permit. After discussions with TCEQ, TCEQ recommends that the emission limits and relevant OPLs of 40 CFR Part 63 Subpart EEE (HWC MACT) would be most appropriate for the HBC and its APCS. Therefore, the emission limits shown in this table are from 40 CFR §63.1219 for new hazardous waste incinerators.

[b] TEQ is toxic equivalency to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin.

[c] In accordance with 40 CFR §63.1219(e)(3), ESD elects to comply with the alternative to the particulate matter standard by establishing SVM and LVM feedrate limits for an expanded list of metals. This is described further in Section 2.3.

[d] Per 40 CFR §63.1219(b)(5), either CO or THC can be used for compliance. ESD has chosen to continuously monitor CO. Since ESD has chosen to monitor CO, compliance with the THC emission standards must be demonstrated during the DRE of POHC test runs during the Trial Burn.

~~Constituent~~	~~Maximum Allowable Emission Rate [a]~~	~~Units~~
~~Volatile organic compounds~~	~~1.26~~	~~lb/hr~~

(VOC)	5.53	tpy
Nitrogen oxides (NOx)	1.47	lb/hr
	6.17	tpy
Carbon monoxide (CO)	0.48	lb/hr
	2.11	tpy
Particulate matter (PM_{10} / $PM_{2.5}$)	0.03	lb/hr
	0.13	tpy
Sulfur dioxide (SO_2)	0.36	lb/hr
	1.58	tpy
Lead (Pb)	4.60E-03	lb/hr
	2.05E-02	tpy
Hydrogen Chloride (HCl)	0.02	lb/hr
	0.09	tpy

Notes:

a. These emission limits are from the facility's Permit by Rule (PBR) issued by the Air Permits Division of the Texas Commission on Environmental Quality, Registration Number 170884.

Table V.K.5. Miscellaneous Unit Operating Parameter Limits
Hybrid Burn Chamber (HBC)

Parameter		Monitoring Device	Device Location	Operating Parameter Limits [a]			Basis for Limit
Maximum Feed Rate (measured as lb NEW fed)		Operating logs; Constituent information [b]	HMI display	HD 1.3 and 1.4 NEW: 440 lbs NEW per batch; 2 batches per hour HD 1.1 and 1.2 NEW: 5 lbs NEW per batch; 2 batches per hour			Design and Safety Information
Maximum Stack Gas Flowrate		Pitot tube and differential pressure transmitter	Stack	6,500 SCFM			Manufacturer recommendation
Minimum Afterburner Temperature		Thermocouple	APCS	1,000 °F			Manufacturer recommendation
Maximum Evaporative Quench Outlet Temperature		Thermocouple	Evaporative Quench Outlet	500 °F			Manufacturer recommendation
Maximum Pressure Drop Across Baghouse		Differential pressure transmitter	Inlet and outlet of baghouse	9 in w.c.			Manufacturer recommendation
Minimum Pressure Drop Across Baghouse		Differential pressure transmitter	Inlet and outlet of baghouse	1 in w.c.			Manufacturer recommendation
Maximum Pressure Drop Across HEPA Filter		Differential pressure transmitter	Inlet and outlet of filter	4 in w.c.			Manufacturer recommendation
Minimum Pressure Drop Across HEPA Filter		Differential pressure transmitter	Inlet and outlet of filter	1 in w.c.			Manufacturer recommendation

Parameter		Monitoring Device	Device Location	Operating Parameter Limits [a]	Basis for Limit
Minimum Dry Sorbent (Sodium Bicarbonate) Feedrate Mass flowmeter Outlet of Dry Sorbent Tank 0 lb/hr Manufacturer recommendation					

Notes:

[a] The HBC does not utilize a traditional automatic waste feed cutoff (AWFCO) system. However, the ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is within the appropriate operating ranges. A Human Machine Interface (HMI) displays information on the temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. HBC process cycles are not allowed to commence if all safe conditions are not met or remedied.

[b] **Military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS). The U.S. Government provides information about the munitions to**

~~disposition. Documentation from manufacturers, suppliers, or reliable resources will be used to characterize industrial munitions.~~

~~Parameter~~	~~Monitoring Basis~~	~~Monitoring Device~~	~~Device Location~~	~~Short-Term Operating Parameter Limits~~			~~AWFCO? *~~
				~~Pre-Trial Burn~~	~~Trial Burn~~	~~Post Trial Burn~~	
~~Established Based on Trial Burn Test Results (continued)~~							

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~~Miscellaneous Unit Operating Parameter Limits~~
~~Hybrid Burn Chamber (HBC) (continued)~~

~~Parameter~~	~~Monitoring Basis~~	~~Monitoring Device~~	~~Device Location~~	~~Short-Term Operating Parameter Limits~~			~~AWFCO? *~~
				~~Pre-Trial Burn~~	~~Trial Burn~~	~~Post Trial Burn~~	
~~Not Established Based on Trial Burn Results (continued)~~							

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Table V.K.5. – Miscellaneous Unit Permit Conditions, Monitoring, and Automatic Feed Cutoff Systems – Short Term Operation Hybrid Burn Chamber, Permit Unit #101 (HBC)

Parameter	Monitoring Basis	Monitoring Device	Device Location	Short-Term OPLs			AWFCO[a]	Basis for Establishing OPL
				Pre-Trial Burn	Trial Burn	Post Trial Burn		
Established Based on Trial Burn Test Results								
Maximum Total Feedrate	HRA	*Operating logs:* Constituent information [b]	HMI display	2.267 lb/hr	2.267 lb/hr	2.267 lb/hr	Yes, See note a	Trial Burn Results
Maximum Total NEW Feedrate	HRA	*Operating logs:* Constituent information [b]	HMI display	680 lb/hr	680 lb/hr	680 lb/hr	Yes, See note a	Trial Burn Results
Maximum Ash Feedrate	12-HRA	*Operating logs:* Constituent information [b]	HMI display	124 lb/hr	192 lb/hr	124 lb/hr	Yes, See note a	Trial Burn Results
Maximum Total Chlorine/Chloride Feedrate	12-HRA	*Operating logs:* Constituent information [b]	HMI display	175 lb/hr	176 lb/hr	175 lb/hr	Yes, See note a	Trial Burn Results
Maximum LVM Feedrate (As, Be, Cr, Sb, Co, Mn, Ni)	12-HRA	*Operating logs:* Constituent information [b]	HMI display	4.26 lb/hr	4.26 lb/hr	4.26 lb/hr	Yes, See note a	Trial Burn Results

Parameter	Monitoring Basis	Monitoring Device	Device Location	Short-Term OPLs			AWFCO[a]	Basis for Establishing OPL
				Pre Trial Burn	Trial Burn	Post Trial Burn		
Maximum SVM Feedrate (Cd, Pb, Se)	12-HRA	*Operating logs:* Constituent information [b]	HMI display	5.05 lb/hr	5.05 lb/hr	5.05 lb/hr	Yes, See note a	Trial Burn Results

Notes:

[a] The HBC does not utilize a traditional automatic waste feed cutoff (AWFCO) system. However, the ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is within the appropriate operating ranges. A Human Machine Interface (HMI) displays information on the temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. HBC process cycles are not allowed to commence if all safe conditions are not met or remedied.

[b] Military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS). The U.S. Government provides information about the munitions to disposition. Documentation from manufacturers, suppliers, or reliable resources will be used to characterize industrial munitions.

[c] The OPLs for the dry scrubber are required for HCl/Cl_2 compliance. These OPLs will only be in effect when feeding chlorinated munition campaigns. When feeding non-chlorinated munition campaigns, these OPLs will not be applicable. See Section 2.7.4 of the Trial Burn Plan.

[d] These OPLs will not be established based on the trial burn results. See Table 2-3 of the Trial Burn Plan for more information on the basis – either manufacturer recommendations or regulatory guidance.

[e] The OPL value will be determined during system tuning and will be based on the manufacturer's written specifications and recommendations for installation, operation, and adjustment of the system. A value will be placed in the appropriate table during the permit modification.

[f] ESD will use the maximum theoretical emission concentration (MTEC) approach to document ongoing compliance with the mercury emission standard per 40 CFR §63.1207(m)(1).

Definitions:

Instantaneous as defined in 40 CFR 266.102(e)(6)(i)(A) shall mean a value which occurs at any time. A value shall be determined by the monitoring device no less than every 15 seconds.

Continuous monitor is one which continuously samples or measures the regulated parameter without interruption, and evaluates the detector response at least once each 15 seconds, and computes and records the average value at least every 60 seconds. *Hourly Rolling Averages* (HRAs) and *12-Hour Rolling Averages* shall be calculated in accordance with the requirements in 40 CFR 63.1209.

Table V.K.5. – Miscellaneous Unit Permit Conditions, Monitoring, and Automatic Feed Cutoff Systems – Short Term Operation Hybrid Burn Chamber, Permit Unit #101 (HBC)

Parameter	Monitoring Basis	Monitoring Device	Device Location	Short-Term OPLs			AWFCO[a]	Basis for Establishing OPL
				Pre Trial Burn	Trial Burn	Post Trial Burn		
Established Based on Trial Burn Test Results								
Maximum Stack Gas Flowrate	HRA	Hot wire anemometer	Stack	31,000 acfm	31,000 acfm	31,000 acfm	Yes, See note a	Trial Burn Results
Minimum Afterburner Temperature	HRA	Thermocouple	Afterburner	1,400 ºF	1,400 ºF	1,400 ºF	Yes, See note a	Trial Burn Results
Minimum Dry Sorbent (Calcium Hydroxide) Feedrate [c]	HRA [c]	Supersack weight transmitter	Dry sorbent injection system	10 lb/hr	10 lb/hr	10 lb/hr	Yes, See note a	Trial Burn Results
Brand / Type of Sorbent [c]	Purchase records [c]	Purchase records	Purchase records	Sorbacal SP by Lhoist, or equivalent	Sorbacal SP by Lhoist, or equivalent	Sorbacal SP by Lhoist, or equivalent	Yes, See note a	Trial Burn Results
Maximum Ceramic Filter Housing Inlet Temperature	HRA	Thermocouple	Inlet to Ceramic Filter Housing	750ºF	750ºF	750ºF	Yes, See note a	Trial Burn Results

Notes:

[a] The HBC does not utilize a traditional automatic waste feed cutoff (AWFCO) system. However, the ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is within the appropriate operating ranges. A Human Machine Interface (HMI) displays information on the temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. HBC process cycles are not allowed to commence if all safe conditions are not met or remedied.

[b] Military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS). The U.S. Government provides information about the munitions to disposition. Documentation from manufacturers, suppliers, or reliable resources will be used to characterize industrial munitions.

[c] The OPLs for the dry scrubber are required for HCl/Cl_2 compliance. These OPLs will only be in effect when feeding chlorinated munition campaigns. When feeding non-chlorinated munition campaigns, these OPLs will not be applicable. See Section 2.7.4 of the Trial Burn Plan.

[d] These OPLs will not be established based on the trial burn results. See Table 2-3 of the Trial Burn Plan for more information on the basis – either manufacturer recommendations or regulatory guidance.

[e] The OPL value will be determined during system tuning and will be based on the manufacturer's written specifications and recommendations for installation, operation, and adjustment of the system. A value will be placed in the appropriate table during the permit modification.

[f] ESD will use the maximum theoretical emission concentration (MTEC) approach to document ongoing compliance with the mercury emission standard per 40 CFR §63.1207(m)(1).

Definitions:

Instantaneous as defined in 40 CFR 266.102(e)(6)(i)(A) shall mean a value which occurs at any time. A value shall be determined by the monitoring device no less than every 15 seconds.

Continuous monitor is one which continuously samples or measures the regulated parameter without interruption, and evaluates the detector response at least once each 15 seconds, and computes and records the average value at least every 60 seconds. *Hourly Rolling Averages* (HRAs) and *12-Hour Rolling Averages* shall be calculated in accordance with the requirements in 40 CFR 63.1209.

Table V.K.5. – Miscellaneous Unit Permit Conditions, Monitoring, and Automatic Feed Cutoff Systems – Short Term Operation Hybrid Burn Chamber, Permit Unit #101 (HBC)

Parameter	Monitoring Basis	Monitoring Device	Device Location	Short-Term OPLs			AWFCO [a]	Basis for Establishing OPL
				Pre Trial Burn	Trial Burn	Post Trial Burn		
Not Established Based on Trial Burn Results [d]								
Maximum Ceramic Filter Differential Pressure	HRA	Differential pressure transmitter	Inlet and outlet of Ceramic Filter	20 in w.g.	20 in w.g.	20 in w.g.	Yes, See note a	Manufacturer's Recommendation
Leak Detection System: - FTIR CEMS (ammonia slip)	Instantaneous	FTIR CEMS	Stack	Manufacturer Specification [e]	Manufacturer Specification [e]	Manufacturer Specification [e]	Yes, See note a	Manufacturer Specification [e]
Minimum Carrier Fluid Backpressure [c]	HRA [c]	*Venturi Pressure Sensor*	Outlet of DSI system	0.5 psi	0.5 psi	0.5 psi	Yes, See note a	Manufacturer's Recommendation
Maximum Mercury Feedrate [f]	12-HRA	*Operating logs:* Constituent information [b]	HMI display	MTEC [f]	MTEC [f]	MTEC [f]	Yes, See note a	MTEC [f]
Maximum Stack Gas Carbon Monoxide (CO) Concentration	HRA	FTIR CEMS	Stack	100 ppmdv @ 7% O_2	100 ppmdv @ 7% O_2	100 ppmdv @ 7% O_2	Yes, See note a	Limit specified in the HWC MACT Rule
Stack Gas Oxygen (O_2) Concentration	HRA	FTIR CEMS (to correct CO to 7% oxygen)	Stack	N/A	N/A	N/A	N/A	N/A

Notes:

[a] The HBC does not utilize a traditional automatic waste feed cutoff (AWFCO) system. However, the ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is within the appropriate operating ranges. A Human Machine Interface (HMI) displays information on the temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. HBC process cycles are not allowed to commence if all safe conditions are not met or remedied.

[b] Military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS). The U.S. Government provides information about the munitions to disposition. Documentation from manufacturers, suppliers, or reliable resources will be used to characterize industrial munitions.

[c] The OPLs for the dry scrubber are required for HCl/Cl_2 compliance. These OPLs will only be in effect when feeding chlorinated munition campaigns. When feeding non-chlorinated munition campaigns, these OPLs will not be applicable. See Section 2.7.4 of the Trial Burn Plan.

[d] These OPLs will not be established based on the trial burn results. See Table 2-3 of the Trial Burn Plan for more information on the basis – either manufacturer recommendations or regulatory guidance.

[e] The OPL value will be determined during system tuning and will be based on the manufacturer's written specifications and recommendations for installation, operation, and adjustment of the system. A value will be placed in the appropriate table during the permit modification.

[f] ESD will use the maximum theoretical emission concentration (MTEC) approach to document ongoing compliance with the mercury emission standard per 40 CFR §63.1207(m)(1).

Definitions:

Instantaneous as defined in 40 CFR 266.102(e)(6)(i)(A) shall mean a value which occurs at any time. A value shall be determined by the monitoring device no less than every 15 seconds.

Continuous monitor is one which continuously samples or measures the regulated parameter without interruption, and evaluates the detector response at least once each 15 seconds, and computes and records the average value at least every 60 seconds. *Hourly Rolling Averages* (HRAs) and *12-Hour Rolling Averages* shall be calculated in accordance with the requirements in 40 CFR 63.1209.

Table V.K.8. – Principal Organic Hazardous Constituents - Hybrid Burn Chamber, Permit Unit #101 (HBC)

List the wastes for which the trial burn demonstration will be made and the principal organic hazardous constituents in each waste.

Waste	Principal Organic Hazardous Constituents
5001 and 5002	Diphenylamine

10.0 CERTIFICATION

An addendum to this report and the certification statement by Mr. Benjamin Lai, Professional Engineer, State of Texas, are included on the following pages.

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Engineering Report - Miscellaneous Unit: Hybrid Burn Chamber (HBC)

EnviroSafe Demil, LLC (ESD) - TCEQ RCRA Part B Permit Application
April 10, 2026

1. Engineering Scope, Role, and Assumptions (TCEQ Context)

This report presents process engineering analysis for the HBC to support the TCEQ RCRA Part B Permit Application. The scope covers the overall engineering basis presented for the unit, including process operation, emissions control, monitoring and instrumentation, liquid handling, inspection and maintenance provisions, exposure pathways, environmental protection measures, and interfaces with structural, mechanical, electrical, controls, civil, Subpart X compliance, and safety-related features to the extent relevant to permit support.

This report is based on information furnished by ESD, including the HBC permit narratives, Trial Burn Plan, supporting appendices, process flow information, and available vendor and manufacturer descriptions. This report is intended to accompany, and not directly revise, ESD's underlying base reports.

This engineering report is certified in accordance with 30 TAC §305.50(a)(7) and the sealing requirements in 22 TAC §137.33. which require all engineering work be personally performed or directly supervised by the Texas Professional Engineer.

2. Executive Summary

The Hybrid Burn Chamber (HBC) is a contained-burn, non-incineration unit that demilitarizes ignitable, non-mass-detonating munitions. Batches up to 250 lb NEW are remotely ignited within a sealed steel chamber; exhaust gases are contained and routed to a robust APCS consisting of a thermal oxidizer, quench, reaction duct with hydrated lime and aqueous ammonia injection, catalytic ceramic filters, ID fan, and stack. Interlocks and HMI controls prevent ignition unless the APCS is within safe operating ranges and the chamber is closed and sealed. Emission limits and operating parameter limits (OPLs) follow the HWC MACT framework as recommended by TCEQ; a Trial Burn will establish unit-specific OPLs and confirm compliance.

3. System Description and Design Basis

- **Feed and Ignition:** Batch operation using burn pans or fixtures for thrusting components; automated loading; remote ignition; extraction after completion; design batch up to 250 lb Net Explosive Weight (NEW).
- **Chamber:** Steel pressure vessel sized for combustion gases and to contain the maximum credible event; operators have no active control after ignition; safety interlocks enforce safe sequence.
- **Air Pollution Control System (APCS):** After processing of energetic materials within the HBC, emissions are exhausted through a series of APCS equipment tailored to the waste profile being processed. Pressure and flow are regulated by an isolation butterfly valve and associated pressure-bypass valve at the HBC outlet. The gas is routed to a thermal oxidizer (afterburner), then quenched to approximately 750 °F, mixed with hydrated lime and aqueous

ammonia in the reaction duct, passed through catalytic ceramic filters, and discharged through the ID fan and stack.

- **CEMS and Instrumentation:** Stack gas is monitored using an FTIR-based CEMS and related instrumentation. Regulatory compliance measurements are identified as CO, O_2, and H_2O. Process-control measurements include NH_3 slip and HCl. PLC/HMI controls, alarms, permissives, and key-interlock firing logic are used to prevent operation unless safe conditions are met.
- **Wash and Neutralization:** Remote chamber wash; neutralization and filtration are provided; filtered liquid may be recycled for wash cycles or stored for offsite disposal subject to final waste management procedures.
- **Integrated management of segmenting liquids:** Liquid collected from the RMOB water-cooled band-saw segmenting operation is transferred from RMOB holding tanks to the HBC/APCS afterburner-quench injection point, where it is introduced into the hot quench stream for thermal treatment as part of the integrated process configuration. On this basis, RMOB segmenting does not create a routine standalone wastewater discharge.

4. Operations, Monitoring, and Maintenance

- **Operations:** SOPs developed with manufacturer hazard analysis; batch fed; next batch only when operating conditions are within defined ranges; outputs are inert casings and recyclables for appropriate offsite disposition.
- **Monitoring:** HMI displays temperatures, pressures, flows, and valve states; ignition permissives require APCS readiness and door-closed status; keys remain captive until chamber pressure is at ambient.
- **Maintenance:** Manufacturer-specified preventative maintenances applies to HBC and APCS; ceramic filters are reverse-pulse cleaned; the ID fan includes vibration and temperature monitoring.

5. Exposure Pathways and Environmental Protection

- **Air:** The APCS is intended to minimize emissions of particulate matter, CO, VOCs, dioxins/furans, HCl/Cl_2, and metals, and the applicable emission limits and operating parameter limits are based on the HWC MACT framework as adapted for this Subpart X unit. Final OPL values and compliance demonstrations remain dependent on the Trial Burn and related permit actions.
- **Surface water, groundwater and soils:** The feed system is enclosed within the RMOB, preventing precipitation from entering the feed area. The HBC is an enclosed vessel set into a large concrete foundation that provides support and contains the footprint of the unit. Solids are managed without free liquids, and environmental protection relies on inspection, housekeeping, immediate cleanup, and controlled management of wash and residual streams. Spills are cleaned up immediately, and routine inspections are used to identify any release concerns. In addition, liquids generated during RMOB segmenting are captured, filtered, routed to holding tanks, and transferred into the HBC/APCS quench stream rather than discharged as wastewater.

6. Secondary Containment Determination

Energetic materials are solids without free liquids. Therefore, secondary containment is not required for the energetic materials themselves. The process tanks do not contain hazardous waste or hazardous liquid. The ammonia feed tank includes secondary containment. Other process-liquid handling elements rely on enclosed equipment, neutralization and filtration,

controlled storage, inspection, and defined waste-management procedures rather than open secondary-containment basins

7. Emission Limits, Operating Parameter Limits (OPLs), and Trial Burn

- **Compliance Strategy:** Adopt 40 CFR Part 63 Subpart EEE emission limits recommended by TCEQ for this Subpart X unit, as the basis for emission compliance.
- **Pre-Trial Feed Rate Controls:** Constituent feed rate caps (e.g., total chlorine, ash, SVM/LVM) apply during shakedown (≤720 hr) and until permit modification post-Trial Burn.
- **Trial Burn:** Trial Burn is intended to establish final OPLs, confirm compliance, and support the final permit basis for constituent feed rates, afterburner temperature, stack flow, DSI feed, ceramic filter inlet temperature, and related APCS parameters.

8. Inspections

Inspections related to the HBC and APCS are described in the facility Inspection Schedule and include the Hybrid Burn Chamber, Air Pollution Control System, monitoring equipment, operational and structural equipment, safety and emergency equipment, and any liquid-handling equipment or instrumentation relied upon for the final OPL basis.

9. Ignitable/Reactive/Incompatible Management

Ignitable and reactive waste is separated and protected from open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks, spontaneous ignition sources, and radiant heat. No-Smoking signage is posted where reactive waste hazards exist. The HBC is located at least 50 feet from the property line, and each type of energetic material is stored in its own sealed container and is not mixed with another type.

10. Construction Schedule

Representative construction schedule: Permit issuance = day 0; HBC installation, APCS installation, and ancillary equipment installation = days 1-365 after permit issuance; HBC construction complete = days 1-365 after permit issuance.

11. Closure

Close the HBC in accordance with 40 CFR 264.601–264.602 and the facility Closure Plan (Appendix VII.A).

Professional Engineer Certification

I certify under penalty of law that this engineering report was prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who will manage the units, or those persons directly responsible for gathering information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Responsible Engineer: Benjamin Lai, P.E.

Texas PE License No.: 115820
Date: April 15, 2026
Seal:

Signature:

Issued by: ONB Engineering Research and Technical Services LLC
Texas Engineering Firm Registration No.: F-28329

ONB Engineering Research and Technical Services LLC
Texas Registered Engineering Firm F-28329
906 N Parham Rd, Ste 205
Henrico VA 23229

ATTACHMENT V.K - HBC

Contained Burn System
"Hybrid Burn Chamber" © (HBC)
Basic Process Description

System Overview: EnviroSafe Demil's contained burn system is known as the "Hybrid Burn Chamber"© (HBC). The HBC provides a modern and environmentally responsible alternative to open burning. These robust systems are designed to be simple, safe, and flexible from an operations standpoint, while eliminating pollution and the potentially harmful emissions of open burn operations.

Materials are prepared in batches and are remotely ignited or activated in a manner to ensure simplicity, flexibility, and safety. The exhaust gases are collected and treated by an air pollution control system (APCS). The design of the APCS to scrub the off gases is specific to the chemistry of the treated materials.

Basic Process Operations:

1. Materials are prepared for treatment and loaded into the HBC.
2. Materials are remotely ignited and destroyed inside the HBC.
3. The exhaust gas is metered from the HBC through the APCS via induced draft from the ID fan.
4. After processing is complete in the HBC and negative pressure is assured, the loading door is remotely opened and the treated materials can be inspected remotely via CCTV.
5. Operators remove the treated burn pan or case from the loading system and place the next load for treatment.
6. The cycle is repeated.

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Continuous Emissions Monitoring System

Precision Partners has a partnership with CEMTEK Environmental, a technology leader in Continuous Emissions Monitoring Systems (CEMS), which after consulting, recommended and will provide a Fourier Transform Infrared Spectroscopy (FTIR) based Continuous Emissions Monitoring System. The Continuous Emissions Monitoring System was designed & engineered to meet the unique conditions encountered when monitoring emissions meeting RCRA 40 CFR Part 264 Subpart X, 40 CFR §63.1219(b)(5), and 40 CFR §63.1219(b)(5)(ii).

The CEMS FTIR technology package includes an analyzer to measure CO, & HCl, NH_3 (FTIR) and EPA compliant data acquisition software, all housed in an environmentally controlled shelter. O_2 will be measured using a zirconia oxide module in the FTIR analyzer, since O2 does not absorb light. This is a mechanical module integrated into the FTIR system. Gas is extracted into the FTIR analyzer, and after passing through it, the gas flows through the zirconia oxide module to provide a continuous O_2 reading in accordance with Performance Specification 4B. The system measures NH_3 and NH_3 slip using the FTIR analyzer, complemented by a triboelectric broken filter detector at the outlet of each filter housing. Together, these components provide dual leak detection capability.

The FTIR measurement technique incorporates several components, including a heated gas cell, electronics, a detector box, pressure measurement instrumentation, and a heated gas inlet. FTIR collects all infrared spectral data simultaneously by sending a broadband infrared light through an interferometer (modulator), which modulates all wavelengths at once. The modulated light passes through a gas cell where molecules in the sample absorb specific wavelengths. This signal is then demodulated using the Fourier Transform process, converting mirror position into a frequency response that directly correlates with the molecules present in the gas sample.

Data analysis begins with the demodulated signal, known as an interferogram, which is converted to a single-beam spectrum via the Fast Fourier Transform (FFT). To account for instrument response, a non-infrared absorbing gas is passed through the cell before sampling, and this baseline is subtracted from the sample signal. The logarithmic ratio of the sample beam to the background beam produces an absorbance spectrum over the infrared range, containing responses from all infrared-active compounds. The height of the absorbance peak is directly proportional to the compound's concentration.

The FTIR CEMS system will utilize a MKS Multigas 2030 FTIR, which is a highly sensitive instrument capable of detecting toxic gases at levels as low as 10–100 parts per billion (ppb). The system enables simultaneous analysis and display of required gases and uses permanent calibration spectrum which will be calibrated daily for O_2, and on an as required basis for CO, HCl, and NH_3. A patented, linearized detector response ensures consistent calibration across all instruments, while a heated sample line maintains temperature before gas enters the cell. Automatic temperature and pressure compensation ensures accuracy. Precision Partners and CEMTEK verify the CO and O_2 CEMS will be installed, calibrated, maintained, and continuously operated in compliance with Performance Specification 4B. The span level of the CO CEMS is 0-200 ppmv, dry basis (low-range span), 0-3,000 ppmv, dry basis (high-range span). The span level of the O2 CEMS is 0-25% oxygen.

The Multigas 2030 software offers robust quantitative analysis of all required compounds simultaneously, with automatic corrections for temperature and pressure variations. It can acquire and analyze samples in under one second, continuously acquiring spectra while computing gas concentrations. A residual spectrum feature identifies unaccounted spectral data, simplifying QA/QC verification and allowing saved spectra to be reprocessed at any time using the same or alternative calibration sets.

The system is specifically designed for process and environmental monitoring and can operate at spectral resolutions up to 0.5 cm^{-1}, even in hostile environments with vibration and temperature fluctuations. Its high-speed data processing produces low-noise infrared spectra. A single analyzer can measure all required components without requiring moisture removal prior to analysis, supporting hot/wet sampling methods. It is engineered for highly corrosive applications and excels at measuring water-soluble and reactive gases such as HCl and NH_3. Its rugged design and versatility make it well suited for the Hybrid Burn Chamber application.

Hot/Wet FTIR technology based CEMS is an ideal technology to monitor emissions and conditions of the Hybrid Burn Chamber. The Hot/Wet FTIR is not affected or corroded as all gases and components are heated above the dewpoint to maintain a safe analyzer environment. The ability of one Hot/Wet FTIR analyzer to measure multiple gases simultaneously provides a one analyzer solution, improves overall system integrity, requires less space and reductions in analyzer failures. The simple design of the system removes the requirement for chillers, filters, scrubbers, extra pumps, resulting in lower maintenance and less failure points.

ATTACHMENT V.K –

TRIAL BURN PLAN

TRIAL BURN PLAN
FOR THE
HYBRID BURN CHAMBER (HBC)

EnviroSafe Demil, LLC
401 Demil Way
Hooks, Texas 75561-0019

~~AUGUST~~ APRIL 202~~5~~6

Revision ~~0~~2

TABLE OF CONTENTS

1.0 INTRODUCTION, BACKGROUND, AND REGULATORY OVERVIEW 1
2.0 TRIAL BURN OBJECTIVES 3
2.1 Test Conditions 3
2.2 Emission Performance Objectives 3
2.3 Alternative to the Particulate Matter Standard 3
2.4 Waiver of Operating Parameter Limits during Pretesting 5
2.5 Waiver of Operating Parameter Limits during the Trial Burn 5
2.6 Establishing Operating Parameter Limits 6
2.7 Site-Specific Considerations for OPLs ..... 14~~12~~
2.7.1 Maximum Total Feedrate and Maximum Total NEW Feedrate ..... 14~~12~~
2.7.2 Feedrates Calculated Based on Charge Rates ..... 15~~13~~
2.7.3 Minimum Afterburner Temperature ..... 15~~13~~
2.7.4 Dry Sorbent Injection System OPLs during Non-Chlorinated Munition Campaigns 17~~13~~
2.7.5 Overnight Standby ..... 18~~14~~
2.8 Operation of Waste Firing System ..... 18~~15~~
2.9 Metals Feedrate Extrapolation Procedures ..... 19~~15~~
2.10 Mercury Maximum Theoretical Emission Concentration ..... 20~~17~~
2.11 Expected Levels of Regulated Constituents in Certain Feedstreams ..... 21~~17~~
3.0 DETAILED ENGINEERING DESCRIPTION ..... 22~~19~~
3.1 Feed System ..... 22~~19~~
3.2 Hybrid Burn Chamber (HBC) ..... 24~~21~~
3.3 Ignition System ..... 24~~21~~
3.4 Air Pollution Control System (APCS) ..... 24~~21~~
3.4.1 Thermal Oxidizer (Afterburner) ..... 25~~22~~
3.4.2 Ammonia Injection System ..... 25~~22~~
3.4.3 Dry Sorbent Injection (DSI) System ..... 25~~22~~
3.4.4 Ceramic Filter Housing and Elements ..... 25~~22~~
3.4.5 Waste Collection and Handling ..... 26~~23~~
3.4.6 ID Fan ..... 26~~23~~
3.4.7 Stack ..... 26~~23~~
3.4.8 Instrumentation and Control ..... 26~~23~~
3.5 HBC Wash System ..... 27~~24~~
3.6 Monitoring of Process Conditions and Safety Interlocks ..... 27~~24~~
3.7 Stack Gas Monitoring – CEMS ..... 28~~25~~
4.0 TRIAL BURN PROTOCOL ..... 30~~26~~

4.1 Target Operating Conditions 3026
4.2 Process Feeds 3530
4.2.1 Ammonium Perchlorate Motors: V878 (MK56) and MLRS *3530*
4.2.2 V298 Rocket Motors (not planned to be fed) *3631*
4.3 Spike Selection Rationale 3631
4.3.1 POHC Spike *3631*
4.3.2 Chlorine Spike *4035*
4.3.3 Metal Spikes *4136*
4.3.4 Ash Spike *4136*
4.4 Characteristics, Feedrates, and Quantities of Process Feeds and Spiking Materials 4237
4.5 Operating Conditions and Steady-State Operation 4237
5.0 SAMPLING AND ANALYSIS 4439
5.1 Stack Gas Sampling and Analytical Program 4439
5.2 Feed Sampling and Analytical Program 4439
5.3 Spike Sampling and Analytical Program 4641
5.4 Quality Assurance / Quality Control Program 4641
6.0 TRIAL BURN SCHEDULE AND TRIAL BURN REPORT 4742
6.1 Trial Burn Schedule 4742
6.2 Trial Burn Report 4742
6.3 Future Plans for Dry Sorbent OPLs 4944

LIST OF TABLES

Table 2-1 Emissions Performance Requirements 4
Table 2-2 Operating Parameter Limits Specified in 40 CFR, Part 63, Subpart EEE 7
Table 2-3 Basis for Establishing Operating Parameter Limits 9
Table 4-1 Protocol for Test ..... 31~~27~~
Table 4-2 Operating Condition Targets ..... 32~~28~~
Table 4-3 V878 (MK56) Rocket Motor Chlorine Composition ..... 37~~32~~
Table 4-4 V878 (MK56) Rocket Motor Ash Composition ..... 38~~33~~
Table 4-5 V298 Rocket Motor Lead Composition ..... 39~~34~~
Table 4-6 Characteristics, Feedrates, and Quantities of the Feeds ..... 43~~38~~
Table 5-1 Stack Gas Sampling ..... 45~~40~~
Table 6-1 Tentative Test Schedule ..... 48~~43~~

LIST OF FIGURES

Figure 3-1 Process Flow Diagram ..... 23~~20~~

LIST OF APPENDICES

Appendix I Quality Assurance Project Plan (QAPP)
Appendix II Stack Detection Limit and Feedrate Calculations
Appendix III Continuous Monitoring System Performance Evaluation Test Plan (PETP) and Information on the Continuous Emissions Monitoring System
Appendix IV Rocket Motor Constituents (contained in *Appendix XIII – Confidential Material* of the RCRA permit application)

LIST OF ACRONYMS

APCS	Air Pollution Control System
As	Arsenic
AWFCO	Automatic Waste Feed Cutoff
Be	Beryllium
Cd	Cadmium
CEMS	Continuous Emissions Monitoring System
CFR	Code of Federal Regulations
Cl_2	Chlorine
Co	Cobalt
CO	Carbon Monoxide
Cr	Chromium
Cr_2O_3	Chromium Oxide
DAC	Defense Ammunition Center
DRE	Destruction and Removal Efficiency
DODIC	Department of Defense Identification Code
DSI	Dry Sorbent Injection
EPA	Environmental Protection Agency
ESD	EnviroSafe Demil, LLC
FTIR	Fourier Transform Infrared Spectroscopy
HBC	Hybrid Burn Chamber
HCl	Hydrogen Chloride
Hg	Mercury
HMI	Human Machine Interface
HRA	Hourly Rolling Average
HWC	Hazardous Waste Combustor
HWC MACT	Hazardous Waste Combustor Maximum Achievable Control Technology
LVM	Low Volatile Metals
MACS	Munitions Analytical Compliance System
MACT	Maximum Achievable Control Technology
MIDAS	Munitions Item Disposition Action System
MLRS	Multiple Launch Rocket System
Mn	Manganese
MTEC	Maximum Theoretical Emission Concentration
NEMA	National Electrical Manufacturer Association

LIST OF ACRONYMS (CONTINUED)

NESHAP	National Emissions Standards for Hazardous Air Pollutants
NEW	Net Explosive Weight
Ni	Nickel
NOx	Nitrogen Oxides
O_2	Oxygen
OPL	Operating Parameter Limit
Pb	Lead
PbO	Lead Oxide
PCDD/PCDF	Polychlorinated Dibenzo-*p*-Dioxins/Polychlorinated Dibenzofurans, Dioxins/Furans, D/F
PFD	Process Flow Diagram
PLC	Programmable Logic Controller
PM	Particulate Matter
POHC	Principal Organic Hazardous Constituents
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RIO	Remote Input/Output
Sb	Antimony
SCR	Selective Catalytic Reduction
Se	Selenium
SOx	Sulfur Oxides
SVM	Semivolatile Metals
TCEQ	Texas Commission on Environmental Quality
TEQ	Toxic Equivalency to 2,3,7,8-Tetrachlorodibenzo-*p*-Dioxin
THC	Total Hydrocarbons (as propane)
UDRI	University of Dayton Research Institute
VOC	Volatile Organic Compound

1.0 INTRODUCTION, BACKGROUND, AND REGULATORY OVERVIEW

EnviroSafe Demil, LLC (ESD) is installing a Hybrid Burn Chamber (HBC) at its facility in Hooks, Texas. The HBC is not an incinerator and there is no controlled flame combustion. The HBC operation most closely resembles open burning/open detonation but is more environmentally responsible. As opposed to open burning/open detonation, the HBC has the advantage of containing and cleaning the exhaust gases.

The HBC is subject to 40 CFR Part 264 Subpart X (40 CFR §264.600-§264.603) – Miscellaneous Units. 40 CFR §264.601 requires that Subpart X permit terms and provisions include those requirements of 40 CFR Part 264 Subparts I through O and Subparts AA through CC, 40 CFR Part 270, 40 CFR Part 63 Subpart EEE, and 40 CFR Part 146 that are appropriate for the miscellaneous unit being permitted. Even though the HBC is not an incinerator, the Texas Commission on Environmental Quality (TCEQ) recommends that the emission limits and relevant operating parameter limits (OPLs) described in the National Emissions Standards for Hazardous Air Pollutants (NESHAP) from Hazardous Waste Combustors (HWC) found at 40 CFR Part 63 Subpart EEE would be most appropriate for the HBC and its air pollution control system (APCS). This standard is commonly referred to as the HWC Maximum Achievable Control Technology (MACT) standard.

This document is submitted in accordance with 40 CFR §270.23(e) and presents a plan for a Trial Burn test that will be conducted to show compliance with the Hazardous Waste Combustor Maximum Achievable Control Technology emission standards for new hazardous waste incinerators specified in 40 CFR §63.1219. After the test, ESD will submit a Trial Burn Report which will include the results of the Trial Burn, demonstrating that the HBC meets the applicable Final Subpart EEE emission standards. The Trial Burn Report will establish OPLs that allow adequate operational flexibility while meeting the HWC MACT emission standards. These OPLs will then be incorporated into ESD's permit.

The purposes of this Trial Burn Plan are to describe the HBC system and define the target process operating conditions that will be demonstrated during the test. The Trial Burn Plan describes the sampling activities, analytical methods, and data collection and reduction techniques that will be used to:

- Demonstrate compliance with the emission standards for new hazardous waste incinerators specified in 40 CFR §63.1219, and
- Establish OPLs for the HBC system.

ESD is requesting that the agency review and approve this Trial Burn Plan for the HBC. ESD also specifically requests approval of the following items:

- As discussed in Section 2.4, ESD intends to disable OPLs during operational pretesting for a period of time not to exceed 720 hours per 40 CFR §63.1207(h)(2).
- The OPLs for the dry scrubber are required for HCl/Cl_2 compliance. As discussed in Section 2.7.~~6~~4, ESD is requesting the agency approve ~~using a Continuous Emissions Monitoring System (CEMS) to measure HCl in lieu of the OPLs specified in 40 CFR §63.1209(o)(4) for the Dry Sorbent Injection System, as allowed in 40 CFR §63.1209(a)(5)~~waiving the dry scrubber OPLs during non-chlorinated munitions campaigns.
- As discussed in Section 2.9, ESD intends to use extrapolation to determine the metals feedrates per 40 CFR §63.1209(n)(2)(vii) and §63.1209(l)(1)(v).

Pursuant to 40 CFR §63.1207(e) of the HWC MACT rule, ESD must also develop and submit a site-specific Continuous Monitoring Systems Performance Evaluation Test Plan (CMS PETP). A CMS PETP is included as an appendix to this plan.

The appendices to this Trial Burn Plan include:

- Quality Assurance Project Plan (QAPP) for the Trial Burn
- Spiking Rate Calculations
- Continuous Monitoring System Performance Evaluation Test Plan (PETP) and Information on the Continuous Emissions Monitoring System
- Rocket Motor Constituents (contained in *Appendix XIII – Confidential Material* of the RCRA permit application)

2.0 TRIAL BURN OBJECTIVES

The objectives of this Trial Burn are to demonstrate compliance with the HWC MACT emission limits and to establish limits for operating parameters that ensure compliance with the emission standards.

This section provides a summary of the objectives for the Trial Burn, including a discussion on how the operating data and emission data collected during the Trial Burn will be utilized to establish OPLs that will assure ongoing compliance with the HWC MACT standards.

2.1 Test Conditions

One test condition will be demonstrated during the proposed test. The data collected during the test will be utilized to develop OPLs.

2.2 Emission Performance Objectives

The emissions performance objectives of the Trial Burn are to demonstrate compliance with emission standards for each constituent of concern for new hazardous waste incinerators. These emissions standards are shown in Table 2-1.

2.3 Alternative to the Particulate Matter Standard

Under 40 CFR §63.1219, ESD has two compliance options for particulate matter (PM) emissions:

(1) A limit on particulate matter emissions of 0.0016 gr/dscf corrected to 7% oxygen per 40 CFR §63.1219(b)(7); or
(2) An alternative to the particulate matter standard under 40 CFR §63.1219(e)(3).

ESD will comply with the alternative to the particulate matter standard described in 40 CFR §63.1219(e)(3). Under this compliance alternative, ESD must not discharge or cause combustion gases to be emitted into the atmosphere that contain the following:

- Cadmium (Cd), lead (Pb), and selenium (Se) in excess of 10 µgm/dscm, combined emissions, corrected to 7 percent oxygen; or
- Arsenic (As), beryllium (Be), chromium (Cr), antimony (Sb), cobalt (Co), manganese (Mn), and nickel (Ni) in excess of 23 µgm/dscm, combined emissions, corrected to 7 percent oxygen.

In order to ensure compliance with the alternative emission limitations described above, ESD will establish Semivolatile Metals (SVM) and Low Volatile Metals (LVM) feedrates. The SVM

Table 2-1
Emissions Performance Requirements

Regulatory Citation [a]	Constituent	Maximum Allowable Emissions
40 CFR §264.343	Particulate Matter (PM)	0.08 gr/dscf, corrected to 7% O_2
40 CFR §63.1219(b)(1)(ii)	Dioxins/Furans (PCDD/PCDF)	0.11 ng TEQ/dscm [b], corrected to 7% O_2
40 CFR §63.1219(b)(2)	Mercury	8.1 µg/dscm, corrected to 7% O_2
40 CFR §63.1219(b)(3), (b)(7), (e)(3)(i) [c]	Semivolatile Metals (SVM includes cadmium, lead, and selenium) [c]	10 µg/dscm, corrected to 7% O_2, for Cd, Pb, and Se combined
40 CFR §63.1219(b)(4), (b)(7), (e)(3)(ii) [c]	Low Volatile Metals (LVM includes antimony, arsenic, beryllium, chromium, cobalt, manganese, and nickel) [c]	23 µg/dscm, corrected to 7% O_2, for As, Be, Cr, Sb, Co, Mn, and Ni combined
40 CFR §63.1219(b)(5)(i)	Carbon Monoxide (CO) [d]	100 ppmv, dry, corrected to 7% O_2
40 CFR §63.1219(b)(5)(ii)	Total Hydrocarbons (THC as propane) [d]	10 ppmv, dry, corrected to 7% O_2
40 CFR §63.1219(b)(6)	Hydrogen Chloride/Chlorine gas (HCl/Cl_2) (expressed as a chloride (Cl^-) equivalent)	21 ppmv, dry, corrected to 7% O_2
40 CFR §63.1219(c)	DRE of POHCs	99.99% destruction and removal efficiency

Notes:

[a] As noted in Section 1.0, the HBC is not an incinerator. ESD is applying for a RCRA 40 CFR Part 264 Subpart X permit. After discussions with TCEQ, TCEQ recommends that the emission limits and relevant OPLs of 40 CFR Part 63 Subpart EEE (HWC MACT) would be most appropriate for the HBC and its APCS. Therefore, the emission limits shown in this table are from 40 CFR §63.1219 for new hazardous waste incinerators.

[b] TEQ is toxic equivalency to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin.

[c] In accordance with 40 CFR §63.1219(e)(3), ESD elects to comply with the alternative to the particulate matter standard by establishing SVM and LVM feedrate limits for an expanded list of metals. This is described further in Section 2.3.

[d] Per 40 CFR §63.1219(b)(5), either CO or THC can be used for compliance. ESD has chosen to continuously monitor CO. Since ESD has chosen to monitor CO, compliance with the THC emission standards must be demonstrated during the DRE of POHC test runs.

feedrate will include lead, cadmium, and selenium. The LVM feedrate will include arsenic, beryllium, chromium, antimony, cobalt, manganese, and nickel. These metal feedrates will be established based on the results of the Trial Burn and an extrapolation procedure as described in Section 2.9.

Additionally, ESD will comply with the particulate matter emission limit included in 40 CFR §264.343 of 0.08 gr/dscf, corrected to 7% O_2.

2.4 Waiver of Operating Parameter Limits during Pretesting

40 CFR §63.1207(h)(2) provides that current OPLs established under 40 CFR §63.1209 are waived during pretesting prior to performance testing for an aggregate time not to exceed 720 hours of operation under an approved test plan or if the source records the result of pretesting. Pretesting is defined as:

- Operations when stack emissions testing for dioxin/furan, mercury, semivolatile metals, low volatile metals, particulate matter, or hydrogen chloride/chlorine gas is being performed; and
- Operations to reach steady-state operating conditions prior to stack emissions testing.

Prior to conducting the test, ESD plans to conduct pretests to prepare for conducting the actual Trial Burn. This pretesting will be conducted at conditions as close as practicable to those described in this plan. Since some of these conditions may be at levels beyond ESD's existing OPLs when the initial permit is issued, a waiver of the OPLs is necessary to ensure that exceedances of existing limits during pretesting are not deemed to constitute violations of ESD's permit.

Only the OPLs in Table 2-3 under the heading "Not Established Based on Trial Burn Results" will be active during pretesting.

Any active OPL exceedances that occur during pretesting will be logged in the operating record. ESD will record and keep a log of all pretesting periods. The aggregate pretesting time will not exceed a total of 720 hours, in accordance with 40 CFR §63.1207(h)(2).

2.5 Waiver of Operating Parameter Limits during the Trial Burn

OPLs that will be established based on Trial Burn results will be disabled during the Trial Burn. Disabling these OPLs will allow for demonstration of the worst-case conditions for these

parameters. This is consistent with 40 CFR §63.1207(h)(1) which provides a waiver of OPLs during a test.

Only the OPLs in Table 2-3 under the heading "Not Established Based on Trial Burn Results" will be active during Trial Burn.

The disabled OPLs will be reactivated at their pre-test values at the conclusion of the Trial Burn. Any active OPL exceedances that occur during the Trial Burn will be logged in the operating record.

2.6 Establishing Operating Parameter Limits

The regulatory requirements applicable to the HBC and APCS are presented in Table 2-2. This table was used to develop the list of proposed OPLs which is presented in Table 2-3. Table 2-3 shows the approach to establishing each OPL.

The results of the Trial Burn will be used to establish limits for operating parameters that ensure compliance with the emission standards. Many OPLs will be established based on data collected during testing per 40 CFR §63.1209. For the purposes of calculating LVM, SVM, mercury, chlorine, and ash feedrates, the concentration of any constituents determined not to be present in the feeds based on information provided by the manufacturer, will be assumed to be "zero." Extrapolation will be used to develop the final SVM and LVM feedrate OPLs, as discussed in Section 2.9.

Some OPLs will be based on manufacturer specifications, good engineering practice, and/or regulatory guidance. The basis for establishing the values for each of these parameters is shown in Table 2-3 and is discussed below.

Maximum Ceramic Filter Differential Pressure

The OPL for the maximum ceramic filter differential pressures is not specifically called out in the HWC MACT standard. This OPL is an operator-proposed parameter that ESD chose to meet the requirement in 40 CFR §63.1209(m)(1)(iv) for "other particulate matter control devices." 40 CFR §63.1209(m)(1)(iv)(D) allows the operator-proposed parameters to be set based on manufacturer's specifications.

The differential pressure of the ceramic filters does not serve as an indicator of performance efficiency for this specific equipment (i.e., changes in differential pressure are not related to emission performance and removal efficiency). Even though the maximum differential pressure OPL provides no useful data that the system is achieving better performance, ESD will establish

Table 2-2
Operating Parameter Limits Specified in 40 CFR, Part 63, Subpart EEE

Emission Parameter	Requirements in 40 CFR §63.1209	Proposed OPL	Averaging Period
DRE of POHCs	(j)(1) Minimum combustion chamber temperature	- Minimum Afterburner Temperature (ºF)	HRA
	(j)(2) Maximum flue gas flowrate or production rate	- Maximum Stack Gas Flowrate (as~~s~~cfm)	HRA
	(j)(3) Maximum pumpable hazardous waste feedrate	N/A – No wastes are pumpable	N/A
	(j)(3) Maximum total hazardous waste feedrate	- Maximum Total NEW ~~Charge Rate~~Feedrate (lb/hr)	HRA
	(j)(4) Waste firing parameters - specified by operator [a]	- Maximum Stack Gas Carbon Monoxide (CO) Concentration (ppmdv, 7% O_2)	HRA
Dioxins/ Furans [b]	(k)(1) Gas temperature at the inlet to a dry particulate matter control device	- Maximum Ceramic Filter Housing Inlet Temperature (ºF)	HRA
	(k)(2) Minimum combustion chamber temperature	- Minimum Afterburner Temperature (ºF)	HRA
	(k)(3) Maximum flue gas flowrate or production rate	- Maximum Stack Gas Flowrate (as~~s~~cfm)	HRA
	(k)(4) Maximum pumpable hazardous waste feedrate	N/A – No wastes are pumpable	N/A
	(k)(4) Maximum total hazardous waste feedrate	- Maximum Total NEW Feedrate~~Charge Rate~~ (lb/hr)	HRA
Mercury	(l)(1) Maximum feedrate of mercury	- Maximum Mercury Feedrate~~Charge Rate~~ (lb/hr) – MTEC (Section 2.10)	12-HRA
	(l)(2) Wet scrubber	N/A	N/A
	(l)(3) Activated carbon injection	N/A	N/A
	(l)(4) Activated carbon bed	N/A	N/A
PM	(m)(1)(i) Wet scrubbers	N/A	N/A
	(m)(1)(ii)-(iii) [Reserved]	N/A	N/A
	(m)(1)(iv) Other PM control devices that are not fabric filters, high energy wet scrubbers, electrostatic precipitator or ionizing wet scrubber	~~- Minimum Ceramic Filter Differential Pressure (in. w.g.)~~ HRA -Maximum Ceramic Filter Differential Pressure (in. w.g.) HRA	HRA HRA

Notes:

[a] See Section 2.8 for discussion of waste firing parameters.

[b] 40 CFR §63.1209(k)(5) – (k)(9) are not applicable to the APCS.

[c] The OPLs for the dry scrubber are required for HCl/Cl_2 compliance. These OPLs will only be in effect when feeding chlorinated munition campaigns. When feeding non-chlorinated munition campaigns, these OPLs will not be applicable. See section 2.7.4.

NEW = Net Explosive Weight

Table 2-2
Operating Parameter Limits Specified in 40 CFR, Part 63, Subpart EEE (continued)

Emission Parameter	Requirements in 40 CFR §63.1209	Proposed OPL	Averaging Period
PM (continued)	(m)(2) Maximum flue gas flowrate or production rate	- Maximum Stack Gas Flowrate (asacfm)	HRA
	(m)(3) Maximum ash feedrate	- Maximum Ash FeedrateCharge Rate (lb/hr)	12-HRA
	§63.1206(c)(8) Bag Leak Detection System	- FTIR CEMS (measures ammonia slip) - Triboelectric Broken Filter Detector	Instantaneous
SVM & LVM	(n)(1) Maximum inlet temperature to dry PM APCD	- Maximum Ceramic Filter Housing Inlet Temperature (ºF)	HRA
	(n)(2) Maximum feedrate of semivolatile and low volatile metals	- Maximum SVM FeedrateCharge Rate (lb/hr) - Maximum LVM FeedrateCharge Rate (lb/hr)	12-HRA
	(n)(3) Control device operating parameter limits	OPLs on the PM control device as specified by §63.1209(m)(1) – see above	
	(n)(4) Maximum total chlorine and chloride feedrate	- Maximum Total Chlorine/Chloride FeedrateCharge Rate (lb/hr)	12-HRA
	(n)(5) Maximum flue gas flowrate or production rate	- Maximum Stack Gas Flowrate (asacfm)	HRA
	§63.1206(c)(8) Bag Leak Detection System	- FTIR CEMS (measures ammonia slip) - Triboelectric Broken Filter Detector	Instantaneous
HCl/Cl_2	(o)(1) Maximum total chlorine & chloride feedrate	- Maximum Total Chlorine/Chloride FeedrateCharge Rate (lb/hr)	12-HRA
	(o)(2) Maximum flue gas flowrate or production rate	- Maximum Stack Gas Flowrate (asacfm)	HRA
	(o)(3) Wet scrubbers	N/A	N/A
	Dry Scrubber: **Dry Sorbent Injection System** [c]		
	(o)(4)(i) Minimum sorbent feedrate	N/A (See Section 2.7.6)- Minimum Dry Sorbent (Calcium Hydroxide) Feedrate (lb/hr) [c]	N/AHRA
	(o)(4)(ii) Minimum carrier fluid flowrate or nozzle pressure drop	N/A (See Section 2.7.6)- Minimum Carrier Fluid Backpressure (psi) [c]	N/AHRA
	(o)(4)(iii) Sorbent specifications - either specify brand/type or document key parameters that affect adsorption	N/A (See Section 2.7.6)- Brand/Type: Sorbacal SP manufactured by Lhoist [c]	N/A
Fugitives	(p) Maximum combustion chamber pressure	N/A - HBC is sealed during treatment	N/A

Notes:

[a] See Section 2.8 for discussion of waste firing parameters.

[b] 40 CFR §63.1209(k)(5) – (k)(9) are not applicable to the APCS.

[c] The OPLs for the dry scrubber are required for HCl/Cl_2 compliance. These OPLs will only be in effect when feeding chlorinated munition campaigns. When feeding non-chlorinated munition campaigns, these OPLs will not be applicable. See section 2.7.4.

NEW = Net Explosive Weight

Table 2-3
Basis for Establishing Operating Parameter Limits

Parameter	Averaging Period	Approach to Establishing Operating Limit	POHC	PCDD/PCD	Mercury	PM	LVM	SVM	HCl/Cl_2	Fugitives	CO/THC
Established Based on Trial Burn Test Results											
Maximum Total Feedrate	HRA	Average of the maximum HRA for each test run (not required for emissions compliance, but included per TCEQ's request – see Section 2.7.1)									
Maximum Total NEW Feedrate	HRA	Average of the maximum HRA for each test run	X	X							
Maximum Ash Feedrate	12-HRA	Average of the test run averages				X					
Maximum Total Chlorine/Chloride Feedrate	12-HRA	Average of the test run averages					X	X	X		
Maximum LVM Feedrate (As, Be, Cr, Sb, Co, Mn, Ni)	12-HRA	Average of the test run averages; Extrapolated				X[a]	X				
Maximum SVM Feedrate (Cd, Pb, Se)	12-HRA	Average of the test run averages; Extrapolated				X[a]		X			
Minimum Afterburner Temperature	HRA	Average of the test run averages	X	X							
Maximum Stack Gas Flowrate	HRA	Average of the maximum HRA for each test run	X	X		X	X	X	X		
Minimum Dry Sorbent (Calcium Hydroxide) Feedrate [b]	HRA [b]	Average of the test run averages							X		
Brand / Type of Sorbent [b]	N/A	Manufacturer's Recommendation will be used during the test (Sorbacal SP manufactured by Lhoist)							X		
Maximum Ceramic Filter Housing Inlet Temperature	HRA	Average of the test run averages		X			X	X			

Notes:

[a] The expanded LVM and SVM feedrate limits are required for compliance with the alternative particulate matter standard. Section 2.3 provides more information.

[b] The OPLs for the dry scrubber are required for HCl/Cl_2 compliance. These OPLs will only be in effect when feeding chlorinated munition campaigns. When feeding non-chlorinated munition campaigns, these OPLs will not be applicable. See section 2.7.4.

[c] ESD will use the MTEC approach for mercury. See Section 2.10.

Table 2-3
Basis for Establishing Operating Parameter Limits (continued)

Parameter	Averaging Period	Approach to Establishing Operating Limit	POHC DRE	PCDD/PCDF	Mercury	PM	LVM	SVM	HCl/Cl_2	Fugitives	CO/THC
Not Established Based on Trial Burn Results											
Maximum Ceramic Filter Differential Pressure	HRA	Manufacturer's Recommendation (20 in w.g.)				X	X	X			
Bag Leak Detection System - FTIR CEMS (measures ammonia slip)	Instant-aneous	Manufacturer's Specification				X	X	X			
Minimum Carrier Fluid Backpressure [b]	HRA [b]	Manufacturer's Recommendation (0.5 psi)							X		
Maximum Mercury Feedrate [c]	12-HRA	MTEC [c]			X						
Maximum Stack Gas Carbon Monoxide (CO) Concentration	HRA	Limit specified in the HWC MACT Rule (100 ppmv, dry, corrected to 7% O_2)									X

Notes:

[a] The expanded LVM and SVM feedrate limits are required for compliance with the alternative particulate matter standard. Section 2.3 provides more information.

[b] The OPLs for the dry scrubber are required for HCl/Cl_2 compliance. These OPLs will only be in effect when feeding chlorinated munition campaigns. When feeding non-chlorinated munition campaigns, these OPLs will not be applicable. See section 2.7.4.

[c] ESD will use the MTEC approach for mercury. See Section 2.10.

~~Table 2-3~~
~~Basis for Establishing Operating Parameter Limits~~

~~Parameter~~	~~Averaging Period~~	~~Approach to Establishing Operating Limit~~	~~POHC~~	~~PCDD/PCD~~	~~Mercury~~	~~PM~~	~~LVM~~	~~SVM~~	~~HCl/Cl_2~~	~~Fugitives~~	~~CO/THC~~
~~**Established Based on Trial Burn Test Results**~~											
~~Maximum Total NEW Charge Rate~~	~~HRA~~	~~Average of the maximum HRA for each test run~~	~~X~~	~~X~~							

Maximum Ash Charge Rate	12-HRA	Average of the test run averages				X					
Maximum Total Chlorine/Chloride Charge Rate	12-HRA	Average of the test run averages					X	X	X		
Maximum LVM Charge Rate (As, Be, Cr, Sb, Co, Mn, Ni)	12-HRA	Average of the test run averages; Extrapolated				X[a]	X				
Maximum SVM Charge Rate (Cd, Pb, Se)	12-HRA	Average of the test run averages; Extrapolated				X[a]		X			
Minimum Afterburner Temperature[b]	10-minute RA[b]	Average of the minimum one-minute average (OMA) values when emissions are actively being treated during each run of the trial burn (see Section 2.7.3 for more information)	X	X							
Maximum Stack Gas Flowrate[b]	10-minute RA[b]	Average of the maximum one-minute average (OMA) values when emissions are actively being treated during each run of the trial burn (see Section 2.7.4 for more information)	X	X		X	X	X	X		

Notes:

[a] The expanded LVM and SVM charge rate limits are required for compliance with the alternative particulate matter standard. Section 2.3 provides more information.

[b] The operating parameters associated with the APCS will only be in effect when emissions from a batch are actively being controlled.

[c] ESD will use the MTEC approach for mercury. See Section 2.10.

Table 2-3
Basis for Establishing Operating Parameter Limits (continued)

Parameter	Averaging Period	Approach to Establishing Operating Limit	POHC DRE	PCDD/PCDF	Mercury	PM	LVM	SVM	HCl/Cl_2	Fugitives	CO/THC
Not Established Based on Trial Burn Results											
Maximum Ceramic Filter Housing Inlet Temperature [b]	HRA [b]	Manufacturer's recommendation (750ºF)		X			X	X			
Minimum Ceramic Filter Differential Pressure (in. w.g.) [b]	HRA [b]	Manufacturer's Recommendation (1 in w.g.)				X	X	X			
Maximum Ceramic Filter Differential Pressure (in. w.g.) [b]	HRA [b]	Manufacturer's Recommendation (20 in w.g.)				X	X	X			
Bag Leak Detection System [b] - FTIR CEMS (measures ammonia slip) - Triboelectric Broken Filter Detector	Instant-aneous	Manufacturer's Recommendation				X	X	X			
Maximum Mercury Charge Rate [c]	N/A	MTEC [c]			X						
Maximum Stack Gas Carbon Monoxide (CO) Concentration	HRA	Limit specified in the HWC MACT Rule (100 ppmv, dry, corrected to 7% O_2)									X

Notes:

[a] The expanded LVM and SVM charge rate limits are required for compliance with the alternative particulate matter standard. Section 2.3 provides more information.

[b] The operating parameters associated with the APCS will only be in effect when emissions from a batch are actively being controlled.

[c] ESD will use the MTEC approach for mercury. See Section 2.10.

an OPL on the maximum differential pressure because it is an indicator of large buildup of filter cake on the ceramic filters. A limit on the maximum differential pressure is an indication that the pulse cleaning system is working appropriately.

Differential pressure on the ceramic filters will vary throughout the run as sorbent collects on the ceramic filters and then is later pulsed to remove the sorbent, making establishment of a maximum value as a limit impractical (if not impossible) as the differential pressure will be constantly changing. Therefore, the value for maximum differential pressure will be set based on manufacturer's specifications as allowed in 40 CFR §63.1209(m)(1)(iv)(D).

Bag Leak Detection System: FTIR CEMS (ammonia slip)

Ammonia Injection rate will be initially set to treat the expected amount of NOx generated from the Thermal Oxidizer Burner (note that NOx will not be regulated by the RCRA permit, but is mentioned in this document because it is part of the system's emissions treatment capability). During system tuning, the ammonia injection will be reduced until only trace amounts of ammonia are detectable by the CEMS at the stack outlet. If the initial ammonia readings at the stack are non-detectable, ammonia injection will be increased until trace amounts are detected. This ensures that all NOx emissions have been abated while also minimizing ammonia slip.

Once the ammonia injection rate is determined, and the baseline ammonia output from the stack are established, a potential broken filter will be identified if the ammonia in the stack exhaust unexpectedly increases. This would be due to a clear lack of catalyst (i.e. a broken filter). This will be flagged as a Potential Broken Filter Alarm. A visual inspection would then be required to confirm the existence of a broken filter.

Minimum Carrier Fluid Backpressure

For a dry scrubber, the OPL requirements are specified in 40 CFR §63.1209(o)(4). The limit in 40 CFR §63.1209(o)(4)(ii) for the minimum carrier fluid backpressure must be established "based on manufacturer's specifications" per the HWC MACT standard. Therefore, this value will be set based on the manufacturer's specifications as required by 40 CFR §63.1209(o)(4)(ii).

Maximum Mercury Feedrate

ESD does not plan to feed munitions containing mercury and will use the maximum theoretical emission concentration (MTEC) approach to document ongoing compliance with the mercury emission standard per 40 CFR §63.1207(m)(1). This approach is discussed in Section 2.10 and is based on all the mercury fed to the HBC being emitted through the stack (i.e., no credit is taken for mercury removal in the APCS). Since no mercury containing munitions will be fed during the

test (or normal operations), this limit will not be established based on the test results and will follow 40 CFR §63.1207(m)(1).

Maximum Stack Gas Carbon Monoxide (CO) Concentration
This limit is specified in the HWC MACT standard and will remain at the value in the HWC MACT standard (100 ppmv, dry, corrected to 7% O_2).

2.7 Site-Specific Considerations for OPLs

ESD's HBC and the process feeds have unique features that are not considered by the HWC MACT standard. Due to these unique features, several of the required OPLs are not attainable or are not applicable to the system. ESD has proposed several OPLs to meet the intent of the HWC MACT OPL requirements and these specific OPLs are discussed in this section.

2.7.1 Maximum Total Feedrate and Maximum Total NEW ~~Charge Rate~~Feedrate

As shown in Table 2-2, the HWC MACT standard has proposed operating limits in 40 CFR §63.1209 on the total hazardous waste feedrate for proving compliance with the DRE of POHCs and Dioxin/Furan emission standards. The HBC system is different than a traditional incinerator in the type of material that it feeds. The entire amount of material sent to the HBC does not "incinerate" or "combust." The material fed to the HBC consists of munition items such as rocket motors, flares, smoke munitions, and other munitions that are ignitable and non-mass detonating. These materials can consist of motor casings and other non-explosive portions of the item, along with the explosive material. The motor casings and other non-explosive portions of the item will not combust during treatment in the HBC and will remain in the HBC after treatment. Large pieces of metal remaining after processing in the HBC will be inspected to ensure no energetic material remains and then will be shipped off-site for disposal or for recycling.

Due to the fact that large metal pieces, motor casings, and other non-explosive portions of the items are fed to the HBC and will not affect the combustion process, a limit on the total hazardous waste feedrate for the HBC is not an appropriate operating limit. However, ESD will set a limit on the maximum total feedrate (lb/hr) per TCEQ's request.

For the HBC, the important part of the feed to set a limit on is the amount of net explosive weight (NEW) fed to the unit. The NEW is the amount of explosive material that will combust during treatment. Therefore, to meet the requirement for a limit on the total hazardous waste feedrate per 40 CFR §63.1209, ~~instead of a limit on the total overall material fed to the HBC,~~ ESD will set a limit on the total amount of NEW fed to the HBC.

ESD will set a limit on both the maximum total feedrate (per TCEQ's request) and the maximum total NEW ~~charge rate~~feedr ~~(lb/hr)~~ate (to satisfy the requirement for maximum total hazardous waste feedrate). ~~This~~ These limits will be based upon the average of the maximum hourly rolling average (HRA) for each test run demonstrated during the test.

2.7.2 Feedrates ~~vs.~~ Calculated Based on Charge Rates

Because the HBC is operated in a batch mode of operation, a "feedrate" in the traditional sense cannot be directly applied. Therefore, ESD's feedrate limits in lb/hr will be calculated based upon the "charge rates~~.~~" per batch. ESD will ensure the "charge rates" comply with the "lb/hr" limits by calculating the effective feedrate in "lb/hr" as follows:

$$Effective\ Feedrate\ \left(\frac{lb}{hr}\right) = Charge\ Rate\left(\frac{lb}{batch}\right)\ x\ Number\ of\ Batches\ per\ Hour\left(\frac{batches}{hr}\right)$$

Feedrate limits and compliance will be tracked in units of pounds per hour (lb/hr), as calculated per the equation above.

2.7.3 Minimum Afterburner Temperature

As shown in Table 2-2, the HWC MACT standard has proposed an operating limit in 40 CFR §63.1209 on the minimum combustion chamber temperature for proving compliance with the Destruction and Removal Efficiency (DRE) of Principal Organic Hazardous Constituents (POHCs) and Dioxin/Furan emission standards. The HBC is operated in a batch mode of operation. The HBC temperature will rise during treatment and will return to close to ambient after treatment so that the chamber can be opened and the next batch can be fed to the HBC. There is no direct control of the temperature within the HBC's combustion chamber.

The afterburner's temperature can be controlled more precisely than the HBC combustion chamber temperature and provides additional residence time and a high temperature in order complete combustion of any volatile organic compounds (VOCs). Therefore, ESD will set a limit on the minimum afterburner temperature to satisfy the requirement for minimum combustion chamber temperature.

~~While the afterburner temperature can be controlled, the afterburner temperature will still vary depending on the stage in the cycle since the HBC process is operated in a batch mode of operation. The afterburner temperature scenarios are as follows:~~

- ~~When the emissions from a batch are actively being treated, the afterburner will be at full operating temperature.~~

- ~~In between batches, the afterburner will be at a lower temperature.~~
- ~~The afterburner will be in a "low-burn" setting outside of normal operating hours to keep the afterburner and catalytic ceramic filter systems warm.~~

~~The afterburner temperature scenario which will affect the destruction of VOCs is the first scenario (when emissions from a batch are actively being treated). Therefore, the minimum afterburner temperature OPL established during the trial burn will only be in effect during the following afterburner temperature scenario.~~

- ~~When the emissions from a batch are actively being treated.~~

~~Typically, t~~The combustion chamber temperature OPL is determined as the "average of the test run averages" demonstrated during the test for HWC MACT compliance. ~~The HWC MACT specified approach to setting this OPL works well when the system and APCS operates in a continuous mode. However, due to this being a batch mode of operation and the afterburner temperature not being kept constant throughout the batch cycle during the test or during normal operations, this OPL will be determined based upon the average of the minimum one-minute average values when emissions are actively being treated during each run of the trial burn.~~ For ongoing compliance, this OPL will be complied with on an hourly ~~10-minute~~ rolling average basis.

~~*2.7.4 Maximum Stack Gas Flowrate*~~

~~Due to the HBC being operated in a batch mode of operation, the other operating parameters associated with the APCS will have varying values depending on the stage in the cycle, much like the afterburner temperature. Therefore, the operating parameters associated with the APCS will only be in effect when emissions from a batch are actively being controlled.~~

~~Typically, for HWC MACT compliance, the maximum stack gas flowrate OPL is determined by the "average of the maximum HRA demonstrated during each test run". The HWC MACT specified approach to setting OPLs works well when the system and APCS operates in a continuous mode. However, due to this being a batch mode of operation and the APCS parameters not being kept constant throughout the batch cycle during the test or during normal operations, this OPL will be determined based upon the average of the maximum one-minute average values when emissions are actively being treated during each run of the trial burn. For ongoing compliance, this OPL will be complied with on a 10-minute rolling average basis.~~

~~*2.7.5 APCS-Related OPLs*~~

~~Due to the HBC being operated in a batch mode of operation, the operating parameters associated with the APCS will have varying values depending on the stage in the cycle, much like the afterburner temperature. Therefore, the operating parameters associated with the APCS will only be in effect when emissions from a batch are actively being controlled.~~

2.7.~~6~~4 ~~Using CEMS for Compliance with the Dry Scrubber~~Dry Sorbent Injection System OPLs during Non-Chlorinated Munition Campaigns

The Dry Sorbent Injection (DSI) System is used to treat acid gases by metering powdered caustic material into the gas stream prior to distribution through the ceramic filter housings. The sorbent neutralizes the acid gases and is filtered out of the gas stream directly on the outer surface of the ceramic filters. The sorbent develops a filter cake which is pulse cleaned to control differential pressure and remove spent sorbent. The spent sorbent is discharged from the filter housing waste hopper.

Munitions are processed in campaigns – a campaign is where multiple batches of the same munition are processed through the HBC in a consecutive time period. For example, a certain type of munition will be processed through the HBC for several days to several months, depending on the amount of munitions needing to be processed. The munitions processed during the Trial Burn will contain significant amounts of chlorine. As noted in Section 4.2.2, some of the munition campaigns sent to the HBC during normal operations will not include chlorine. If there is no chlorine in the munitions being processed, there is no reason to scrub chlorine, so the dry scrubber is not required to be operated at a certain level for compliance with the HWC MACT HCl/Cl_2 emission standard. Operating the DSI system at these levels unnecessarily when sorbent is not needed will result in unneeded sorbent being used and unreacted material being collected in the waste hopper, leading to additional operating cost and additional waste being created unnecessarily. Therefore, because the OPLs for the dry scrubber are only required for HCl/Cl_2 compliance (see Table 2-2 and 2-3), the dry scrubber OPLs are only needed when feeding chlorinated munition campaigns. When feeding non-chlorinated munition campaigns, the following dry scrubber OPLs will not be applicable (i.e., will be set to zero).

Non-Chlorinated Munition Batches:

- Minimum Dry Sorbent Feedrate (0 lb/hr)
- Minimum Carrier Fluid Backpressure (0 psi)
- Brand/Type of Sorbent (none)

ESD is requesting the agency approve waiving the above dry scrubber OPLs when chlorinated munition campaigns are not being fed to the HBC due to the fact that the OPLs for the dry scrubber are only required for HCl/Cl_2 compliance.

2.7.5 Overnight Standby

The only time all OPLs will not be in effect is outside of normal operating hours when munitions are not being processed:

- *Overnight Standby:* Outside of normal operating hours, the APCS may be in a "low-burn" setting to keep the system warm and ready for operation the next operating shift.
  *The APCS OPLs will be complied with prior to treating emissions from the first batch of each operating shift.

Examples of when the system may enter *Overnight Standby* include overnight hours or over weekends when munitions are not being processed.~~40 CFR §63.1209(o)(4) contains OPLs for systems that are equipped with a dry scrubber. 40 CFR §63.1209(a)(5) allows using Continuous Emissions Monitoring System (CEMS) for compliance monitoring in lieu of compliance with the corresponding OPLs for hydrogen chloride and chlorine. The HBC APCS will be equipped with a FTIR CEMS to monitor HCl. Therefore, ESD requests approval to use a CEMS to measure HCl in lieu of the OPLs specified in 40 CFR §63.1209(o)(4) for the Dry Sorbent Injection System, as allowed in 40 CFR §63.1209(a)(5).~~

2.8 Operation of Waste Firing System

In 40 CFR §63.1209(j)(1)-(4), EPA specifies OPLs that must be maintained to ensure compliance with the DRE standard. The required OPLs specified in 40 CFR §63.1209(j)(1) – (3) are:

- Minimum combustion chamber temperature (OPL will be Minimum Afterburner Temperature, see Section 2.7.3 for more information)
- Maximum flue gas flowrate or production rate (OPL will be Maximum Stack Gas Flowrate~~, see Section 2.7.4 for more information~~)
- Maximum hazardous waste feedrate (OPL will be Maximum Total NEW ~~Charge Rate~~Feedrate, see Section 2.7.1 for more information)

As shown in Table 2-2 and Table 2-3, ESD proposes to establish OPLs for these requirements.

In 40 CFR §63.1209(j)(4), the HWC MACT rule requires that an operator must specify operating parameters and limits to ensure that good operation of each hazardous waste firing system is maintained. ESD will operate with the following OPL to fulfill this requirement.

- Maximum Stack Gas CO Concentration.

ESD will maintain the stack gas CO less than 100 ppmv, dry, corrected to 7 percent O_2, on an hourly rolling average basis. This parameter, in conjunction with other parameters discussed in this subsection, will provide assurance that the waste firing system is in good operation and is well maintained.

2.9 Metals Feedrate Extrapolation Procedures

In accordance with 40 CFR §63.1209(n)(2)(vii) and §63.1209(l)(1)(v), ESD is proposing a procedure for extrapolating the SVM and LVM feedrates achieved during the Trial Burn. ESD proposes to extrapolate SVM and LVM feedrates to 80% of the respective HWC MACT emission standard or will limit the extrapolation to three (3) times the demonstrated feedrate during the Trial Burn, whichever is more restrictive.

Upon completion of the Trial Burn, the following extrapolation procedure will be used to establish SVM and LVM feedrate OPLs.

1. Determine the ratio of the HWC MACT emission standards for SVM and LVM to the demonstrated concentration measured during the trial burn.

$$SVM\ Ratio = \frac{10\ \frac{\mu g}{dscm}\ @\ 7\%\ O2}{Demonstrated\ SVM\ concentration\ (\frac{\mu g}{dscm}\ @\ 7\%\ O2)}$$

$$LVM\ Ratio = \frac{23\ \frac{\mu g}{dscm}\ @\ 7\%\ O2}{Demonstrated\ LVM\ concentration\ (\frac{\mu g}{dscm}\ @\ 7\%\ O2)}$$

2. Calculate the possible ~~mercury,~~ LVM~~,~~ and SVM feedrate OPL based on the ratios from Step #1 and assuming 80 percent of the allowable concentration.

$$SVM\ feedrate\ OPL\ \left(\frac{lb}{hr}\right) = Demonstrated\ SVM\ feedrate\ \left(\frac{lb}{hr}\right)\ x\ SVM\ Ratio\ x\ 0.80$$

$$LVM\ feedrate\ OPL\ \left(\frac{lb}{hr}\right) = Demonstrated\ LVM\ feedrate\left(\frac{lb}{hr}\right)\ x\ LVM\ Ratio\ x\ 0.80$$

3. Calculate the possible LVM and SVM feedrate OPL based on three times the demonstrated LVM and SVM feedrates during the Trial Burn.

$$SVM\ feedrate\ OPL\ \left(\frac{lb}{hr}\right) = Demonstrated\ SVM\ feedrate\left(\frac{lb}{hr}\right)\ x\ 3$$

$$LVM\ feedrate\ OPL\ \left(\frac{lb}{hr}\right) = Demonstrated\ LVM\ feedrate\left(\frac{lb}{hr}\right)\ x\ 3$$

~~3.~~4. Compare the possible LVM and SVM feedrate OPLs calculated by extrapolating to 80% of the respective HWC MACT emission standard (Step #2) and the LVM and SVM feedrate OPLs calculated by multiplying the demonstrated feedrates by 3 (Step #3). The more restrictive (i.e. lower) value will be the OPL. ~~The values determined in Step #2 will be the OPL.~~ For ongoing compliance, these OPLs will be complied with on a 12-hourly rolling average (12-HRA) basis.

ESD requests approval of this metals feedrate extrapolation procedure per 40 CFR §63.1210(n)(2)(vii) and §63.1209(l)(1)(v).

2.10 Mercury Maximum Theoretical Emission Concentration

ESD does not plan to feed munitions containing mercury and will use the maximum theoretical emission concentration (MTEC) approach to document ongoing compliance with the mercury emission standard per 40 CFR §63.1207(m)(1). This approach is based on all the mercury fed to the HBC being emitted through the stack (i.e., no credit is taken for mercury removal in the APCS). Because the munitions do not contain mercury, the MTEC will be zero. If ESD chooses to feed mercury-containing munition items in the future, the items will be fed at rates that will result in an MTEC that does not exceed the mercury emissions standard. For example, a maximum mercury feedrate limit will be calculated using the MACT limit of 8.1 µg/dscm at 7% O_2 and the stack gas flowrate and the stack gas oxygen. An example of this calculation is shown below, assuming a stack gas flowrate of 9,300 dscfm and a stack gas oxygen concentration of 14.0%.

$$\frac{8.1\mu gHg}{dscm},7\%O_2 \times \frac{20.9 - 14.0\%O_2}{13.9} \times 9{,}300dscfm \times \frac{dscm \cdot 60min \cdot g \cdot lb}{35.315dscf \cdot hr \cdot 10^6\mu g \cdot 453.6g}$$

$$= \quad 0.00014 \text{ lbHg/hr}$$

ESD will ensure that the mercury emission standard is not exceeded by calculating the MTEC based on the actual feedrate of mercury and the stack gas flowrate and oxygen concentration. The amount of mercury in the munitions will be determined as described in Section 5.2. If mercury is not listed as a component in the item, the mercury concentration is assumed to be zero. As mentioned above, the actual feedrate of mercury is anticipated to be zero since ESD does not plan to feed munitions containing mercury.

2.11 Expected Levels of Regulated Constituents in Certain Feedstreams

In 40 CFR §63.1207(f)(1)(xi) and 40 CFR §63.1209(c)(5), the HWC MACT standard requires documentation of the expected levels of the regulated constituents (metals and chlorine) in natural gas, process air and feedstreams from vapor recovery systems.

Natural Gas

The HBC does not use natural gas. Natural gas is used in the afterburner that is part of the APCS. The natural gas will be commercially supplied. The concentration of the applicable metals and chlorine in natural gas is very insignificant and is negligible compared to these constituents in the hazardous waste feedstreams. Therefore, natural gas is not considered when documenting compliance with the feed limits for metals and chlorine/chloride on an ongoing basis.

Process Air

The combustion air (process air) for the unit is drawn from ambient air near the unit. Since the HBC system is sealed during treatment and the resulting combustion gases are routed through the APCS, the fugitive emissions of regulated constituents (metals and chlorine) from the unit will be negligible. Therefore, the feedrate of regulated constituents in the process air introduced to the HBC is considered negligible as compared to the regulated constituents contained in the process feed. The process air is not considered when documenting compliance with the feed limits for metals and chlorine/chloride on an ongoing basis.

Feedstreams from Vapor Recovery Systems

The HBC does not have any feedstreams from vapor recovery systems.

3.0 DETAILED ENGINEERING DESCRIPTION

The following sections provide a detailed engineering description of the HBC system. It should be noted that the currently planned configuration of equipment and instrumentation are described in this section and may be changed to equivalent or superior materials or items. A process flow diagram (PFD) is included as Figure 3-1. The PFD is a representation of the combustion and air pollution control systems and includes all major process flow streams.

The HBC provides demilitarization for numerous munition items such as rocket motors, flares, smoke munitions, and other munitions that are ignitable and non-mass detonating. After the materials are prepared for processing, they are transferred through the Rocket Motor Ops Building to the feed sled of the HBC. The HBC system is a contained burn system followed by air pollution control equipment. The HBC is manufactured by Tex-Fab, Inc. and is a custom built chamber with a design capacity of 250 pounds Net Explosive Weight (NEW). Precision Partners Industrial Development Group (PPIDG) is providing the APCS equipment.

Contained burn technology can be thought of as "open burning indoors." This proven technology provides a modern and environmentally responsible alternative to replace open burning. These robust systems are designed to be simple, safe, and flexible from an operations standpoint, while limiting pollution and potentially harmful emissions which are a concern from open burning operations.

Materials are prepared in batches and are ignited in a manner similar to traditional open burning operations, maintaining simplicity and flexibility. The exhaust gases, however, are contained and cleaned prior to release to protect human health and the environment. The design of the APCS to scrub the off gases is tailored to the chemistry of the materials being processed.

The basic components of the contained burn system include the feed system, the HBC, an ignition system and an APCS. Ancillary systems include an HBC wash system and utilities. The components and systems presented in the following sections are used to achieve energetic destruction and pollution abatement.

3.1 Feed System

The feed system design is customized based on the type and quantity of material to be processed to maximize throughput, process material type flexibility, and minimize personnel handling of the process feed material, thus minimizing risk. Each batch is limited to 250 pounds Net Explosive Weight (NEW) through the feed system. All feeding into the HBC is performed by operators in the control room (Range Control) which is separated from the HBC by a substantial barricade wall

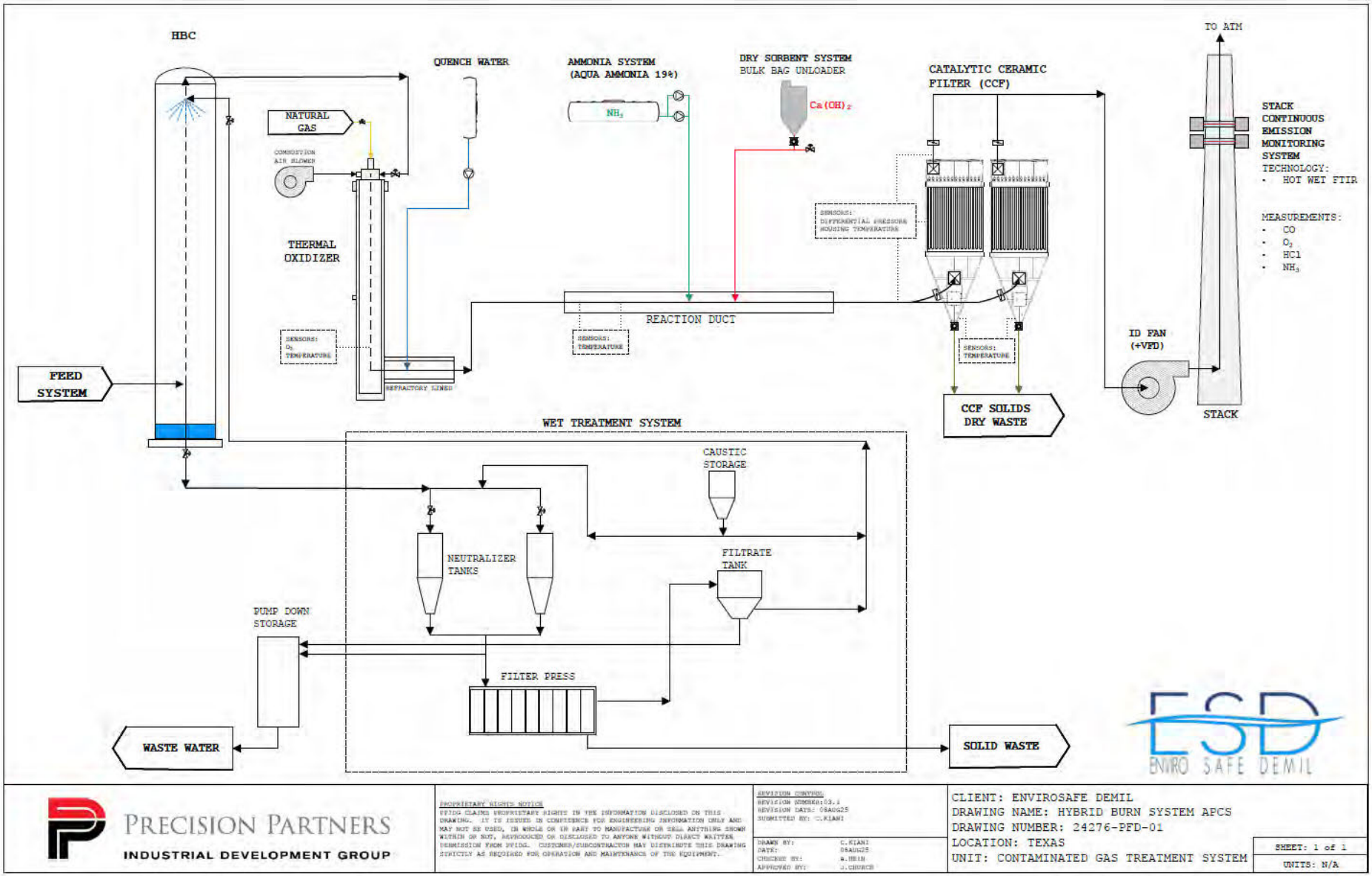

Figure 3-1
Process Flow Diagram

designed to prevent injury to operators. Safety systems throughout the HBC include a series of interlocks and alarms for abnormal conditions.

The feed system operates in a batch feed mode. Bulk materials are prepared for processing and are placed into a removable burn pan. Rocket motor components or other items that create thrust when burned are secured using a holding fixture to restrain the motor during firing. The burn pan or rocket motor is then remotely loaded into the HBC using an automated loading system. The material is ignited remotely. After thermal processing is complete, the burn pan is remotely extracted from the HBC.

3.2 Hybrid Burn Chamber (HBC)

The HBC is a steel pressure vessel specially designed and sized to contain the exhaust products generated from burning. It is designed to ensure both the safety of personnel and to protect equipment in the case of a maximum credible event. It is sized to provide proper combustion of the process materials and to withstand the process operating pressures and temperatures.

3.3 Ignition System

An electrically actuated ignition source is incorporated in the contained burn system so that materials loaded for processing can be ignited remotely by an operator. The ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is operational. Once the chamber is closed and ignition initiated, the operators have no further active control.

3.4 Air Pollution Control System (APCS)

After processing the energetic materials within the HBC, emissions are exhausted through a series of air pollution control equipment that make up the APCS.

The pressure and flow of the gas will be regulated by ~~a multi-damper recirculation loop~~an isolation butterfly valve and associated pressure bypass valve at the outlet of the HBC. The HBC gas will be evacuated from the top of the chamber directly into a thermal oxidizer (also known as an afterburner) for VOC destruction where the gas temperature will be increased to ~~approximately 2,000~~1,400ºF to 2,100ºF for 2 seconds of residence time to provide effective thermal oxidation of VOCs.

The hot flue gas will then be quenched by water injection down to approximately 750ºF and will enter the reaction duct. In the reaction duct, dry sorbent (hydrated lime) and aqueous ammonia (19% solution) are injected into the gas stream to mix prior to distribution through the ceramic

filter housings. At the ceramic filter housings, the process PM and reacted sorbent containing captured HCl and SOx are filtered out of the gas stream directly on the outer surface of the ceramic filters and discharged from the filter housing waste hopper. The catalyst in the filters will react with the NOx and ammonia resulting in NOx destruction. The clean gas exits the filter housings and flows through the high temperature induced draft fan and out the stack. (Note that NOx and SOx are not regulated by the RCRA permit, but are mentioned in this document because it is part of the system's emissions treatment capability).

3.4.1 Thermal Oxidizer (Afterburner)

A down-fired natural gas direct-fired thermal oxidizer is provided and includes a certified combustion management system. The system increases gas temperatures to ~~2,000~~1,400°F to 2,100ºF ~~with~~ for approximately 2 seconds of residence time to achieve thermal oxidation. This design enhances the effectiveness of the oxidation process while allowing any particulate matter to stay suspended in the gas stream for removal at the ceramic filters.

3.4.2 Ammonia Injection System

Note that NOx will not be regulated by the RCRA permit, but is mentioned in this document because it is part of the system's emissions treatment capability.

To control NOx with the catalytic ceramic filters, ~~atomized~~ aqueous ammonia (19% by ~~vol~~weight~~.~~) is injected directly into the flue gas inlet duct upstream from the dry sorbent injection (DSI) point. The ammonia system utilizes a metering pump with pulse dampener~~s~~ and pressure transmitters to ensure proper system operation. Ammonia is atomized using compressed air at the nozzle to ensure proper mixing with NOx in the flue gas. All wetted components are chemical resistant plastic and 316 grade stainless. The pump skid is contained in an impact resistant steel structure with a spill containment and plastic spray shields.

3.4.3 Dry Sorbent Injection (DSI) System

Dry sorbent is stored in supersacks with a capacity of 1,100 lbs. Supersacks of fresh sorbent are loaded on the bag unloader system designed to inject sorbet into the flue gas duct within the operating injection range of 10-40 lbs/hr. The bag unloader system has a screw feeder to control the feed rate and a ~~high pressure centrifugal blower~~compressed air venturi to convey sorbent to the injection point. Supersack ~~fluidizing paddles~~vibrators keep the fresh sorbent flowing out of the supersack. The bag unloader system uses ~~level~~ weight sensors and alarms to notify operators that a supersack change is required.

3.4.4 Ceramic Filter Housing and Elements

Note that NOx will not be regulated by the RCRA permit, but is mentioned in this document because it is part of the system's emissions treatment capability.

The prefabricated filter housings include the tube sheet, reverse air pulse filter cleaning system, inlet/outlet duct connection flanges, housing body, hopper, insulation, and cladding. The filter housing is welded internally to eliminate air or water leakage into the housing while under negative pressure during operation.

The filter elements in this system are embedded with a catalyst for selective catalytic reduction (SCR) of NOx, using the filter ceramic as the catalyst substrate. The PM filtration at the surface serves to protect the catalyst active material. The catalyst has best efficiency between 500 °F – 775 °F, but can operate outside of this temperature range at lower efficiency. The CFA Cerafil catalytic ceramic filters have been proven to operate for over 10 years without replacement. Due to the mechanism of the filters, both the embedded catalyst and the mechanical integrity of the filter, do not observe meaningful performance degradation for the life of the filter. This significantly reduces the cost, downtime and risk observed when compared against traditional selective catalytic reduction (SCR) catalyst and fabric filter bags which often require replacement in <3 years.

3.4.5 Waste Collection and Handling

The spent sorbent material temperature at the discharge of the filter housing hoppers will be approximately 600ºF. The sorbent waste quickly cools as it passes through a rotary air lock to be collected in waste hoppers for disposal.

3.4.6 ID Fan

The 150-HP high temperature induced draft fan features a direct drive configuration for improved performance. It includes integrated vibration and temperature sensors for enhanced monitoring. This design ensures efficient operation and reliable performance at all times during operation.

3.4.7 Stack

The exhaust system features a ~~freestanding 50~~60-foot carbon steel stack supported by a blind flange, complete with EPA test ports and CEMS port~~s~~.

3.4.8 Instrumentation and Control ~~Cabinet~~

All instrumentation for process monitoring is included, such as thermocouples, flow monitors, and pressure transmitters. The control ~~cabinet contains all control components, including a~~

~~Programmable Logic Controller (PLC)~~ room contains the Main Programmable Logic Controller (PLC) and HMI interface for operator input. This PLC will directly communicate with three Remote Input/Output (RIO) panels located in the field to control the APC and Wash System equipment. System design ensures the timely reporting of abnormal conditions and alarms and ensures proper process flow.. These components are assembled inside a National Electrical Manufacturer Association (NEMA) 4X outdoor-rated cabinets for durability. This ensures reliable process control and monitoring in all environments.

3.5 HBC Wash System

This system provides for automated remote washing of the interior of the chamber to periodically remove ash or condensate materials from the chamber. The spray water is drained from the HBC and passes through a neutralization system to neutralize any acid present. A downstream ~~and a~~ filter press system will then ~~to~~ remove any solids from the chamber or from the neutralization process. The filtered liquid stream can then be re-used for future HBC wash cycles or pumped into storage tanks where it is characterized prior to final disposal off-site.

3.6 Monitoring of Process Conditions and Safety Interlocks

Items are fed to the chamber in batches and are allowed to consume themselves (in the manner in which they were originally designed) inside of the chamber. When operating conditions are within the specified ranges, the items are then removed to be replaced by the next batch or item. If conditions are incorrect for another batch based on the chamber sensors or APCS sensors, the batch is not fed or processed until conditions are remedied.

The HBC does not utilize a traditional automatic waste feed cutoff (AWFCO) system. However, the ignition system has several safety interlocks incorporated so ignition is only enabled when the system verifies that the material has been loaded, the HBC loading door is closed and sealed, and the APCS is within the appropriate operating ranges. A Human Machine Interface (HMI), which is a series of computers and monitors, displays information on the temperatures, pressures, and general process conditions of the HBC and APCS. The HMI has alarms and interlocks for normal and abnormal conditions of the equipment. HBC process cycles are not allowed to commence if all safe conditions are not met or remedied.

The firing sequence requires a permissive from the APCS that indicates the parameters within the APCS are within the required setpoints (thermal oxidizer is ready to receive gases for treatment, DSI and ammonia systems are working, pressure throughout the system is within setpoints, etc.). Once the position switch on the HBC door is activated saying the door is closed, and verified through a manual switch at the chamber, the ignition sequence is allowed to begin. Operators have individual keys and must return to the control room to place their key into the key interlock

mechanism to allow firing of the rocket motor. At this point, the keys are captive in the firing switch. The sequence of opening the door for another cycle cannot be completed until pressure has reduced to ambient in the chamber. This indicates that all the gas has been evacuated and treated through the APCS. If there are out of spec readings, or the APCS has become faulted, the keys are unable to be removed, and the cycle cannot be repeated. The error will need to be corrected to unlock the keys and allow the door to be opened for another cycle.

3.7 Stack Gas Monitoring – CEMS

Stack gas is continuously monitored using a Fourier ~~transform~~ Transform ~~infrared~~ Infrared spectroscopy (FTIR) based Continuous Emissions Monitoring System (CEMS). The CEMS measures the following for regulatory compliance:

- Carbon monoxide (CO)
- Oxygen (O_2) by Zirconium Oxide
- Water (H_2O)

The CEMS measures the following for process control, but are not in place for regulatory compliance:

- Ammonia (NH_3) (Ammonia slip ~~(~~serves as ~~a bag leak detection system~~the broken filter detection system)
- Hydrogen Chloride (HCl)

The CO and O_2 CEMS will be installed, calibrated, maintained, and continuously operated in compliance with Performance Specification 4B.

The primary functions of the CEMS are to:

- ~~C~~Continuously measure, display, and record the gas concentrations in the stack, and
- ~~A~~activate alarms ~~and provide input into safety interlocks.~~

Additionally, the CEMS performs these important functions:

- ~~Remotely displays stack gas composition and~~Monitors CEMS operational status, and
- Performs calibration of monitoring systems.

More information on the CEMS is included in Appendix III.

4.0 TRIAL BURN PROTOCOL

The purpose of this section is to describe in detail the protocol for the Trial Burn. The Trial Burn will be conducted under worst-case test conditions that maximize the potential for emissions of the pollutants of concern. The Trial Burn for the HBC will consist of one test condition with three replicate runs.

The Trial Burn operating conditions represent the theoretical worst-case conditions for emissions of the following pollutants:

- Principle Organic Hazardous Constituents;
- Total hydrocarbons;
- Carbon monoxide;
- Dioxins/Furans;
- Particulate matter;
- Hydrogen chloride/chlorine (HCl/Cl_2);
- Semivolatile metals (Cd, Pb, Se); and
- Low volatile metals (As, Be, Cr, Sb, Co, Mn, Ni).

Typical process feeds processed in the HBC will be fed during the Trial Burn. Ash, chlorine, and metals will be spiked to increase the feeds of these constituents to worst-case levels.

A summary of the test protocol is presented in Table 4-1. This table presents the key operating conditions, emission test parameters, spiking materials, and process feeds that will be fed during the test.

4.1 Target Operating Conditions

Operating conditions during the test are discussed in 40 CFR §63.1207(g)(1). In accordance with 40 CFR §63.1207(g)(1)(i)(A) and (B), the dioxin/furan emission testing will be conducted with significant chlorine feed and the LVM and SVM emission tests will be conducted with significant ash feed. The APCS will be operated at worst case conditions for pollutant removal during the test.

Target operating conditions for the test are intended to be worst-case conditions for the demonstration of the Trial Burn objectives discussed in Section 2.0. Table 4-2 presents the target values for operational parameters for the Trial Burn.

Table 4-1
Protocol for Test

Key Operating Conditions	Emissions Test Parameters	Process Feed [a]	Spiking Materials [b,c]
Maximum Total Feedrate Maximum Total NEW Feedrate~~Charge Rate~~ Maximum Ash Feedrate~~Charge Rate~~ Maximum Total Chlorine/Chloride Feedrate~~Charge Rate~~ Maximum SVM Feedrate~~Charge Rate~~ Maximum LVM Feedrate~~Charge Rate~~ Minimum Afterburner Temperature Maximum Stack Gas Flowrate Minimum Dry Sorbent (Calcium Hydroxide) Feedrate Maximum Ceramic Filter Housing Inlet Temperature	PM HCl/Cl_2 LVM (As, Be, Cr, Sb, Co, Mn, Ni) SVM (Cd, Pb, Se) PCDD/PCDF POHCs THC CO	V878 (MK56) Rocket Motors	Lead Spike Lead Oxide Chromium Spike Chromium Oxide Chlorine Spike Potassium Chloride POHC Spike Diphenylamine Ash Spike See note d

Notes:

[a] The anticipated process feed during the test is shown. Actual process feed during the test may vary based on availability at the time of the test and suitability to meet the test objectives. The Trial Burn Report will document the process feed used during the test.

[b] These are the anticipated spiking materials, but the spiking materials may change based on availability or compatibility with the process feed. The Trial Burn Report will document the spiking materials used during the test.

[c] These spiking materials will be fed in packets.

[d] The metals spikes and the chlorine spike will also provide ash. If additional ash needs to be spiked during the test to meet test objectives, the ash spike used during the test will be documented in the Trial Burn Report.

Table 4-2
Operating Condition Targets

~~Parameter~~	~~Units~~	~~Target for Trial Burn~~
~~HBC Operating Parameters~~		
~~Maximum Total NEW Charge Rate~~	~~lb/hr~~	~~680~~
~~Maximum Ash Charge Rate~~	~~lb/hr~~	~~90~~
~~Maximum Total Chlorine/Chloride Charge Rate~~	~~lb/hr~~	~~175~~
~~Maximum SVM Charge Rate (Pb, Cd, Se)~~	~~lb/hr~~	~~5.05~~
~~Maximum LVM Charge Rate (As, Be, Cr, Sb, Co, Mn, Ni)~~	~~lb/hr~~	~~4.26~~
~~APCS Operating Parameters [a]~~		
~~Maximum Stack Gas Flowrate~~	~~scfm~~	~~9,300~~
~~Minimum Afterburner Temperature~~	~~ºF~~	~~2,000~~

~~*Notes:*~~
~~[a] The targets related to the APCS are for when emissions from a batch are actively being treated. See Section 2.7.5 for more information.~~

Parameter	Units	Target for Trial Burn
HBC Operating Parameters		
Maximum Total NEW Feedrate	lb/hr	680
Maximum Ash Feedrate	lb/hr	124
Maximum Total Chlorine/Chloride Feedrate	lb/hr	175
Maximum SVM Feedrate (Pb, Cd, Se)	lb/hr	5.05
Maximum LVM Feedrate (As, Be, Cr, Sb, Co, Mn, Ni)	lb/hr	4.26
APCS Operating Parameters [a]		
Maximum Stack Gas Flowrate	acfm	31,000
Minimum Afterburner Temperature	ºF	1,400
Minimum Dry Sorbent (Calcium Hydroxide) Feedrate	lb/hr	10 lb/hr

Maximum Ceramic Filter Housing Inlet Temperature	ºF	750

During the test, the HBC and APCS will be operated under the following conditions:

- Maximum total feedrate;
- Maximum total NEW ~~charge rate~~feedrate;
- Maximum ash feedrate~~charge rate~~;
- Maximum total chlorine/chloride feedrate~~charge rate~~;
- Maximum LVM feedrate~~charge rate~~;
- Maximum SVM feedrate~~charge rate~~;
- Minimum afterburner temperature;
- Maximum stack gas flowrate;
- Minimum dry sorbent (calcium hydroxide) feedrate~~.~~;
- Maximum ceramic filter housing inlet temperature.

Maximum feedrates of ash, metals, and chlorine/chloride will maximize the potential emissions of these pollutants. The maximum ash feedrate will stress the capability of the APCS to control particulate emissions. The maximum feedrate of chlorine/chloride is a worst-case parameter for HCl/Cl_2 emissions as well as SVM and LVM emissions. Maximum ash, metals, and chlorine/chloride feedrates will be achieved by the use of spiking materials.

A high chlorine feedrate and minimum afterburner temperature are worst-case conditions for emissions of dioxins/furans. The minimum afterburner temperature will minimize organics combustion.

Maximum stack gas flowrate is a worst-case condition for all pollutants. This condition represents minimum residence time in the combustion chamber and afterburner, which minimizes the destruction of organic compounds. Maximum stack gas flowrate is also a worst-case condition for the APCS, because the gas velocity is maximized and therefore the pollutant residence time in each stage of the APCS is minimized.

The minimum dry sorbent feedrate is a worst-case condition for HCl/Cl_2 emissions. The dry sorbent neutralizes acid gases, so a minimum feedrate minimizes the treatment of HCl/Cl_2 emissions.

The maximum ceramic filter housing inlet temperature is a worst-case parameter for dioxin/furan formation, and is also a worst-case parameter for LVM and SVM emissions due to the effect on metals volatilization.

Additionally, as required by 40 CFR §63.1207(g)(1)(i)(C), the particulate matter control device (ceramic filters) will undergo its normal (or more frequent) cleaning cycle during the PM and metals sampling timeframe. Since the HBC is a batch process and is not a continuous process, the normal cleaning cycle occurs between batches. The cleaning cycle will follow standard operating procedures in order to demonstrate that the normal cleaning cycle has no adverse effect on average emissions. The cleaning cycle will occur between batches during one of the sampling runs.

4.2 Process Feeds

The HBC provides demilitarization for numerous munition items such as rocket motors, flares, smoke munitions, and other munitions that are ignitable and non-mass detonating.

The process feeds ~~to be processed~~ during the Trial Burn are typical of the materials planned to be processed in the HBC. It is anticipated that ammonium perchlorate motors (either V878 (MK56) motors or Multiple Launch Rocket System (MLRS) motors) will be fed during the test. While this is the planned process feed, actual process feeds to be used during the test will be selected on the basis of availability at the time of testing and suitability to meet the test objectives.

This section describes the ammonium perchlorate rocket motors that are planned to be fed to the HBC during the test as well as another type of rocket motor (V298). The V298 rocket motors are not planned to be fed during the test but are included to show the expected lead content of the motors. The amount of lead contained in the V298 rocket motors was used to determine the amount of lead that will be spiked during the test.

Constituent information on the rocket motors is included in Appendix IV (contained in *Appendix XIII – Confidential Material* of the RCRA permit application). This appendix includes information obtained from the MIDAS database on the constituents of the various rocket motors' Net Explosive Weight (NEW). The constituents in the NEW were used to calculate the maximum levels of chlorine, metals, and ash in the rocket motors that will be processed under normal conditions.

4.2.1 Ammonium Perchlorate Motors: V878 (MK56) and MLRS

The process feed planned to be used during the test will be either V878 (MK56) rocket motors or MLRS rocket motors. These motors are very similar in composition. The basis for this test plan is designed using the V878 (MK56) rocket motors because the V878 (MK56) rocket motors will have a higher NEW content per batch than the MLRS rocket motors.

The composition of the V878 (MK56) rocket motors can be seen in Appendix IV (contained in *Appendix XIII – Confidential Material* of the RCRA permit application)~~Table 4-3~~. As can be seen

from the composition, the rocket motors contain a significant amount of ammonium perchlorate. The amount of chlorine in each rocket motor is calculated in Table 4-43. The amount of ash in each rocket motor is calculated in Table 4-54. These rocket motors contain no HWC MACT metals, so spiking materials will be used to increase the feedrate of HWC MACT metals in order to allow for motors with HWC MACT metal(s) content (i.e V298) to be fed during normal operations. Additional chlorine will also be spiked during the test in order to allow for motors with a higher chlorine content (i.e., MLRS) to be fed during normal operations.

4.2.2 V298 Rocket Motors (not planned to be fed)

As previously mentioned, the V298 rocket motors are not planned to be fed during the test because they contain no chlorine. Information is presented to show the expected lead content of the motors, which will be used to establish the lead spiking amount for the test.

The composition of the V298 rocket motors can be seen in Appendix IV (contained in *Appendix XIII – Confidential Material* of the RCRA permit application)Table 4-6. As can be seen from the composition, the rocket motors contain lead. The amount of lead in each rocket motor is calculated in Table 4-75.

4.3 Spike Selection Rationale

Spikes have been selected to achieve the feedrate goals for ash, chlorine, and metals and to demonstrate the performance of the HBC system for control of PM, HCl/Cl_2, and metals. The spikes proposed for the test are discussed below, but alternative spikes may be used based upon availability at the time of testing, compatibility with the process feed, and suitability to meet the test objectives.

4.3.1 POHC Spike

The University of Dayton Research Institute (UDRI) incinerability index is included in Appendix D of US EPA's *Guidance on Setting Permit Conditions and Reporting Trial Burn Results*. This list classifies compounds into classes, with Class 1 being the most difficult to destroy. US EPA indicates that it is acceptable to select POHCs based on the class designation of the compound. If the facility achieves 99.99% DRE for a Class 1 POHC, then any compound in Class 1, or in a lower class, can be successfully destroyed. The guidance suggests that a POHC from Class 2 or higher be chosen to demonstrate that the unit can destroy hazardous organic compounds.

Rocket motor compositions of the Net Explosive Weight (NEW) are included in Appendix IV (contained in *Appendix XIII – Confidential Material* of the RCRA permit application). There are no Class 1 POHCs in the rocket motor compositions. Diphenylamine will be used as a POHC

Table 4-~~4~~3
V878 (MK56) Rocket Motor Chlorine Composition [a]

Parameter	Prop Booster MK56	Prop Sustainer MK56
Ammonium Perchlorate (NH_4ClO_4)		
Weight Ammonium Perchlorate (lb) [b]	251.38	191.44
Molecular Weight Ammonium Perchlorate (g/mol)	117.49	117.49
Chlorine Weight in Ammonium Perchlorate (g)	35.453	35.453
Chlorine total (lb) [b]	75.86	57.77
Total Chlorine in V878 (MK56) (lb) [b]	133.62	
Total Chlorine per Segment (lb) [b,c]	**44.54**	

Notes:

[a] These motors are too large to feed into the HBC whole. These motors will be segmented and fed to the HBC in 3 different pieces.

[b] Weights shown are net explosive weight (NEW).

[c] The weight per segment is calculated assuming the motor is segmented into 3 pieces.

Table 4-~~5~~4
V878 (MK56) Rocket Motor Ash Composition [a]

Parameter	Prop Booster MK56	Prop Sustainer MK56
Per Item Weights (lb) [b]		
Aluminum	83.79	-
Phosphorus	1.20	1.95
Ferric Oxide	0.38	-
Graphite	-	1.50
Zirconium Carbide	-	1.50
Iron	-	0.017
Silicon	-	0.01
Total Ash in V878 (MK56) (lb) [b]	90.35	
Total Ash per Segment (lb) [b,c]	**30.12**	

Notes:

[a] These motors are too large to feed into the HBC whole. These motors will be segmented and fed to the HBC in 3 different pieces.

[b] Weights shown are net explosive weight (NEW).

[c] The weight per segment is calculated assuming the motor is segmented into 3 pieces.

Table 4-~~7~~5
V298 Rocket Motor Lead Composition [a]

Parameter	Prop Dual Grain MK73 MOD 0	Prop Grain MK53 MOD 0
Lead Salicylate ($C_{14}H_8O_6Pb$)		
Weight Lead Salicylate (lb) [b]	27.65	29.90
Weight Lead Salicylate (g) [b]	12,540	13,562
Molecular Weight Lead Salicylate (g/mol)	479.41	479.41
Lead Weight in Lead Salicylate (g)	207.2	207.2
Lead total (g) [b]	5,420	5,862
Lead total (lb) [b]	11.95	12.92
Lead 2-Ethyl Hexoate ($C_{16}H_{30}O_4Pb$)		
Weight Lead 2-Ethyl Hexoate (lb) [b]	27.17	29.38
Weight Lead 2-Ethyl Hexoate (g) [b]	12,322	13,327
Molecular Weight Lead 2-Ethyl Hexoate (g/mol)	493.61	493.61
Lead Weight in Lead 2-Ethyl Hexoate (g)	207.2	207.2
Lead total (g) [b]	5,172	5,594
Lead total (lb) [b]	11.40	12.33
Total Lead per Item (g)	10,592	11,456
Total Lead per Item (lb)	23.35	25.26
Total Lead per Segment (g) [c]	**2,118**	**2,291**
Total Lead per Segment (lb) [c]	**4.67**	**5.05**

Notes:
[a] These motors are too large to feed into the HBC whole. These motors will be segmented into approximately 250 lb segments for treatment during the test. Therefore, each motor will be segmented into approximately 5 pieces.
[b] Weights shown are net explosive weight (NEW).
[c] The weights per segment are calculated assuming the motor is segmented into 5 pieces.

during the test. Diphenylamine is a Class 2 compound (ranked 67th-70th) on the thermal stability list compiled by the UDRI and is included in US EPA's *Guidance on Setting Permit Conditions and Reporting Trial Burn Results*. While there are many compounds ranked higher than diphenylamine in the UDRI ranking, these compounds were not selected for use as POHCs based on one or more of the following criteria:

- The compounds are gaseous at ambient temperature (such as cyanogen)
- The compounds are dangerous to handle due to acute toxicity, flammability, or explosiveness (such as hydrogen cyanide or acetonitrile)
- The compounds are fluorinated (such as sulfur hexafluoride)

The compounds are common products of incomplete combustion (PICs), which could artificially bias the DRE stack test results (such as benzene or naphthalene).

Diphenylamine is commonly used as a POHC in testing for other demilitarization facilities across the industrial base. Diphenylamine was chosen based on its state at ambient temperature (solid), its ability to be fed with the normal process feeds in packets, and because it is representative of the types of constituents the HBC will handle. Achieving a 99.99% DRE for diphenylamine at worst-case operating conditions during the test will demonstrate the ability of the HBC system to effectively destroy a variety of volatile and semivolatile organic compounds.

A known quantity of the POHC spike will be fed in packets along with the process feed to the HBC. The quantity of POHC fed during each batch will be recorded on field data sheets.

The total quantity of the POHC to be spiked during the test is based on the target feedrate of POHC and the expected duration of the test. The target feedrate was established to provide a sufficient amount of POHC for detection in the stack at 99.99% DRE. A copy of the spreadsheet calculation for minimum POHC quantity to be fed is provided in Appendix II of this document.

The minimum feedrate is determined by dividing the expected emission rate by the minimum allowable fraction of uncombusted POHC (0.01% for a DRE of 99.99%). Because in-stack detection limits are not precise, vary depending on the analytical laboratory selected, and cannot be determined absolutely until the actual analysis, the target feedrate has been set at least ten times the minimum feedrate to allow a comfortable margin of error.

4.3.2 Chlorine Spike

Potassium chloride will be used as a source of additional chlorine during the test. Potassium chloride was chosen based on its state at ambient temperature (solid), its ability to be fed with the normal process feeds in packets, and because it is commonly used in testing for other demilitarization facilities across the industrial base.

Potassium chloride is approximately 47.56% chlorine and will provide adequate additional chlorine input during the test. Potassium chloride also contributes to the ash feedrate. A known quantity of the chlorine spike will be fed in packets along with the process feed to the HBC. The weight of potassium chloride in each packet will be determined based on the weight of additional chlorine needed to achieve the target feedrate for chlorine in Table 4-2. The quantity of chlorine spike fed during each batch will be recorded on field data sheets.

4.3.3 Metal Spikes

Chromium (representative of the LVM group) and lead (representative of the SVM group) will be spiked as solid oxides of the respective metals during the test. Pre-weighed packets containing chromium oxide (Cr_2O_3) and lead oxide (PbO) will be placed with the process feeds fed to the HBC.

These metal oxides were chosen based on their state at ambient temperature (solid), their ability to be fed with the normal process feeds in packets, and because they are commonly used in testing. Additionally, these metals (Cr and Pb) are less toxic than the other metals in their respective groups, and are therefore safer for personnel to handle during testing. Even though these materials are safer for personnel to handle, ESD will feed approximately 1/3 of the anticipated maximum amount of metals needed for ongoing operating limits in order to minimize the amount of material the operators must handle during the test and to minimize any unnecessary effects to the environment during the test. As discussed in Section 2.9, ESD will utilize extrapolation as allowed by the regulations in order to maximize the feedrate limit for ongoing operations.

The weight of Cr_2O_3 and PbO in each packet will be determined based on the weight of metal spikes needed to achieve the target feedrates for chromium and lead in Table 4-2. These metal spikes will also contribute to the ash feedrate. The quantity of metal spikes fed during each batch will be recorded on field data sheets.

4.3.4 Ash Spike

As mentioned above, the anticipated chlorine spike and the anticipated metal spikes will contribute to the ash feedrate. At this time, additional spiking of ash is not planned. However, if it is

determined that additional ash needs to be spiked during the test to meet test objectives, the ash spike used during the test will be documented in the Trial Burn Report.

4.4 Characteristics, Feedrates, and Quantities of Process Feeds and Spiking Materials

A summary of the characteristics, feedrates, and quantities of the expected process feed and spiking streams is presented in Table 4-~~8~~6. The expected quantities are based on providing 20 hours of materials at the target feedrates. The basis for 20 hours is to provide sufficient materials for the time required for pre-test shakedown, establishing steady state each test day, stack sampling, time between test runs, and contingency time, in case a run must be repeated. Any excess process feeds or spiking materials can be processed at the conclusion of testing.

Target feedrates for each of the process feed and spiking streams are also shown in Table 4-~~8~~6. These feedrates are designed to allow demonstration of maximum NEW and constituent feedrates and the target operational parameters. Based on these target feedrates, the constituent feedrates of ash, chlorine, and metals are also shown in Table 4-~~8~~6.

4.5 Operating Conditions and Steady-State Operation

In 40 CFR §63.1207(g)(1)(iii) the HWC MACT Standard requires that prior to obtaining performance test data, the system must function under performance test conditions until steady-state operation is reached with respect to emissions of pollutants that are to be measured during the performance test and operating parameters for which limits will be established.

Since the HBC is operated in batch feed mode, steady state of the feed system cannot be achieved. ~~As discussed in Section 2.7.5, steady state of the APCS also cannot be achieved due to the batch cycle stages.~~ Therefore, ESD will operate the APCS for a minimum of 30 minutes at as close to steady state as possible before stack testing begins. Prior to the initiation of stack sampling, the HBC APCS will be brought as close as possible to the target levels for the APCS parameters shown in Table 4-2. The Trial Burn Coordinator will monitor these parameters and determine when the targets are as close as possible to being achieved before the batch process begins and the emissions make their way through the APCS. ~~After a batch is commenced, the APCS will then be operated at the target levels during the time the APCS is actively treating the emissions (*On-Batch*).~~

Table 4-~~8~~6
Characteristics, Feedrates, and Quantities of the Feeds [a]

Parameter	Units	V878 (MK 56) Rocket Motor [b]	Diphenylamine Spike [c]	Chlorine Spike [c]	Chromium Spike [c]	Lead Spike [c]	Ash Spike [d]	Total	Target
Characteristics									
Expected Composition		See Table 4-3 to Table 4-~~5~~4	Diphenylamine ($(C_6H_5)_2NH$)	Potassium Chloride (KCl)	Chromium oxide (Cr_2O_3)	Lead oxide (PbO)	TBD [d]	-	-
Storage Device		Rocket Motor Casing; Segmented	Packets	Packets	Packets	Packets	Packets	-	-
Feed Location		HBC burn pan with holding fixture	HBC burn pan	HBC burn pan	HBC burn pan	HBC burn pan	HBC burn pan	-	-
Physical Form		Solid	Solid	Solid	Solid	Solid	Solid	-	-
Diphenylamine	wt. %	0	100	0	0	0	0		
Ash	wt. %	13.3	0	100	100	100	100	-	-
Chlorine/chloride	wt. %	19.7	0	47.56	0	0	0	-	-
Low Volatile Metals (as Cr)	wt. %	0	0	0	68.42	0	0	-	-
Semivolatile Metals (as Pb)	wt. %	0	0	0	0	92.83	0	-	-
Target Feedrate and Quantity									
Total Feedrate per ~~batch~~Batch	lb/batch	386.3~~227~~	15.3	30.0	2.08	1.81	TBD [d]	~~276~~436	-
NEW Feedrate per Batch	lb/batch	227	0	0	0	0	0	227	-
Batch Frequency	batch/hr	3	3	3	3	3	3	3	3
~~NEW~~ Total Feedrate	lb/hr	~~680~~1,159	~~46.0~~0	~~90.0~~0	~~6.23~~0	~~5.44~~0	TBD [d]~~0~~	~~680~~1,307	~~680~~ -
Total NEW Feedrate	lb/hr	680	~~0~~46.0	~~90.0~~0	~~6.23~~0	~~5.44~~0	~~TBD~~ [d]0	~~828~~680	~~-~~680
Quantity Required for Test [e]	lb	~~13,600~~23,180	920	1,800	125	109	TBD [d]	-	-
Diphenylamine	lb/hr	0	46.0	0	0	0	0	46	46
Ash	lb/hr	90.4	0	90.0	6.23	5.44	TBD [d]	192	124
Chlorine/chloride	lb/hr	134	0	42.8	0	0	0	176	175
Low Volatile Metals (as Cr)	lb/hr	0	0	0	4.26	0	0	4.26	4.26
Semivolatile Metals (as Pb)	lb/hr	0	0	0	0	5.05	0	5.05	5.05

Notes:

[a] Target feedrates may be adjusted as needed in order to achieve overall test targets.

[b] The anticipated process feed during the test is shown. Actual process feed during the test may vary based on availability at the time of the test and suitability to meet the test objectives. The Trial Burn Report will document the process feed used during the test.

[c] These are the anticipated spiking materials, but the spiking materials may change based on availability or compatibility with the process feed. The Trial Burn Report will document the spiking materials used during the test.

[d] At this time, additional spiking of ash is not planned. However, if it is determined that additional ash needs to be spiked during the test to meet test objectives, the ash spike used during the test will be documented in the Trial Burn Report.

[e] Quantity is based on feeding materials for 20 hours.

5.0 SAMPLING AND ANALYSIS

Stack gas emissions will be sampled and analyzed during the Trial Burn. The feed and spikes will not be sampled during the Trial Burn.

This program is structured to provide the necessary information for demonstrating that performance criteria are achieved at the target process conditions. A detailed discussion of the sampling and analytical equipment, procedures, equipment calibrations, quality assurance /quality control, and sample handing procedures is provided in the Quality Assurance Project Plan (QAPP) included as Appendix I.

5.1 Stack Gas Sampling and Analytical Program

A summary of the stack gas sampling and analytical program is presented in Table 5-1. A stack sampling contractor will perform all of the stack sampling for the test, except for the CO and O_2 sampling which will be performed by the permanently-installed CEMS. This contractor will be responsible for all emissions samples collected during the test. The emissions samples will be sent to qualified laboratories for analysis. Additional information on the project team roles and responsibilities is provided in the QAPP in Appendix I.

5.2 Feed Sampling and Analytical Program

The off-site generators of the energetic materials are responsible for providing the information needed in order to safely and properly treat, store, or dispose of the energetic materials.

The military munitions to be used during the Trial Burn have been manufactured following U.S. Government specifications. The military munitions are characterized by information identified by the Department of Defense Identification Codes (DODICs) provided by the military or information in the Munitions Item Disposition Action System (MIDAS), which is an ammunition information database~~d~~ located within the Defense Ammunition Center (DAC) Munitions Analytical Compliance System (MACS). The database information is based upon military specifications and specific production records and contains the chemical constituent information for all ammunition, components, and parts.

Due to the dangers associated with sampling and analyzing explosives, ESD does not intend to rely on sampling and analysis to characterize the materials using during the Trial Burn. In lieu of sampling the feeds, ESD will use information from the manufacturer to determine the composition of the feeds.

Table 5-1
Stack Gas Sampling

Sampling Method [a]	Number of Sampling Runs	Sampling Time per Run	Analytical Parameters	Analytical Method [a]
EPA Method 1	1	N/A	Sampling and Traverse Point Locations	EPA Method 1
EPA Method 2	See note b	Continuous	Volumetric Flowrate	EPA Method 2
EPA Method 3A	See note b	Continuous	Molecular Weight	EPA Method 3A
EPA Method 4	See note b	Continuous	Moisture	EPA Method 4
EPA Method 5/26A	3	2 hours	Particulate Matter	EPA Method 5
			HCl/Cl_2	EPA Method 26A
EPA Method 29	3	2 hours	SVM (Cd, Pb, Se) LVM (As, Be, Cr, Sb, Co, Mn, Ni)	EPA Method 29
EPA Method 23	3	3 hours **AND** a minimum sample volume of 2.5 dscm	PCDD/PCDF [c]	EPA Method 23
SW-846 Method 0010	3	3 hours **AND** a minimum sample volume of 3 dscm (105.9 dscf)	POHC (Diphenylamine)	SW-846 Method 8270
EPA Method 25A	3	3 hours (concurrent with SW-846 Method 0010)	Total Hydrocarbons (THC)	EPA Method 25A
Installed CEMS: Performance Specification 4B	3	Continuous	Oxygen (O_2)	O_2 CEMS PS-4B
			Carbon Monoxide (CO)	CO CEMS PS-4B

Notes:
[a] Methods are from 40 CFR §60 Appendix A or US EPA SW-846. The method listed, or an equivalent method, will be used during the test.
[b] Methods 2, 3A, and 4 are performed as part of the other isokinetic sampling methods.
[c] Per 40 CFR §63.1208(b)(1)(iii), ESD may assume that nondetects are present at zero concentration.

5.3 Spike Sampling and Analytical Program

The spiking materials will not be sampled and analyzed during the Trial Burn. These will be pure materials purchased for testing. The suppliers will certify the spiking materials composition.

5.4 Quality Assurance / Quality Control Program

The QAPP presented in Appendix I describes procedures that will be implemented to ensure the quality of the data acquired during implementation of the Trial Burn Plan. The procedures define the management organization, quality assurance (QA) objectives, calibration procedures, sample custody, quality control (QC) checks, performance and system audits, along with data reduction, validation and reporting.

6.0 TRIAL BURN SCHEDULE AND TRIAL BURN REPORT

This section provides details on the test schedule and the information that will be submitted with the Trial Burn Report.

6.1 Trial Burn Schedule

ESD plans to conduct the Trial Burn within 720 hours of commencing operation of the HBC and feeding materials to the HBC. An additional 720 hours of operation may be requested if circumstances prevent ESD from performing the Trial Burn within the allotted time. An overall test schedule is presented in Table 6-1.

The Trial Burn will consist of one test condition with three replicate runs. Minimum sampling times for each sample train are summarized in Table 5-1 and vary depending on the amount of gas sample required to have adequate volume for analysis. These sampling times do not account for sampling port changes, sampling train leak checks, and choreography of the sampling trains.

The total test time for the Trial Burn can be approximated based on the sampling times in Table 5-1, and planning for a total of three test runs. Each run will require a minimum sampling time of 180 minutes (3 hours) per run, for a total of 540 minutes (9 hours). As previously mentioned, these sampling times are approximate and only include time for the actual sampling.

A typical day of testing is expected to last from 8 to 12 hours, including time for performing pretest calibrations, establishing steady state operations, setup of sampling equipment, and sample recovery. It is expected that one to two test runs can be conducted per day and that the three test runs will be conducted over a period of two days.

6.2 Trial Burn Report

The results of the Trial Burn will be submitted within 90 days after the test has been completed and the results have been prepared in report format. The Trial Burn Report will contain, at a minimum, the following information:

- Results of emissions sampling for pollutants of concern
- Results of constituent feedrates based on manufacturer information
- Operating data summaries
- Any other appropriate test data, including field logs
- Identification and explanation of any deviations from the Trial Burn Plan

Table 6-1
Tentative Test Schedule

Test Day	Activity
Day 1	• Subcontractors arrive on-site • Safety orientation • Pretest meeting • Sampling and spiking equipment setup
Day 2	• Perform Trial Burn; Runs 1 and 2
Day 3	• Perform Trial Burn; Run 3
Day 4 (contingency day)	• Process data collection • Sample shipping • Subcontractors leave site

- OPLs established as a result of the Trial Burn

The following information will be included as appendices to the Trial Burn Report:

- Emission Sampling Report
- Process Feed Composition Data
- Process Operating Data
- Example Calculations

Final OPLs are expected to be based on either demonstrated performance of the HBC during the Trial Burn, manufacturer specifications, good engineering practice, and/or regulatory guidance. ESD has specified the basis for establishing OPLs in the discussion of proposed OPLs in Section 2.0 of this Trial Burn Plan.

6.3 Future Plans for Dry Sorbent OPLs

In order to expedite review of the RCRA permit application and Trial Burn Plan, ESD has removed the *On-Batch* and *Off-Batch* approach from the Trial Burn Plan, with the expectation that collection of operating data from the HCl CEMS and test data can be used to demonstrate the validity of the *On-Batch* and *Off-Batch* approach. In the future, after collecting data, ESD will present the data to TCEQ to request a modification to revise the operating parameter limits to allow the *On-Batch* and *Off-Batch* approach for the dry sorbent injection system OPLs.

APPENDIX I

QUALITY ASSURANCE PROJECT PLAN (QAPP)

QUALITY ASSURANCE PROJECT PLAN
FOR THE
TRIAL BURN TEST
OF THE
ENVIROSAFE DEMIL, LLC
HYBRID BURN CHAMBER

APPENDIX I

EnviroSafe Demil, LLC
401 Demil Way
Hooks, Texas 75561-0019

~~AUGUST~~ DECEMBER 2025

Revision ~~0~~1

QUALITY ASSURANCE PROJECT PLAN FOR THE TRIAL BURN TEST OF THE ENVIROSAFE DEMIL, LLC HYBRID BURN CHAMBER

Expected Trial Burn Test Dates: _____

Project Approvals and Distribution

Trial Burn Coordinator: _____

Printed Name _____ Title _____

Signature _____ Date _____

Stack Sampling Coordinator: _____

Printed Name _____ Title _____

Signature _____ Date _____

Laboratory Analysis Coordinator: _____

Printed Name _____ Title _____

Signature _____ Date _____

Laboratory Analysis Coordinator: _____

Printed Name _____ Title _____

Signature _____ Date _____

Quality Assurance Manager: _____

Printed Name _____ Title _____

Signature _____ Date _____

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

Note: 2) The individuals listed above agree that no testing methods to be used in the upcoming plan testing event have been modified. If modifications are planned please identify and explain all sampling and analytical specific method modifications in your designated testing submittal plan. Also, a formal letter should be addressed to EPA Region 6 Kishor Fruitwala PhD, P.E. requesting an approval for the method modification (s) with justification for each method modification as well as a predetermined statement if the modification is felt to be a minor, intermediate or major modification.

TABLE OF CONTENTS

1.0 PROJECT DESCRIPTION AND GENERAL OVERVIEW 1
2.0 ORGANIZATION OF PERSONNEL, RESPONSIBILITIES, AND QUALIFICATIONS 4
2.1 Trial Burn Coordinator 4
2.2 Stack Sampling Coordinator 4
2.3 Laboratory Analysis Coordinator(s) 6
2.4 Quality Assurance Manager 6
2.5 Other Project Responsibilities 6
2.6 Report Preparation 6
3.0 SUMMARY OF QUALITY ASSURANCE OBJECTIVES AND GOALS 9
3.1 Quality Assurance Objectives for Precision, Accuracy, and Completeness 9
3.2 Representativeness and Comparability 12
3.3 Method Detection and Quantitation Limits 13
4.0 SAMPLING PROCEDURES 14
4.1 Field Quality Control Samples 14
4.2 Pre-sampling Activities 14
4.2.1 Equipment Calibration 14
4.2.2 Glassware Preparation 14
4.2.3 Sample Media Preparation 14
4.2.4 Other Pre-sampling Activities 15
4.3 Exhaust Gas Sample Collection 15
4.3.1 Sampling Point Determination – EPA Method 1 15
4.3.2 Flue Gas Velocity and Volumetric Flow Rate – EPA Method 2 15
4.3.3 Flue Gas Composition and Molecular Weight – EPA Method 3A 17
4.3.4 Flue Gas Moisture Content – EPA Method 4 17
4.3.5 Particulate Matter and Hydrogen Chloride/Chlorine –Combined EPA Methods 5 and 26A 17
4.3.6 Multiple Metals – EPA Method 29 22
4.3.7 Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans–EPA Method 23 24
4.3.8 Diphenylamine (POHC) – SW-846 Method 0010 29
4.3.9 Total Hydrocarbons – EPA Method 25A 33
4.3.10 Continuous Emission Monitoring System (CEMS) 33
4.4 Process and Spiking Materials 33
4.5 Total Samples for Testing 35

5.0 SAMPLE HANDLING, TRACEABILITY, AND HOLDING TIMES 37
5.1 Field Sampling Operations 37
5.2 Chain-of-Custody Procedures 37
5.2.1 Field Custody Procedures 38
5.2.2 Transfer of Custody and Shipment 38
5.3 Sample Holding Times 40
6.0 CALIBRATION PROCEDURES AND FREQUENCY 42
6.1 Sampling Equipment 42
6.1.1 Pitot Tubes 43
6.1.2 Differential Pressure Gauges 43
6.1.3 Digital Temperature Indicator 43
6.1.4 Dry Gas Meter and Orifice 45
6.1.5 Barometer 45
6.2 Analytical Instruments 45
7.0 ANALYTICAL PROCEDURES 48
8.0 DATA REDUCTION, VALIDATION, AND REPORTING 49
8.1 Field Data Reduction 49
8.2 Laboratory Data Reduction 49
8.3 Blank Correction Procedures 50
8.4 Data Validation 51
8.5 Data Reporting and Test Report Contents 52
9.0 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY 54
9.1 Sampling Equipment Operational QC Checks and Frequency 54
9.2 Sample Collection QC Checks and Frequency 56
9.3 Analytical Quality Control Checks 57
9.3.1 Laboratory Quality Control Samples and Blanks 57
9.3.2 Laboratory Data Evaluation 59
10.0 PERFORMANCE AND SYSTEM AUDITS 60
10.1 System Audits 60
10.2 Performance Audits 60
11.0 CALCULATION OF DATA QUALITY INDICATORS 62
11.1 Precision 62
11.2 Accuracy 62
11.3 Completeness 63
11.4 Method Detection Limit and Estimated Detection Limits 63
12.0 PREVENTATIVE MAINTENANCE 65
12.1 Sampling Equipment Inspection and Maintenance 65

12.2 Laboratory Analytical Instrument Maintenance 65
13.0 CORRECTIVE ACTION 66
14.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT 69

LIST OF TABLES

Table I-1-1 Tentative Test Schedule 3
Table I-2-1 Sampling Analysis Responsibilities 7
Table I-3-1 Summary of Quality Assurance Objectives and Goals 11
Table I-4-1 Stack Gas Sampling and Analytical Procedures Summary 16
Table I-4-2 Number of Stack Samples Generated 36
Table I-5-1 Summary of Sample Containers, Preservation, and Holding Times 41
Table I-6-1 Sampling Equipment Calibration Requirements 44
Table I-6-2 Analytical Instrument Calibration Requirements 46
Table I-9-1 Quality Control Validity Checks 58

LIST OF FIGURES

Figure I-2-1 Test Organization Chart 5
Figure I-4-2 Diagram of Methods 5 and 26A Sampling Train 18
Figure I-4-3 Diagram of Methods 5 and 26A Recovery Procedure 21
Figure I-4-4 Diagram of Method 29 Sampling Train 23
Figure I-4-5 Diagram of Method 29 Recovery Procedure 25
Figure I-4-6 Diagram of Method 23 Sampling Train 27
Figure I-4-7 Diagram of Method 23 Recovery Procedures 30
Figure I-4-8 Diagram of SW-846 Method 0010 Sampling Train 31
Figure I-4-9 Diagram of SW-846 Method 0010 Recovery Procedures 34
Figure I-5-1 Example Chain-of-Custody Form 39
Figure I-13-1 Example Corrective Action Form 68

LIST OF ATTACHMENTS

Attachment 1 Quality Assurance and Personnel Qualification Information
Attachment 2 Example Data Collection Forms

1.0 PROJECT DESCRIPTION AND GENERAL OVERVIEW

EnviroSafe Demil, LLC (ESD) is installing a Hybrid Burn Chamber (HBC) at its facility in Hooks, Texas. A detailed engineering description of the HBC and a process flow diagram are provided in Section 3.0 of the Trial Burn Plan.

The overall objective for this project is to demonstrate compliance of the HBC with the National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Hazardous Waste Combustors (HWC), codified as 40 CFR, Part 63, Subpart EEE. The NESHAP specifies emissions standards that reflect emissions performance of Maximum Achievable Control Technologies (MACT) and is commonly referred to as the HWC MACT Standard.

The objective of this Quality Assurance Project Plan (QAPP) is to address the quality assurance objectives of the Trial Burn Test for the HBC. Data collected according to this plan will be used to:

- Demonstrate compliance with the emission standards for new hazardous waste incinerators contained in the HWC MACT standard
- Establish operating parameter limits (OPLs) for the HBC system

ESD intends to conduct the Trial Burn for this unit on a schedule agreed upon by ESD and the Texas Commission on Environmental Quality (TCEQ). A test program has been developed that includes sampling of the stack emissions under one test condition, utilizing three separate runs to collect data for the Trial Burn.

Samples of the stack gas will be collected for analysis of the following compounds using the indicated method during the Trial Burn:

- Particulate matter (PM), hydrogen chloride (HCl), and chlorine (Cl_2) will be collected using a combined EPA Method 5/26A sampling train.
- Metals emissions (arsenic (As), beryllium (Be), chromium (Cr), antimony (Sb), cobalt (Co), manganese (Mn), nickel (Ni), cadmium (Cd), lead (Pb), and selenium (Se)) will be collected using an EPA Method 29 sampling train.
- Polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) emissions will be collected using an EPA Method 23 sampling train.
- The Destruction and Removal Efficiency (DRE) of Principle Organic Hazardous Constituents (POHCs) will be calculated by using a SW-846 Method 0010 sampling train to collect emissions of a POHC. The POHC used during this test will be diphenylamine.

- Total hydrocarbons (THC) will be measured using Method 25A.
- Data from the permanently installed continuous emission monitoring systems (CEMS) will be collected for carbon monoxide (CO) and oxygen (O_2).

A stack sampling contractor will collect the stack emission samples using the methods described in Section 4.0. Contract laboratories will perform all analyses referenced in Section 4.0.

The stack testing will be performed under conditions that are designed to maximize the potential for emissions of pollutants of concern. The test will consist of one test condition with three replicate runs. The test is expected to take three days including set-up and removal of test equipment. Another day is reserved for contingency, in case of delays. Situations that would temporarily halt and potentially extend a test run include: extreme weather, broken glassware, a leak in the sampling trains, power outages, plant failure, and any other test equipment failures. A tentative test schedule for the test is shown in Table I-1-1.

This Quality Assurance Project Plan (QAPP) will serve as an essential guidance by which the sampling and analysis will be performed. The QAPP defines all aspects of quality assurance and quality control procedures and establishes sampling and analytical quality indicators that will demonstrate achievement of the test objectives. Additionally, this QAPP defines precision and accuracy criteria for all required measurements that will be used to set the acceptable boundaries for the evaluation of all test data. If these criteria are met, then the data will be deemed valid and usable for the purposes of the Trial Burn.

Table I-1-1
Tentative Test Schedule [a,b]

Day	Time	Tasks
1	-	Subcontractors arrive, safety orientation, pretest meeting, sampling equipment set-up
		Conduct CEMS RATA [c]
		Agency audit of sampling equipment
2	0700	Stack sampling personnel prepare for Run 1
	0900	**Start Run 1** for all sampling methods Method 5/26A (PM and HCl/Cl_2) Method 29 (Metals) Method 23 (PCDDs/PCDFs) SW-846 Method 0010 (Diphenylamine)
	1200	Discontinue Run 1 for PM, HCl/Cl_2, and Metals sampling trains (M5/26A and M29 – Run for 120 minutes)
	1300	Discontinue Run 1 for PCDDs/PCDFs and Diphenylamine sampling train (M23 and M0010 – Run for 180 minutes)
	1300	**Finish Run 1.** Set up for Run 2.
	1400	**Start Run 2** for all sampling methods (M5/26A, M29, M23, M0010)
	1700	Discontinue Run 2 for PM, HCl/Cl_2, and Metals sampling trains (M5/26A and M29 – Run for 120 minutes)
	1800	Discontinue Run 2 for PCDDs/PCDFs and Diphenylamine sampling train (M23 and M0010 – Run for 180 minutes)
	1800	**Finish Run 2.** End of testing for the day.
3	0700	Stack sampling personnel prepare for Run 3
	0900	**Start Run 3** for all sampling methods (M5/26A, M29, M23, M0010)
	1200	Discontinue Run 3 for PM, HCl/Cl_2, and Metals sampling trains (M5/26A and M29 – Run for 120 minutes)
	1300	Discontinue Run 3 for PCDDs/PCDFs and Diphenylamine sampling train (M23 and M0010 – Run for 180 minutes)
	1300	**Finish Run 3**. End of Trial Burn
4	-	**Contingency Day** Contingency runs (if needed), process data collection, sample shipping, subcontractors leave site

Notes:

[a] Schedule is tentative and is subject to change.

[b] Run time estimates include an extra hour per run to account for port change times and other possible pauses. Run times and duration are subject to change based on local test conditions.

[c] A Relative Accuracy Test Audit (RATA) will be conducted prior to emissions sampling.

2.0 ORGANIZATION OF PERSONNEL, RESPONSIBILITIES, AND QUALIFICATIONS

ESD assumes responsibility for all measurements made in connection with this project and therefore, responsibility for the implementation of an adequate Quality Assurance (QA) Program. This section discusses the approach to management of the QA aspects of the subject test program. Provisions and procedures, which are incorporated in the overall management structure to promote implementation of QA procedures and adherence to QA guidelines, are described. Attachment 1 includes information from the anticipated stack sampling contractor and analytical laboratory that addresses training and development of management and staff to ensure that all personnel performing work have the necessary skills to meet their job specifications effectively. Additionally, Attachment 1 includes the resumes of key individuals from the anticipated stack sampling contractor and analytical laboratory.

The organization of the Project Team, including QA functions, is shown in the Test Organization Chart in Figure I-2-1. Note that the QA structure is independent of the organizational groups who will generate environmental measurement data during this project. The focus of the QA Program is the Quality Assurance Manager (QA Manager). The QA Manager is responsible for the day-to-day overseeing of QA activities and occupies a level higher than the Stack Sampling Coordinator and reports directly to the Trial Burn Coordinator.

2.1 Trial Burn Coordinator

The Trial Burn Coordinator oversees the Stack Sampling Coordinator, Laboratory Analysis Coordinator and Process and Spiking Coordinator's test program planning, organization and performance of the Trial Burn. The Trial Burn Coordinator provides technical supervision and oversees protocol development and review, data interpretation, and report preparation.

The Trial Burn Coordinator supervises the planning, oversight, and review functions associated with the various elements of the test program. The Trial Burn Coordinator will be responsible for the implementation of the test, as well as the coordination and oversight of all testing activities.

2.2 Stack Sampling Coordinator

The Stack Sampling Coordinator (SC) oversees and supervises all stack-sampling activities during the Trial Burn. The SC is responsible for ensuring that all exhaust gas samples are collected and for coordinating analytical activities with the laboratories. The stack sampling contractor chosen for the test will assign an SC for the test.

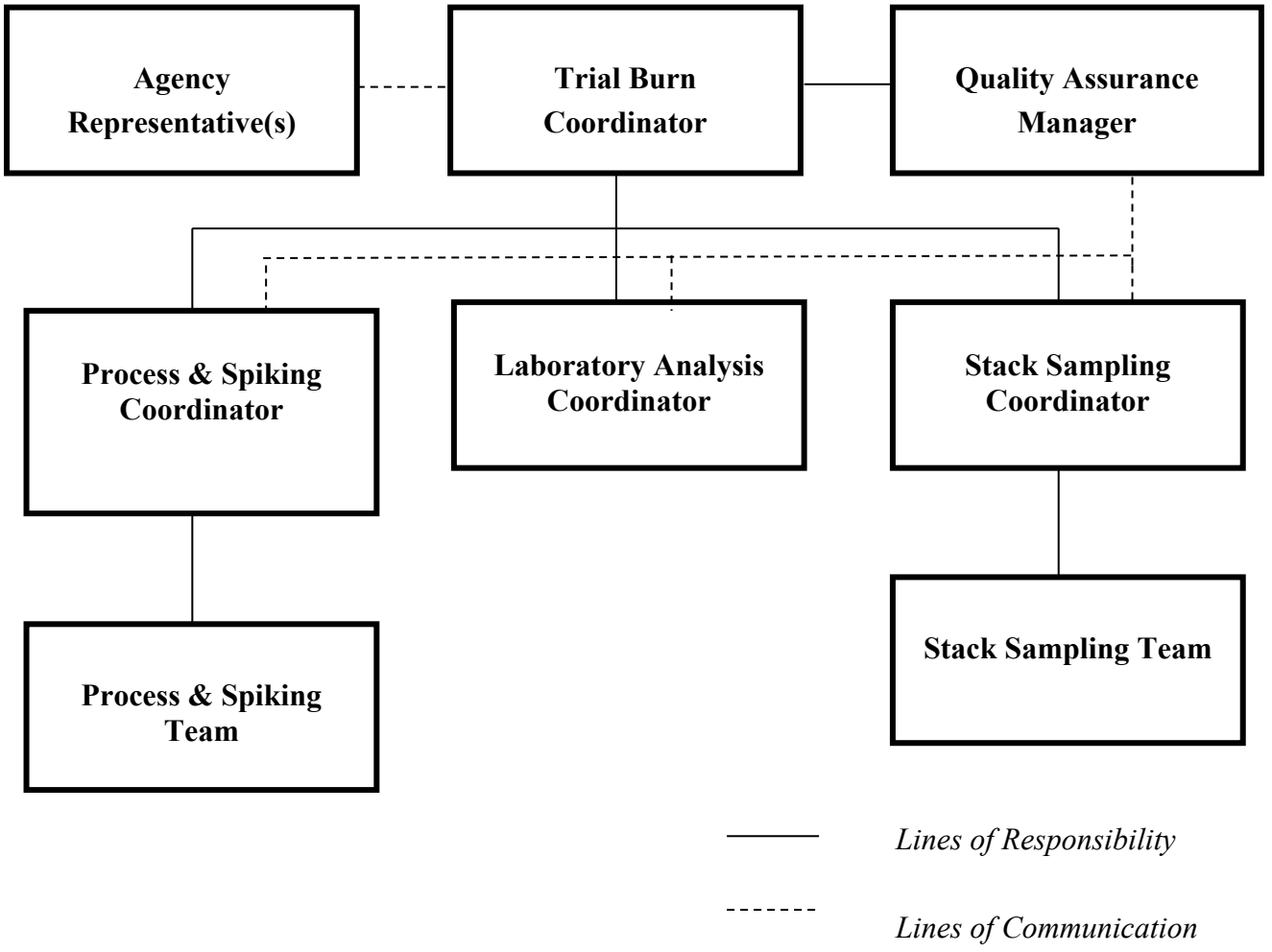

Figure I-2-1
Test Organization Chart

2.3 Laboratory Analysis Coordinator(s)

The Laboratory Analysis Coordinator(s) will manage the handling and analysis of all stack samples. The analysis of all samples will be performed by a qualified contract laboratory, under the supervision of the laboratory manager.

2.4 Quality Assurance Manager

The Quality Assurance Manager (QA Manager) has the primary responsibility for ensuring that all reported data meet the QA objectives associated with the measurement project. The QA Manager is independent of all other testing activities and reports directly to the Trial Burn Coordinator. The QA Manager is responsible for preparing the QA/QC section of the Trial Burn Report following the test. The QA Manager is responsible for monitoring the quality of laboratory work and taking appropriate actions to ensure that quality standards are being met. The QA Manager is specifically responsible for the following:

- Review quality control data
- Communicating the effectiveness of the laboratory quality system to laboratory management

2.5 Other Project Responsibilities

Other positions are shown in Figure I-2-1, but their responsibilities should be evident based on the title and will not be discussed. Sampling and analysis responsibilities are summarized in Table I-2-1.

2.6 Report Preparation

The information for the stack sampling report will be prepared under the direction of the SC, who may also serve as Reporting Manager. The Reporting Manager's main responsibilities include:

- Determine customer and/or regulatory needs
- Complete pre-field testing reviews and planning
- Coordinate field-testing activities
- Keep apprised of and check analytical results
- Analyze data to make conclusions and recommendations, as appropriate
- Prepare and distribute sampling and analysis report

Table I-2-1
Sampling and Analysis Responsibilities [a]

Sample Matrix	Parameter	Sampling Responsibility	Analysis Responsibility
Stack Gas	Particulate Matter (PM)	~~Stack Sampling Contractor~~Alliance Source Testing, LLC	~~Contract Laboratory~~Eurofins Knoxville
	HCl/Cl_2	Alliance Source Testing, LLC~~Stack Sampling Contractor~~	Eurofins Knoxville~~Contract Laboratory~~
	Metals	Alliance Source Testing, LLC~~Stack Sampling Contractor~~	Eurofins Knoxville~~Contract Laboratory~~
	PCDDs/PCDFs	Alliance Source Testing, LLC~~Stack Sampling Contractor~~	Eurofins Knoxville~~Contract Laboratory~~
	POHC (Diphenylamine)	Alliance Source Testing, LLC~~Stack Sampling Contractor~~	Eurofins Knoxville~~Contract Laboratory~~
	Total Hydrocarbons (THC)	Alliance Source Testing, LLC~~Stack Sampling Contractor~~	Alliance Source Testing, LLC~~Stack Sampling Contractor~~
	Carbon Monoxide (CO) / Oxygen (O_2)	CEMS	CEMS

Notes:

[a] The anticipated laboratory/contractor for the test is listed. ~~will be determined prior to the test and communicated to TCEQ.~~ In the event that the anticipated laboratory/contractor is not available, ~~the~~ an alternate laboratory/contractor will be chosen and the change will be noted in the Trial Burn Report. The laboratory chosen will have accreditation under the National Environmental Laboratory Accreditation Program in the matrices, methods, and parameters required for the Trial Burn.

- Compile a historical project file and initiate appropriate records retention

Reports will be prepared discussing sampling, analytical results, and quality assurance results. The QA Manager will review all of the sampling and analytical data, as well as other information pertaining to quality assurance and control and this information will be included in the QA/QC section of the Trial Burn Report.

3.0 SUMMARY OF QUALITY ASSURANCE OBJECTIVES AND GOALS

In order to support the overall objectives of this project, data used to characterize the stack gas require that trained personnel conduct the sampling and analysis procedures with properly operating and calibrated equipment. The measurements obtained must meet certain criteria in order to be considered valid for use in meeting the objectives of the Trial Burn Plan. The accepted criteria may include requirements for precision, accuracy, completeness, representativeness and comparability. Additionally, the limitations of the analytical instrumentation used must be considered and the resulting method detection limits and reporting limits discussed. Each laboratory will meet the minimum QA/QC requirements of all methods for which The NELAC Institute (TNI) is based upon and required by the TCEQ to demonstrate compliance.

3.1 Quality Assurance Objectives for Precision, Accuracy, and Completeness

Table I-3-1 depicts the goals for precision, accuracy, and completeness for the critical measurements of this program. Numerical QA objectives for accuracy and precision of the sampling system calibration, sample preparation, and analysis procedures can be established based on previous experience in applying comparable procedures to a variety of complex sample matrices.

Precision is defined as the degree of mutual agreement between individual measurements made under prescribed conditions. Precision goals have been provided for analytical measurements that will be made in replicate, or as part of matrix spiking duplicate measurements.

For some methods, such as those developed by the American Society for Testing and Materials (ASTM), precision is gauged as the repeatability of results. The values presented for these intervals, or limits, are applicable to confidence levels of 95%. That is, the calculated repeatability and reproducibility values should not exceed the limits in more than 5% of the analyses.

Repeatability is defined as the difference in absolute value between two consecutive test results, carried out on the same sample in the same laboratory, by the same operator, using the same apparatus.

Accuracy is defined as the degree of agreement of a measurement with an accepted reference or true value. The true value can be determined through either a matrix or a surrogate spike into the actual sample. The reference value can be determined through the analysis of a reference standard material.

Table I-3-1
Summary of Quality Assurance Objectives and Goals

Sample Matrix	Parameter	Analysis Method [a]	Precision	Accuracy (% Recovery)	Completeness (% of Total)
Stack Gas	Particulate Matter	EPA Method 5	N/A	N/A	100%
	HCl/Cl_2	EPA Method 26A	10% RPD	90 - 110% MS, MS DUP	100%
	Metals	EPA Method 29	± 20% RPD	75 - 125% PS, PS DUP	100%
	PCDDs/PCDFs	EPA Method 23	≤ 20% RSD	Pre-sampling adsorbent standard: 70%-130% [b] Pre-extraction filter recovery standard: 70%-130% [c] Pre-extraction standard: 20-130% [d]	100%
	Diphenylamine	SW-846 Method 8270	≤ 20% RSD	LCL for MS and MS DUP	100%
	Total Hydrocarbons (THC)	EPA Method 25A	N/A	N/A	100%
	CO	CEMS	N/A	N/A	100%
	O_2	CEMS	N/A	N/A	100%

Notes:

DUP Duplicate LCL Laboratory Control Limit MS Matrix spike
PS Post spike RPD Relative percent difference RSD Relative Standard Deviation

[a] The analytical method listed or an equivalent method will be used.

[b] If the pre-sampling adsorbent standard average percent recovery is below 70%, the sampling run is not valid, and the stack test must be repeated. The alternative described in the method may also be used to eliminate the need to repeat the stack test.

[c] If the percent recovery of all the pre-extraction filter recovery standard compounds is below 70%, samples may be reanalyzed. If the recovery criteria are still not met, the filter extraction is not valid, and the run must be repeated.

[d] This requirement is on a per sample basis. If the recovery criteria are not met, the sample may be reanalyzed and/or the archive sample may be prepared and analyzed. If the recovery criteria are still not met, the sampling run is not valid, and the stack test must be repeated.

Completeness is defined as the percentage of samples judged valid compared to the total number of samples collected. Every attempt will be made to have all generated data to be judged valid data. However, realistically, some samples may be lost in laboratory/shipping accidents and some results may be deemed questionable based on internal quality control procedures. The data quality objective for completeness has been set at 100% for all data points considered critical to the project. Any data report with less than 100% completeness will be assessed on a case-by-case basis according to the priority of the data, with the potential for a repeat of sampling and/or analysis.

Samples for which the critical data points fail accuracy or precision data quality objectives, and therefore, completeness objectives, will be thoroughly investigated to determine if the test goals have been compromised. These samples may require reanalysis to ensure that the quality objectives are met. In the event that data quality objectives specified in this QAPP cannot be met, the QA/QC section of the Trial Burn Report will include a discussion on why the objectives could not be met, as well as an explanation on how the validity of the data was verified.

Evaluation of the precision and accuracy of the analytical program will be completed by examining results from the analysis of internal and calibration check standards, surrogate compounds, and laboratory, reagent and method blanks, as well as field and trip blanks. Additionally, results from the analysis of matrix or surrogate spike samples will be used in the evaluation.

3.2 Representativeness and Comparability

The usefulness of the data is also contingent upon meeting the criteria for representativeness and comparability. Whenever possible, reference methods and standard sampling procedures will be used. The QA objective is that all measurements be representative of the media and process being evaluated. For example, each of the stack gas samples will represent the average composition of the stack gas during each test run that the sample is collected.

The corresponding QA objective is that all data resulting from sampling and analysis be comparable with other representative measurements made by ESD or a contracted organization on this or a similar process operating under similar conditions. The use of published sampling and analytical methods, as well as standard reporting units, ensures the comparability of the data. All data will be reported in terms of mass of analyte per unit volume of sample matrix. Results from the analyses of all samples for a given matrix will be reported in the same units.

3.3 Method Detection and Quantitation Limits

Each laboratory in this test program may encounter measurements that are below detection or quantitation. The method detection limit (MDL) for these parameters or analytes will be determined by each laboratory on a periodic basis using the statistical procedures given in 40 CFR 136, Appendix B. No attempt will be made in this program to develop MDLs or reporting limits specific to this test program. Analytical reporting will generally follow the standard convention of using data qualifiers to indicate situations such as whether an analyte was found in the blank as well as in the sample (e.g., B) or the analyte was positively identified but the concentration is estimated (e.g., J). The method detection limit and reporting limits provided by the analytical laboratory will be noted in the analytical laboratory reports, along with the data qualifier "U" (or other specified qualifier), when the analyte was not detected. All data qualifiers utilized will be fully explained in the analytical reports.

4.0 SAMPLING PROCEDURES

The following subsections provide descriptions and methodologies of the sampling techniques to be employed during this Trial Burn. Deviations from the specified methodologies will be discussed with on-site regulatory personnel and fully documented in the Trial Burn Report.

4.1 Field Quality Control Samples

For stack gas samples, the number of reagent or field blanks per applicable parameter will be collected as specified in Section 4.5.

4.2 Pre-sampling Activities

Pre-sampling activities include equipment calibration, sample media preparation, pre-cleaning of sample train glassware, and other miscellaneous tasks, which are described or referenced in the following subsections. Other pre-sampling activities include such details as team meetings, equipment preparation, equipment setup, and finalization of details before initiation of the sampling program.

4.2.1 Equipment Calibration

The inspection and calibration of sampling equipment is an important step in assuring the successful completion of the field effort. Equipment is inspected for proper operation and durability before calibration. Calibrations will be performed before the field sampling effort. Detailed information on specific calibration procedures for sampling equipment is provided in Section 6.0.

4.2.2 Glassware Preparation

Sample train glassware and sample containers will require specialized cleaning to avoid contamination of the sample from the collection container or devices. Sample containers will be pre-cleaned to specified EPA protocols. Cleaning procedures for each of the sampling train's glassware are summarized in the procedural descriptions in Section 4.3 and are described in detail in the applicable method.

4.2.3 Sample Media Preparation

All sample reagents will be checked to minimize the probability of using contaminated reagents. This includes the use of reagents from the same lot and the collection and analysis of appropriate blanks. All filters for the particulate trains will be desiccated at 20 ± 5.6 °C and weighed to the nearest 0.1 mg. Preparations of other sampling media are summarized in the procedural descriptions in Section 4.3 and are described in detail in the applicable method.

4.2.4 Other Pre-sampling Activities

Sample team meetings are held to designate responsibilities to each team member. Assignments are based on individual experience and relative importance to the assigned task. Many team members have participated in similar projects. Other pre-sampling activities may include the generation of sample lists, printing of computer generated sample labels, procurement of supplies, and proper packing of all equipment.

Site setup is the final pre-sampling activity. This task involves moving the sampling equipment to the vicinity of the sample collection area. All sample trains will be assembled and recovered in a clean area designated for sample recovery.

Before sampling starts, preliminary measurements are made at the stack locations to determine flue gas moisture, velocity, and absence of cyclonic flow. These measurements facilitate the determination of nozzle size selection and operation rates for isokinetic trains.

Examples of the data collection forms are included in Attachment 2. The actual data collection form(s) may differ in format, but the same essential information will be present.

4.3 Exhaust Gas Sample Collection

The collection of stack gas samples will be conducted according to the methods listed in Table I-4-1. A brief summary of each of the methods follows. Information on sample container type and volume requirements, as well as additional sample handling and preservation information is presented in Section 5.0.

4.3.1 Sampling Point Determination – EPA Method 1

The location of the traverse points in the stack will be determined according to the procedures outlined in EPA Method 1.

During preliminary sampling, a cyclonic flow check will be conducted. Sampling will not occur at the sampling point if the check does not meet method requirements until the flow pattern has been changed. Another cyclonic flow check will be done to confirm the effectiveness of the change.

4.3.2 Flue Gas Velocity and Volumetric Flow Rate – EPA Method 2

The flue gas velocity and volumetric flow rate will be determined according to the procedures outlined in EPA Method 2. Velocity measurements will be made using Type S pitot tubes, conforming to the geometric specifications outlined in the method. Each pitot tube is calibrated

Table I-4-1
Stack Gas Sampling and Analytical Procedures Summary

Sampling Method [a]	**Number of Sampling Runs**	**Sampling Time per Run**	**Analytical Parameters**	Analytical Method [a]
EPA Method 1	1	N/A	Sampling and Traverse Point Locations	EPA Method 1
EPA Method 2	See note b	Continuous	Volumetric Flowrate	EPA Method 2
EPA Method 3A	See note b	Continuous	Molecular Weight	EPA Method 3A
EPA Method 4	See note b	Continuous	Moisture	EPA Method 4
EPA Method 5/26A	3	2 hours	Particulate Matter	EPA Method 5
			HCl/Cl_2	EPA Method 26A
EPA Method 29	3	2 hours	SVM (Cd, Pb, Se) LVM (As, Be, Cr, Sb, Co, Mn, Ni)	EPA Method 29
EPA Method 23	3	3 hours **AND** a minimum sample volume of 2.5 dscm	PCDD/PCDF [c]	EPA Method 23
SW-846 Method 0010	3	3 hours **AND** a minimum sample volume of 3 dscm (105.9 dscf)	POHC (Diphenylamine)	SW-846 Method 8270
EPA Method 25A	3	3 hours (concurrent with SW-846 Method 0010)	Total Hydrocarbons (THC)	EPA Method 25A
Installed CEMS: Performance Specification 4B	3	Continuous	Oxygen (O_2)	O_2 CEMS PS-4B
			Carbon Monoxide (CO)	CO CEMS PS-4B

Notes:
[a] Methods are from 40 CFR §60 Appendix A or US EPA SW-846. The method listed, or an equivalent method, will be used during the test.
[b] Methods 2, 3A, and 4 are performed as part of the other isokinetic sampling methods.
[c] Per 40 CFR §63.1208(b)(1)(iii), ESD may assume that nondetects are present at zero concentration.

and a specific calibration coefficient is calculated. Differential pressures will be measured with fluid manometers of the appropriate range. Effluent gas temperatures will be measured with chromel-alumel thermocouples equipped with a digital temperature indicator.

4.3.3 Flue Gas Composition and Molecular Weight – EPA Method 3A

EPA Method 3A will be used to determine the oxygen and carbon dioxide concentrations in the flue gas stream. Using this method, a gas sample is extracted from the stack at a constant rate for determination of O_2, CO_2 and molecular weight. A continuous instrumental analyzer will be used for analysis of the sample. This sample will be collected continuously during each run throughout the test. Alternatively, one integrated bag sample may be collected in a Tedlar® bag for each set of concurrent sampling trains for each test run using the procedures in Method 3A. An instrumental analyzer will be used to determine the oxygen and carbon dioxide concentration of the sample. The nitrogen concentration will be determined by difference, and the three concentrations will be used to calculate the dry gas molecular weight.

4.3.4 Flue Gas Moisture Content – EPA Method 4

The flue gas moisture content will be determined in conjunction with each isokinetic EPA Method 5-type train according to the procedures outlined in EPA Method 4. The impingers will be connected in series and will contain the reagents necessary for the train. The impingers will be surrounded by an ice bath to ensure condensation of the moisture in the flue gas stream. Any moisture that is not condensed in the impingers is captured in the silica gel. For determination of total moisture in the stack gas, the moisture condensed in the impingers and captured in the silica gel will be weighed, summed, and entered into moisture content calculations.

4.3.5 Particulate Matter and Hydrogen Chloride/Chlorine –Combined EPA Methods 5 and 26A

The sampling and analytical procedures outlined in Methods 5 and 26A will be utilized to collect samples for determination of PM and HCl/Cl_2 concentrations in the exhaust gases. Using this method, gaseous and particulate pollutants are withdrawn from the sampling port at an isokinetic sampling rate, and are collected in an optional cyclone, on a filter, and in absorbing solutions. The Teflon mat or quartz-fiber filter collects particulate matter, other than liquid droplets, including chloride salts. The acidic and alkaline absorbing solutions are used to collect gaseous HCl and Cl_2, respectively.

A diagram of the sampling train, which is adapted from the EPA Method 5 procedures, is presented in Figure I-4-2. In addition to those components included in the EPA Method 5 train, the Method 26A train includes a required glass nozzle and probe, a Teflon union, a quartz-fiber

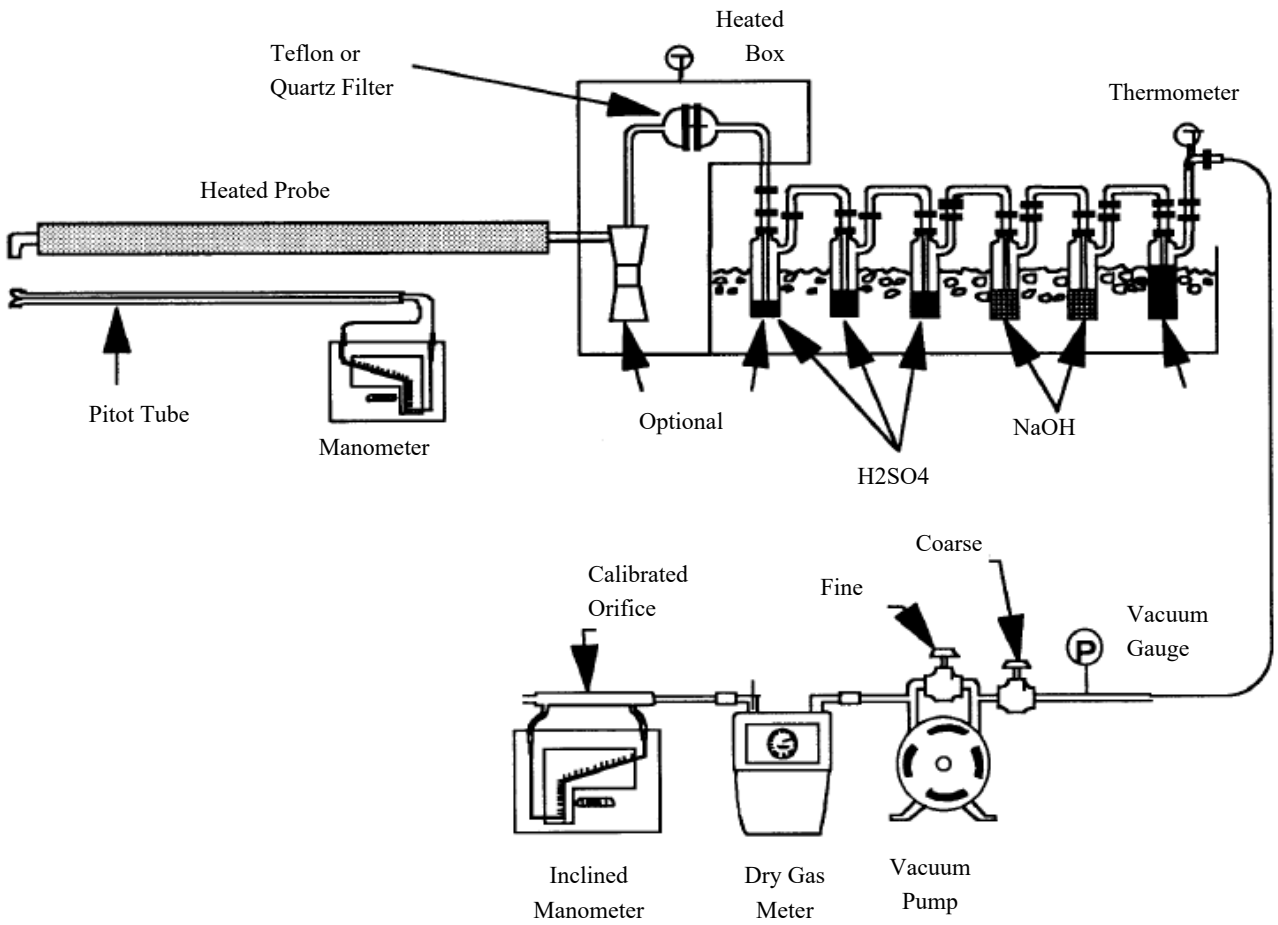

Figure I-4-2
Diagram of Methods 5 and 26A Sampling Train

or Teflon mat filter, a Teflon frit, and acid and alkaline absorbing solutions. The following provides a description of the sample extraction and filter system.

- Probe Nozzle: Glass
- Probe Liner: Borosilicate or quartz glass tubing with a heating system. The heating system will be capable of maintaining the gas temperature at 120 ± 14 °C
- Pitot Tube: Type S (Meeting specifications of EPA Method 2)
- Cyclone: Optional, Glass
- Filter Holder: Borosilicate glass with a Teflon frit filter support and a sealing gasket (The sealing gasket will be made of Teflon)
- Filter Heating System: Designed to maintain a temperature of 120 ± 14 °C around the filter holder and cyclone during sampling

Following the sample extraction and filter system, the impinger train is used to determine stack gas moisture content, and to collect HCl/Cl_2. This impinger train will consist of five or six impingers, connected in series. The first impinger, if included, is used as a knockout trap. It will be similar in design to the alkaline impingers, except for a shorter stem length, and will contain 50 mL of 0.1 N H_2SO_4. The second and third impingers, referred to as the acid impingers, will each contain 100 mL of 0.1 N H_2SO_4. These impingers will be of Greenburg-Smith design with the standard tip. The fourth and fifth impingers, referred to as the alkaline impingers, will each contain 100 mL of 0.1 N NaOH. The final impinger will contain the silica gel. The fourth, fifth and six impingers will be of the Greenburg-Smith design with a modified tip.

To ensure proper operation of the sampling train, both pre-test and post-test leak checks will be conducted. Additionally, a leak test will be conducted during the run if a component change becomes necessary as described below. The leakage rates for all leak checks will not exceed 4% of the average sampling rate, or 0.02 cfm, whichever is less. Should a pre-test leak check not meet these specifications, the leak check will be stopped, the problem determined, and the leak test restarted. Should a leak check during the run not meet the specifications, the run will be stopped and voided. If the post-test leak check exceeds the specifications above, one of two options will be employed: a) the leakage rate will be recorded, the sample volume corrected, and the reliability of the data will be questioned, or b) the sampling run will be voided.

During the sampling run, the sample train will be operated in accordance with the procedures and specifications outlined in Method 5 and 26A, except as noted. Special attention will be given to the following operating specifications:

- The temperature around the filter will be maintained at a temperature of 120 ± 14 °C.
- The temperature at the condenser/silica gel outlet will be maintained less than 20 °C.
- An isokinetic sampling rate within 90 – 110% will be maintained.

Sampling will be conducted for a minimum time of 2 hours. The sampling time at each traverse point will be the same, but will be greater than 2 minutes as specified by Section 8.2.4 of EPA Method 5. The total sampling time interval at each traverse point will be determined based upon the total sampling time (2 hours) divided by the total number of traverse points. Traverse points will be determined according to the procedures outlined in EPA Method 1, as described in Section 4.3.1. The location of the traverse points and sampling time at each traverse point will be included in the appendices to the Trial Burn Report.

Immediately following completion of the sampling run, the nozzle end of the sampling probe will be sealed with cleaned aluminum foil and disconnected from the filter holder. Once the probe has cooled enough to be handled, any excess particulate matter will be wiped from the tip of the probe, and both ends of the probe will be capped with cleaned aluminum foil. Additionally, all openings on the filter holder, transfer line, and impinger train will be disconnected and sealed.

For recovery of the train, the probe, filter, and the impinger/condenser assembly will be transferred to a cleanup area free from uncontrolled dust and protected from the weather to minimize sample contamination or loss. Portions of all washing solutions used for cleanup and for the absorbing reagents will be saved and will be treated as blanks. Recovery procedures will follow those outlined in the method and shown in Figure I-4-3. Five sample containers, outlined below, will be created during the recovery process.

- Container 1: Filter catch for particulate determination
- Container 2: Front half rinse for particulate determination
- Container 3: Knockout and acid impinger catch for moisture and HCl determination
- Container 4: Alkaline impinger catch for Cl_2 and moisture determination
- Container 5: Silica gel for moisture determination

It should be noted that Method 26A requires the addition of sodium thiosulfate to the caustic impinger contents after sampling is complete in order to reduce any hypochlorite ion (OCl^-) to the chloride ion (Cl^-) for analysis. The sodium thiosulfate may be added at the laboratory in order to avoid adding too much, which can cause analytical interferences.

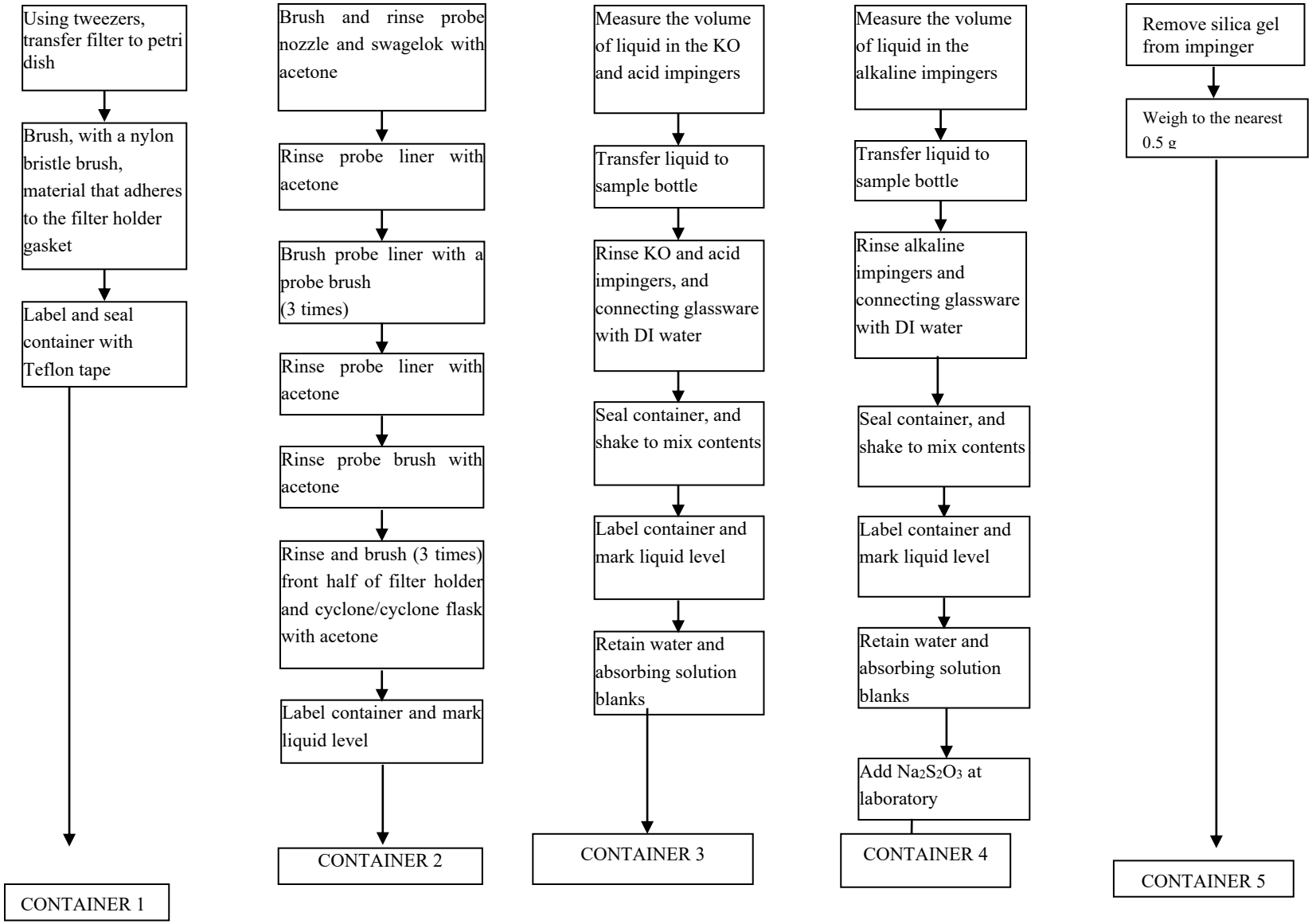

Figure I-4-3
Diagram of Methods 5 and 26A Recovery Procedure

4.3.6 Multiple Metals – EPA Method 29

The sampling and analytical procedures outlined in Method 29 will be utilized to collect samples for determination of multiple metals. Using this method, stack gas emissions are withdrawn from the sampling port at an isokinetic sampling rate and are collected in a multi-component sampling train that consists of a heated filter and a series of chilled impingers.

A diagram of the sampling train, which is adapted from the EPA Method 5 procedures, is presented in Figure I-4-4. The following provides a description of the sample extraction system.

- Probe Nozzle: Glass
- Probe Liner: Borosilicate or quartz-glass tubing with a heating system
- Pitot Tube: Type S (Meeting specifications of EPA Method 2)
- Filter: Quartz or glass fiber filters without organic binders
- Filter Holder: Borosilicate glass with a Teflon frit filter support
- Filter Heating System: Designed to maintain a temperature of 120 ± 14 °C around the filter holder during sampling

The actual condensation and collection of gaseous metals and determination of moisture content occur using a series of three to seven impingers. The first impinger, which is optional, is empty and is used as a moisture knockout impinger. The second and third impingers will contain 100 mL of nitric acid/hydrogen peroxide solution. When analyzing for mercury, this sampling train would contain three more impingers. The fourth impinger would function as another knockout impinger. The fifth and sixth impingers would typically contain 100 mL of acidic potassium permanganate solution. However, since mercury determination is not required in this test plan, these impingers will be eliminated. The final impinger will contain a known quantity of silica gel, or equivalent desiccant.

To ensure proper operation of the sampling train, both pre-test and post-test leak checks will be conducted. Additionally, a leak test will be conducted during the run if a component change becomes necessary. The leakage rates for all leak checks will not exceed 4% of the average sampling rate, or 0.02 cfm, whichever is less. Should a pre-test leak check not meet these specifications, the leak check will be stopped, the problem determined, and the leak test restarted. Should a leak check during the run not meet the specifications, the run will be stopped and voided. If the post-test leak check exceeds the specifications above, one of two options will be employed: a) the leakage rate will be recorded, the sample volume corrected, and the reliability of the data will be questioned, or b) the sampling run will be voided.

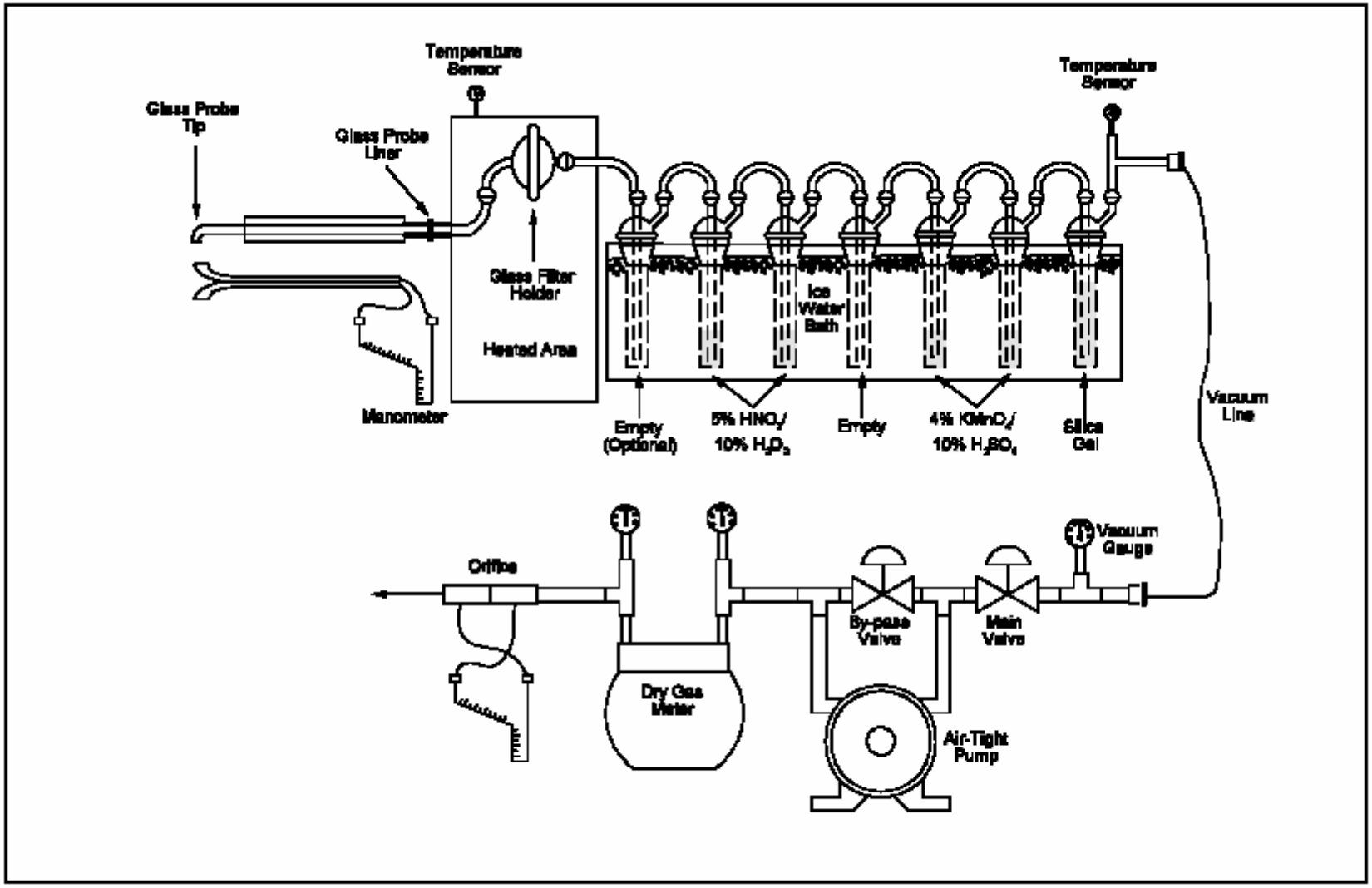

Figure I-4-4
Diagram of Method 29 Sampling Train

During the sampling run, the sample train will be operated in accordance with the procedures and specifications outlined in Method 29. Special attention will be given to the following operating specifications:

- The temperature around the filter holder will be maintained at a temperature of 120 ± 14 °C.
- The condenser/silica gel outlet temperature will never exceed 20 °C.
- An isokinetic sampling rate within 90 – 110% will be maintained.

Immediately following completion of the sampling run, the nozzle end of the sampling probe will be sealed with cleaned aluminum foil and disconnected from the filter holder. Once the probe has cooled enough to be handled, any excess particulate matter will be wiped from the tip of the probe, and both ends of the probe will be capped with cleaned aluminum foil. Additionally, all openings on the filter holder, transfer line, condenser, sorbent trap, and impinger train will be disconnected and sealed.

For recovery, the entire sampling train will be transferred to a cleanup area free from uncontrolled dust and protected from the weather to minimize sample contamination or loss. Recovery procedures will follow those outlined in the method and shown in Figure I-4-5. The sample containers outlined below will be created during the recovery process.

- Container 1: Filter
- Container 2: *Not used – only for particulate determination*
- Container 3: Probe rinse
- Container 4: Contents and rinses of Impingers 1 through 3 (HNO_3/H_2O_2 impingers and moisture knockout Impinger)
- Container 5A: *Not used – only for mercury determination*
- Container 5B: *Not used – only for mercury determination*
- Container 5C: *Not used – only for mercury determination*
- Container 6: Silica gel

4.3.7 Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans–EPA Method 23

The sampling and analytical procedures outlined in US EPA Method 23 will be utilized to collect samples for determination of selected polychlorinated dibenzo-*p*-dioxin and polychlorinated dibenzofuran (PCDD/PCDF) concentrations. Pursuant to §63.1208(b)(1)(ii), to determine

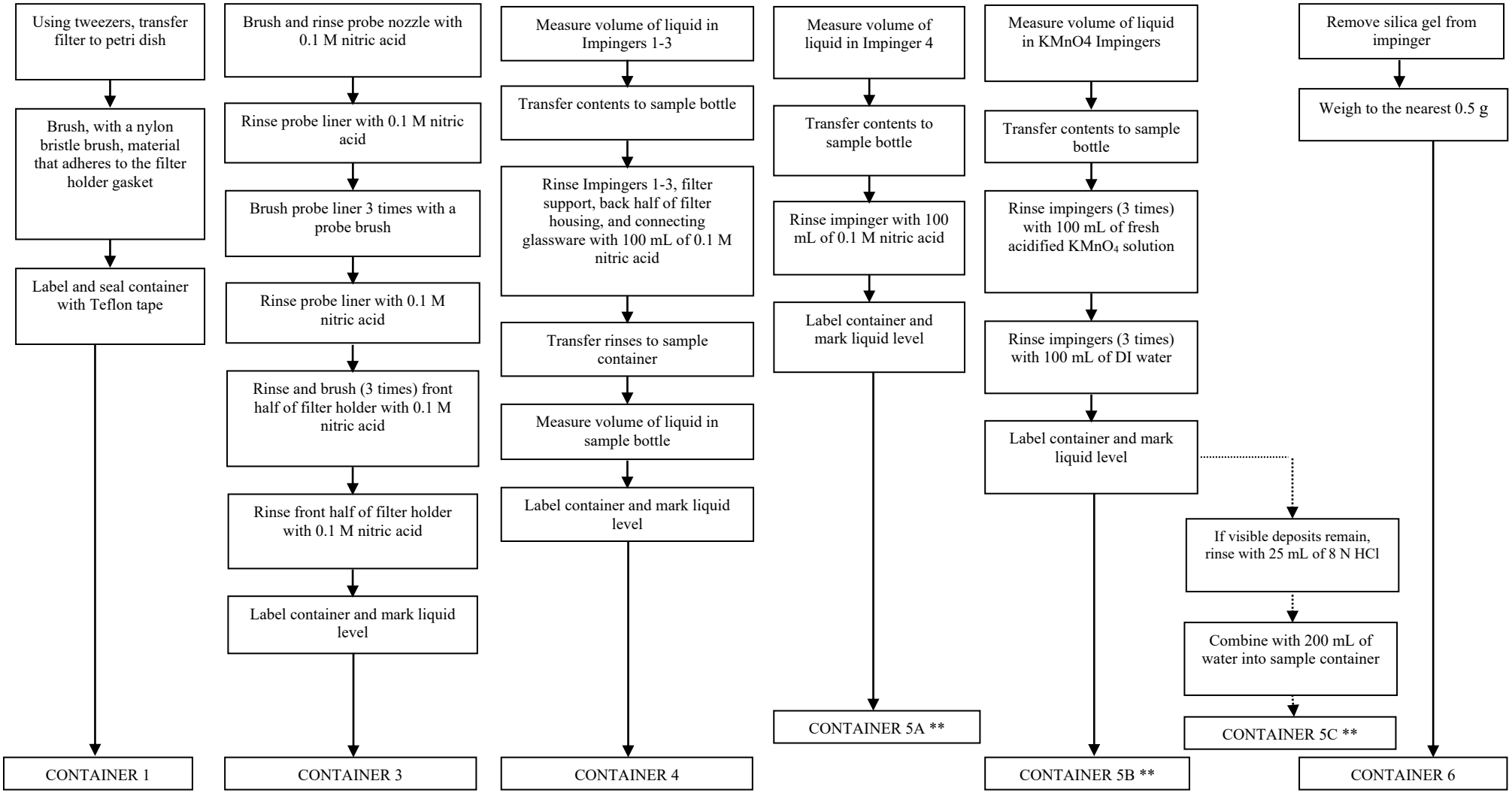

Figure I-4-5

Diagram of Method 29 Recovery Procedures

***Containers 5A, 5B, and 5C are not used during this test. They are only used for mercury determination.*

compliance with the emission standard for dioxins and furans, sampling will be conducted for a total of 3 hours and a minimum sample volume of 2.5 dscm will be collected.

Using this method, stack gas emissions are withdrawn from the sampling port at an isokinetic sampling rate and are collected in a multicomponent sampling train that consists of front half, glassware surfaces, the glass fiber filter, adsorbent resin module (XAD-2 resin), and the back half glassware surfaces. A diagram of the Method 23 sampling train, which is adapted from the EPA Method 5 procedures, is presented in Figure I-4-6. In addition to those components included in the EPA Method 5 train the Method 23 train includes a condenser, XAD-2 adsorbent module, and connecting glassware. The following provides a description of the sampling extraction system components:

- Nozzle: Quartz, borosilicate glass, or titanium
- Probe Liner: Polytetrafluoroethylene (PTFE), borosilicate or quartz glass liners with a heating system capable of maintaining a probe gas temperature of 120 ± 14 °C during sampling
- Filter Holder: borosilicate glass with a PTFE frit or PTFE-coated wire filter support
- Filter Heating System: Capable of monitoring and maintaining probe gas temperatures around the filter to ensure that the sample gas temperature exiting the filter is 120 ± 14 °C during sampling
- Filter Temperature Sensor: Capable of measuring temperature to within ±3 °C so that the sensing tip protrudes at least 1.3 centimeters (cm) (into the sample gas exiting the filter.
- Sample Transfer Line: Must be heat traced and constructed of glass or PTFE with connecting fittings that form leak-free, vacuum-tight connections without using sealing greases or tapes. Maintain the lines at a temperature of 120 °C ± 14 °C.
- Condenser: Glass, water-jacketed, coil-type with compatible fittings.
- Adsorbent Module: Use a water-jacketed glass container to hold up to 40 grams (g) of the solid adsorbent. The adsorbent module will be oriented vertically to facilitate condensate drainage. The connecting fittings must form leak-free, vacuum-tight seals. Include a coarse glass frit in the adsorbent module to retain the adsorbent.
- Water Circulating Bath: Bath pump circulating system capable of providing chilled water flow to the condenser and adsorbent module water jackets. Maintain temperature <20 °C.
- Impingers: Five impingers connected in series with leak-free noncontaminating fittings.
  - Impinger 1: empty; short-stem (water-dropout) impinger, or equivalent
  - Impinger 2: contains 100 mL of reagent water; Greenburg-Smith design, modified by replacing the tip with a 1.3 cm (1/2 in.) inside diameter (ID) glass tube extending to approximately 1.3 cm (1/2 in.) from the bottom of the flask tip

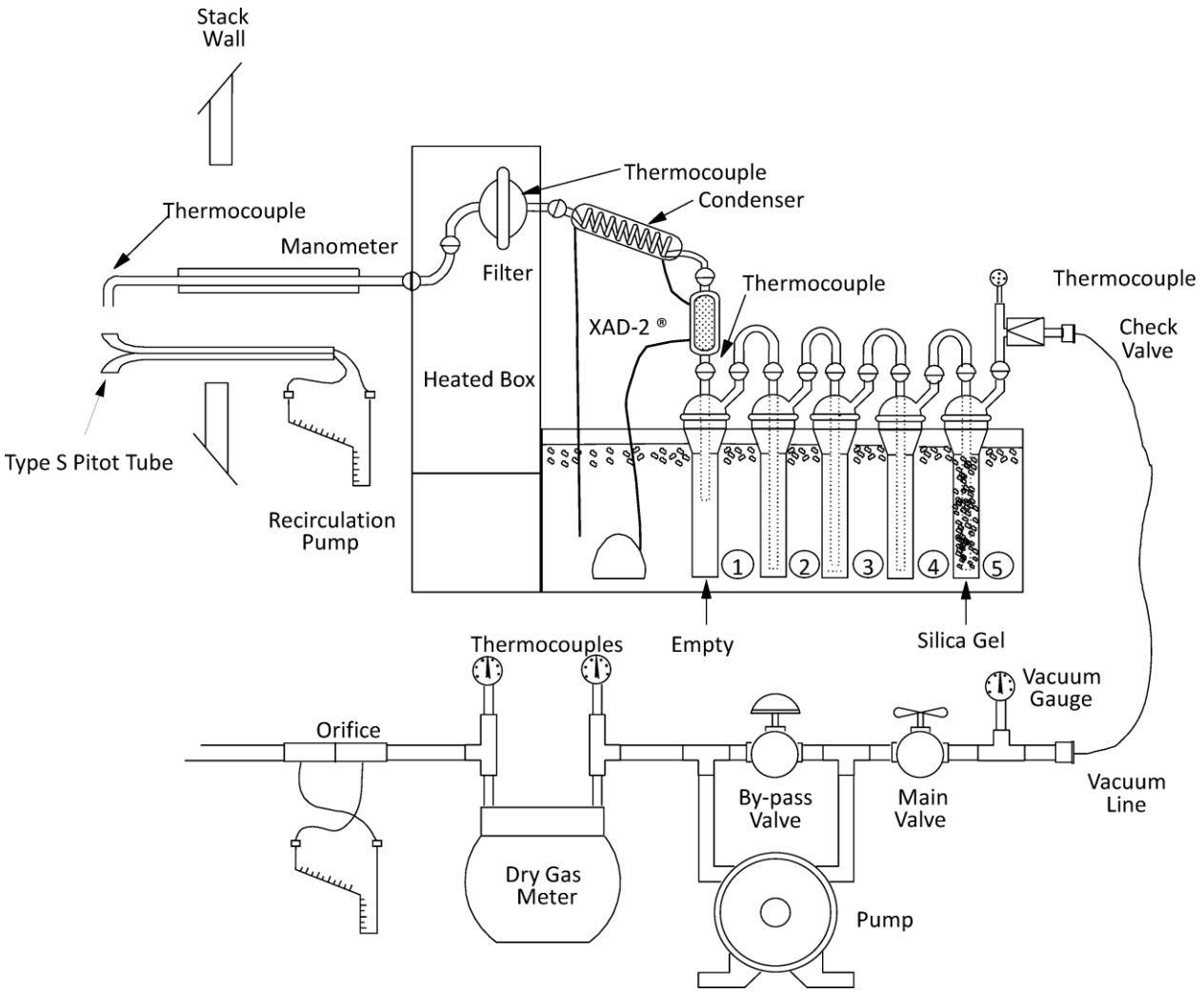

Figure I-4-6
Diagram of Method 23 Sampling Train

- Impinger 3: contains 100 mL of reagent water; Greenburg-Smith design with the standard
- Impinger 4: empty; modified as described for the second impinger
- Impinger 5: contains 200 g or more of silica gel; modified as described for the second impinger

Additional components of the sampling train include: a water circulating bath, a pitot tube, a differential pressure gauge, a metering system, a barometer, and gas density determination equipment. All these components will be designed and configured in accordance with the specifications outlined in EPA Method 23.

To ensure proper operation of the sampling train, a pre-test leak check is recommended, and post-test leak checks are required. Additionally, a leak test will be conducted during the run if a component change becomes necessary. The leakage rates for all leak checks will not exceed 4% of the average sampling rate, or 0.02 cfm, whichever is less. Should a pre-test leak check not meet these specifications, the leak check will be stopped, the problem determined, and the leak test restarted. Should either a leak check during the run or following the run not meet the specifications, one of two options will be employed: a) the leakage rate will be recorded, the sample volume corrected, and the reliability of the data will be questioned, or b) the sampling run will be voided.

During the sampling run, the sample train will be operated in accordance with the procedures and specifications outlined in EPA Method 23. Special attention will be given to the following operating specifications:

- The temperature around the probe, the filter, and the sample transfer line should be maintained at 120 ± 14 °C during sampling.
- The temperature around the impingers should be maintained to keep the adsorbent module entrance and the silica gel exit temperature below 20 °C.
- An isokinetic sampling rate within 90 – 110% will be maintained.
- The filter vacuum will be monitored, and the filter will be changed if the filter vacuum is too high.

Immediately following completion of the sampling run, the nozzle end of the sampling probe will be sealed with cleaned aluminum foil or PTFE tape and disconnected from the filter holder. Once the probe has cooled enough to be handled, any excess particulate matter will be wiped from the tip of the probe, and both ends of the probe will be closed off with cleaned aluminum

foil or PTFE tape. Additionally, all openings on the filter holder, transfer line, condenser, adsorbent module, and impinger train will be disconnected and sealed. For recovery of the train, all train components will be transferred to a cleanup area free from uncontrolled dust and protected from the weather to minimize sample contamination or loss. The recovery procedure is presented in Figure I-4-7.

Additionally, the adsorbent module, impingers, and silica gel impinger will be weighed to within ±0.5 g using the field balance and the weights will be recorded. The liquid, unless determined otherwise, will be discarded and not placed in a separate container. The color of the silica gel and its condition will also be noted on the field data sheet. Analysis of the silica gel is not necessary.

At least one complete field train proof blank (field blank) will be submitted with the Method 23 samples. This field blank will include one complete sampling train, the sample bottles containing aliquots of sample recovery solvents, unused filters, and resin cartridges. The field blank sampling train will be assembled in the field staging area, taken to the sampling area, and leak-checked for the same total number of times as the actual Method 23 sampling train. During the test, the filter housing and probe of the blank train will be heated, and following the test, the blank train will be recovered as if it were an actual test sample. By definition, no gaseous sample will actually be passed through the sampling train.

4.3.8 Diphenylamine (POHC) – SW-846 Method 0010

EPA SW-846 Method 0010 will be used to collect stack gas samples for the analysis of diphenylamine (the selected POHC for the test). Using this method, gaseous and particulate pollutants are isokinetically withdrawn from the stack gas and are collected in a multi-component sampling train.

A diagram of the SW-846 Method 0010 sampling train, which is adapted from the EPA Method 5 procedures, is presented in Figure I-4-8. Organic-laden particulate materials are collected on a high-efficiency glass or quartz-fiber filter, and semi-volatile organic species are collected on a packed bed of porous polymeric adsorbent resin. This train will be operated for a minimum of 3 hours to ensure collection of the minimum amount of gas required to obtain the analyte.

In addition to those components included in the EPA Method 5 train, the SW-846 Method 0010 sampling train includes a condenser coil and a sorbent module. The following provides a description of the sampling extraction system components:

- Probe Nozzle: Stainless steel or glass

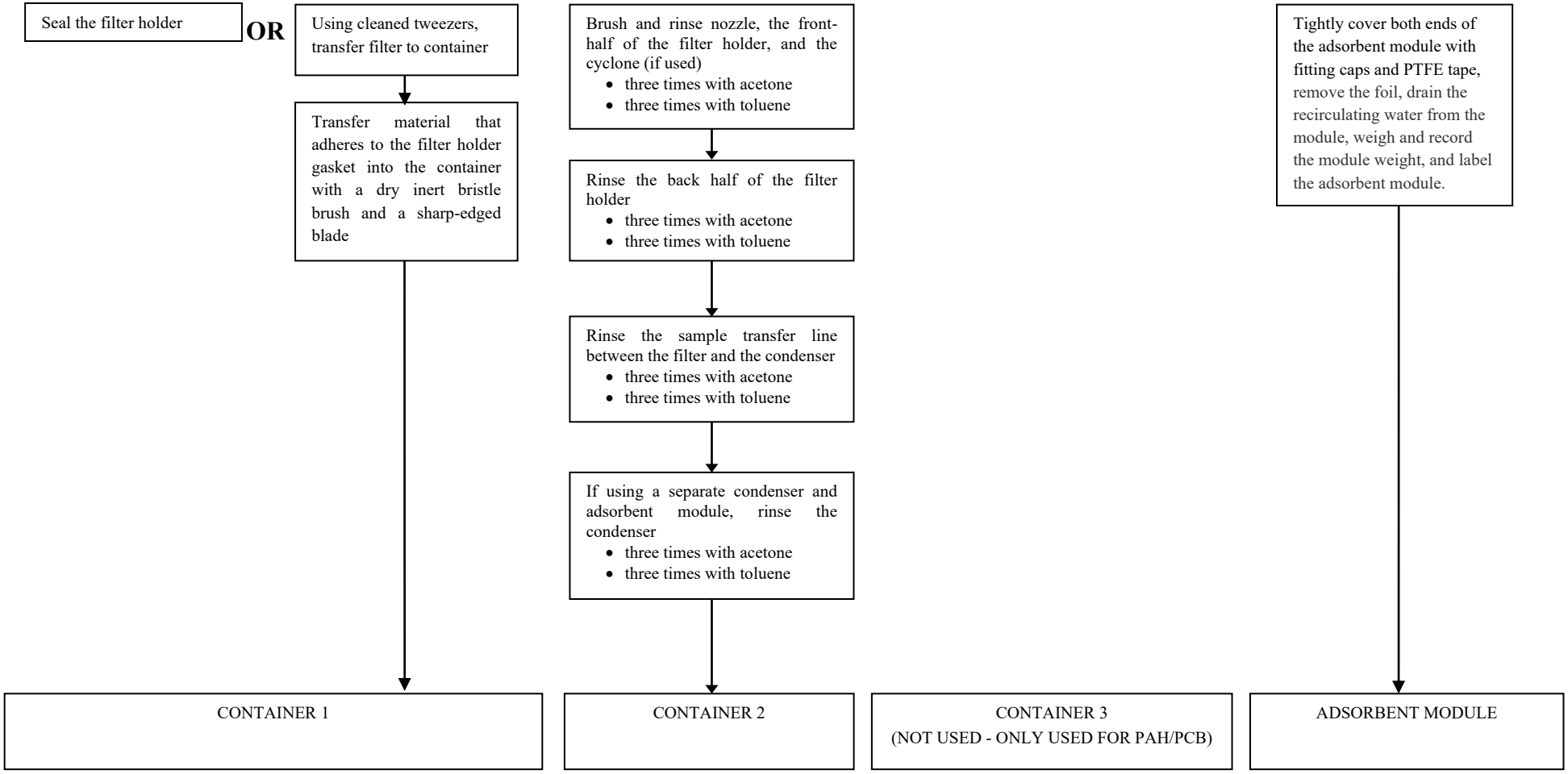

Figure I-4-7
Diagram of Method 23 Recovery Procedures

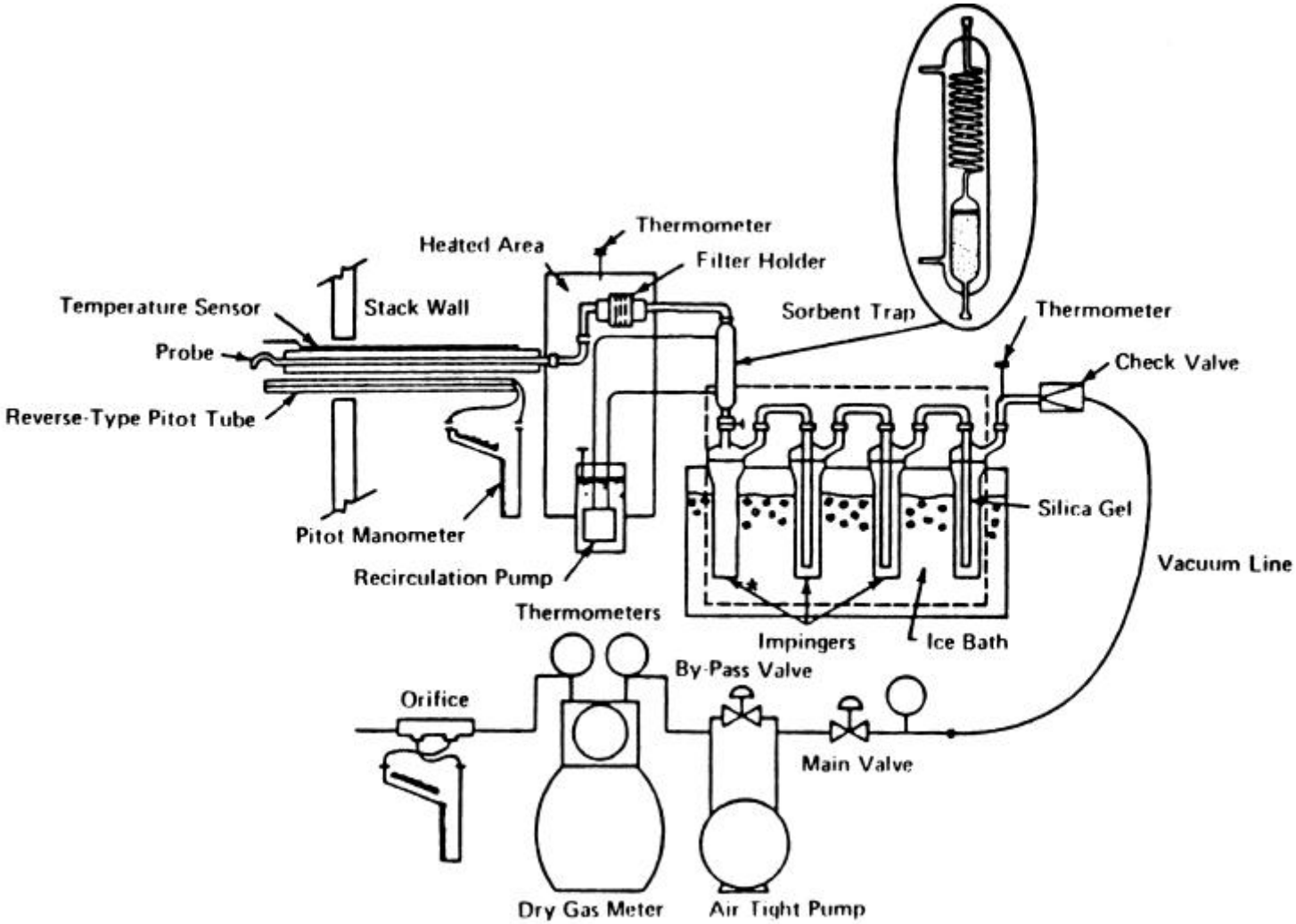

Figure I-4-8
Diagram of SW-846 Method 0010 Sampling Train

- Probe Liner: Borosilicate or quartz tubing with a heating system capable of maintaining a probe gas temperature of 120 ± 14 °C at the exit during sampling
- Pitot Tube: Type S
- Differential pressure gauge
- Filter Holder: borosilicate glass with a glass frit filter support and a sealing gasket
- Filter Heating System: Capable of monitoring and maintaining a temperature of 120 ± 14 °C around the filter holder during sampling
- Organic Sampling Module: This module consists of the following three sections: gas-conditioning section, a sorbent trap, and a condensate knockout trap.
- Impingers Train: Four impingers connected in series with leak-free ground-glass joints.
  - Impinger 1: Greenburg-Smith design, modified by replacing the tip with a 1.3 cm (1/2 in.) inside diameter (ID) glass tube extending to approximately 1.3 cm (1/2 in.) from the bottom of the outer cylinder; contains 100 mL of water
  - Impinger 2: Greenburg-Smith design with the standard tip; contains 100 mL of water
  - Impinger 3: modified as described for the first impinger; empty or charged with a caustic solution (if the stack contains HCl)
  - Impinger 4: modified as described for the first impinger; contains 200-300 g of silica gel or equivalent dessicant
- Metering System: vacuum gauge, leak-free pump, thermometers, dry-gas meter
- Barometer (or a reading from a nearby National Weather Service station can be used)
- Gas Density Determination Equipment: Temperature sensor and pressure gauge and gas analyzer

All these components will be designed and configured in accordance with the specifications outlined in SW-846 Method 0010.

During each run, the sampling train will be assembled and leak checked before sampling commences. To ensure proper operation of the sampling train, both a pre-test leak check and a post-test leak check are required. Additionally, a leak test will be conducted during the run if a component change becomes necessary. The leakage rates for all leak checks will not exceed 4% of the average sampling rate, or 0.02 cfm, whichever is less. Should a pre-test leak check not meet these specifications, the leak check will be stopped, the problem determined, and the leak test restarted. Should either a leak check during the run or following the run not meet the specifications, one of two options will be employed: a) the leakage rate will be recorded, the sample volume corrected, and the reliability of the data will be questioned, or b) the sampling run will be voided.

For recovery of the train, all train components will be transferred to a cleanup area free from uncontrolled dust and protected from the weather to minimize sample contamination or loss. The recovery procedure is presented in Figure I-4-9.

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

4.3.9 Total Hydrocarbons – EPA Method 25A

A continuous emissions monitor will be used to measure exhaust gas concentrations of total hydrocarbons (THC), according to EPA Method 25A. Using this method, a gas sample is extracted through a heated sample line to a flame ionization analyzer (FIA). Results from this analysis are reported as volume concentration equivalents of propane. The THC measurement is performed on a wet basis and will therefore be corrected for moisture to obtain the THC measurement on a dry basis. The THC measurement will also be corrected to 7% oxygen. The monitor will operate continuously throughout the duration of each test run.

4.3.10 Continuous Emission Monitoring System (CEMS)

Sampling for the CO and O_2 measurement will be obtained from the permanently installed carbon monoxide and oxygen CEMS and is performed on a dry basis and corrected to 7% oxygen. This system is described in Section 3.7 of the Trial Burn Plan. A Relative Accuracy Test Audit (RATA) of the CEMS will be conducted in conjunction with the Trial Burn.

4.4 Process and Spiking Materials

As discussed in the Trial Burn Plan, ESD will not rely on sampling and analysis to characterize the materials used during the Trial Burn. ESD will use information from the manufacturer to determine the composition of the process feeds.

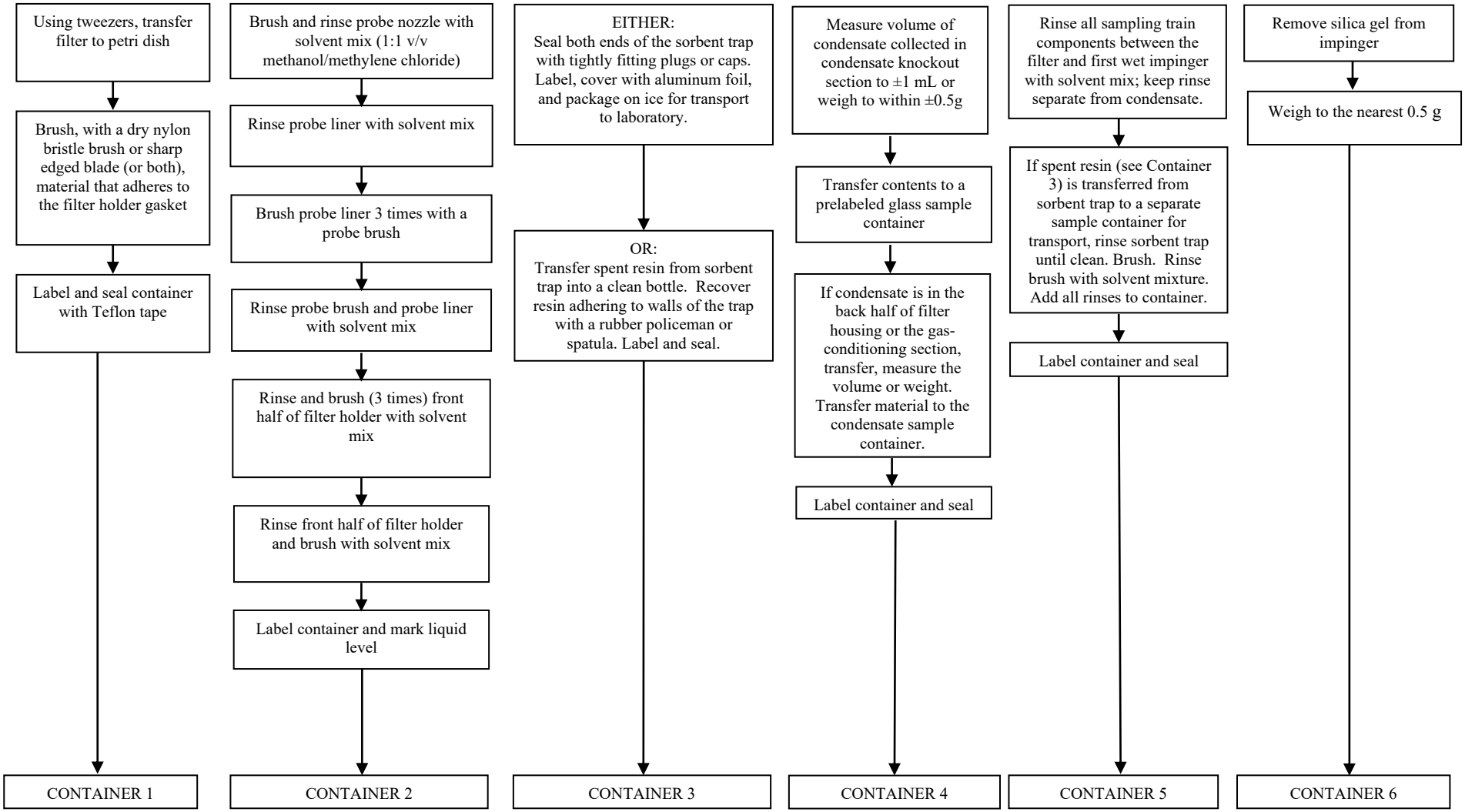

Figure I-4-9
Diagram of SW-846 Method 0010 Recovery Procedures

The spiking materials will not be sampled and analyzed during the Trial Burn. These will be pure materials purchased for testing. The suppliers will certify the spiking materials composition.

4.5 Total Samples for Testing

Table I-4-2 lists the total number of samples that will be collected and analyzed.

Table I-4-2
Number of Stack Samples Generated

Sampling Train	Containers	Test Run			Field Blank	Reagent Blank	Total
		1	2	3			
Method 5/26A	C1 – filter	1	1	1	-	-	3
	C2 – acetone probe wash and reagent blank	1	1	1	-	1	4
	C3 – acid impingers & C6 – reagent blank	1	1	1	-	1	4
	C4 – caustic impingers & C7 – reagent blank	1	1	1	-	1	4
	C5 – silica gel	1	1	1	-	-	3
	C8 – DI water reagent blank	-	-	-	-	1	1
Method 29	C1 – filter and C12 filter blank	1	1	1	-	-	3
	C3 – HNO_3 probe rinse and C8A – reagent blank	1	1	1	-	1	4
	C4 – Contents and rinses of Impingers 1 through 3 (HNO_3/H_2O_2 impingers and moisture knockout Impinger) and C9 HNO_3/H_2O_2 reagent blank	1	1	1	-	1	4
	C5A – *Not used – only for mercury determination*	-	-	-	-	-	0
	C5B and C10 reagent blank- *Not used – only for mercury determination*	-	-	-	-	-	0
	C5C-8 and C11 reagent blank *Not used – only for mercury determination*	-	-	-	-	-	0
	C6 – silica gel	1	1	1	-	-	3
	C8B – DI water reagent blank	-	-	-	-	1	1
Method 23	C1 – Filter	1	1	1	1	-	4
	C2 – Acetone and toluene rinses of nozzle, front half of filter holder, cyclone (if used), back half of filter holder, sample transfer line, and condenser (if using a separate condenser and adsorbent module)	1	1	1	1	-	4
	C3 – N/A; used for PAH/PCB analysis	-	-	-	-	-	0
	Adsorbent Module	1	1	1	1	-	4
SW-846 Method 0010	C1 – filter	1	1	1	-	-	3
	C2 – methanol/methylene chloride probe rinse and distilled water rinse (retain a 200 mL blank of the methanol/methylene chloride and a 200 mL blank of the distilled water)	1	1	1	-	2	5
	C3 – sorbent trap	1	1	1	-	-	3
	C4 – condensate knockout-trap catch	1	1	1	-	-	3
	C5 – methanol/methylene chloride rinses	1	1	1	-	-	3
	C6 – silica gel	1	1	1	-	-	3

Notes:

DI	Deionized water	H_2O_2	Hydrogen peroxide
HNO_3	Nitric acid	XAD	Adsorbent resin

5.0 SAMPLE HANDLING, TRACEABILITY, AND HOLDING TIMES

Sample custody procedures for this program are based on EPA recommended procedures.[1] The custody procedures emphasize careful documentation of sample collection and field analytical data and the use of chain-of-custody records for samples being transported.

5.1 Field Sampling Operations

The Stack Sampling Coordinator will be responsible for ensuring that the proper custody and documentation procedures are followed for the field sampling efforts. Key sampling personnel involved in sample recovery will assist them in this effort.

Samples will be collected, transported, and stored in clean containers that are constructed of materials inert to the analytical matrix. Only containers that allow airtight seals, such as those with Teflon-lined lids, will be used. Opaque containers, such as amber glass jars, will be employed when containers are needed to inhibit photochemical reactions.

All sampling data, including information regarding sampling times, locations, and any specific considerations associated with sample acquisition, will be recorded on pre-formatted data sheets or on the appropriate chain-of-custody form.

Following sample collection, all samples that will be analyzed or archived will be given a unique alphanumeric sample identification code with indelible ink. Actual sample codes could vary slightly depending on sample location and type. Chain-of-custody forms will be maintained for all samples that will be analyzed or archived.

The Trial Burn Coordinator and the Stack Sampling Coordinator will maintain a daily activity log. These will be informal logs used to record various types of information, such as minor problems which arise, sketches of sampling locations, names, and phone numbers of key contacts, and daily activity summaries.

5.2 Chain-of-Custody Procedures

The history of each sample and its handling will be documented from its collection through all transfers of custody until it is transferred to an analytical laboratory. The laboratory will then maintain internal custody according to the laboratory's QC program.

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[1] *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, Stationary Source-Specific Methods (EPA-600/R-94/038c, September 1994*).

A sample will be considered to be in a person's custody if one of the following applies:

- It is in one's actual physical possession.
- It is in one's view, after being in one's physical possession.
- It is in one's physical possession and locked or otherwise sealed so tampering will be evident.
- It is kept in a secure area, restricted to authorized personnel only.

In order to maintain and document sample possession, the following chain-of-custody procedure shall be implemented.

5.2.1 Field Custody Procedures

The Laboratory Analysis Coordinator will be personally responsible for the care and custody of the samples collected until they are properly transferred or dispatched. Sample labels shall be completed for each sample that will be analyzed or archived using waterproof ink. Any deviation will be documented in a logbook notation.

The Trial Burn Coordinator, through communication with the QA Manager, will determine whether proper custody procedures were followed during the field work and will decide if analyses of additional samples are required.

5.2.2 Transfer of Custody and Shipment

A chain-of-custody form, such as that shown in Figure I-5-1, will accompany all samples that will be analyzed or archived. The actual chain-of-custody form(s) may differ in format from the one shown in Figure I-5-1, but the same essential information will be present. When transferring the possession of samples, the individuals relinquishing and receiving the samples will sign, date and note the time on the record. This record will document sample custody transfer from the sampler, often through another person, to the laboratory.

Samples will be packaged for transportation from the field to the laboratory in appropriate packaging to prevent leakage or breakage. Samples requiring cold storage will be placed on ice for transport. Sample transport boxes will always be secured except when in use. Vans containing equipment and samples will be locked whenever they are left unattended.

Chain-of-Custody

Project Number		Plant, Location, Building	
Samples Prepared by:		Sampling Location	

Sample ID	Sample Description	Container	Analysis	Preservation	Sampling Technique	Sampling Date & Time*	Comments
						Date: Time*:	
						Date: Time*:	
						Date: Time*:	
						Date: Time*:	
						Date: Time*:	
						Date: Time*:	
						Date: Time*:	

Received by:	Date:	Time*:
Received by:	Date:	Time*:
Received by:	Date:	Time*:
Received by:	Date:	Time*:

* Use military time

To be filled out by the receiving lab sample custodian:

Were all samples in good condition upon receipt? Y N

If not, please note which sample(s) and describe condition of sample(s).

Figure I-5-1

Example Chain-of-Custody Form

The original chain-of-custody record will accompany the samples in each shipment box and the Laboratory Analysis Coordinator or their designee will retain a copy in a secure location. These records will be included in the final report along with the completed analytical results and raw data.

5.3 Sample Holding Times

Table I-5-1 outlines the types of samples to be collected for the testing program, the applicable sample matrix, sample container to be used, preservation technique, and holding times before extraction and/or analysis. The holding times indicated on Table I-5-1 begin on the day of sample collection.

Sample preservation information will be included on the chain-of-custody form and laboratory receipt procedures will include temperature measurement for samples requiring preservation with ice.

Table I-5-1
Summary of Sample Containers, Preservation, and Holding Times

Sample Matrix	Parameter	Sampling/Analysis Methods [a]	Container(s)	Preservation	Allowable Holding Time
Stack Gas	Particulate Matter	EPA Method 5	Polyethylene petri dish, w/ 1" Teflon tape Glass bottle, 1-L, w/Teflon lined screw cap	None	N/A
	HCl/Cl_2	EPA Method 26A	Polyethylene bottle, 500 mL and 1 L, w/leak free screw cap	None	28 days
	Metals	EPA Method 29	Polyethylene petri dish, w/ 1" Teflon tape Polyethylene bottle, 500 mL and 1 L, w/leak free screw cap	None	6 months
	PCDDs/PCDFs	EPA Method 23	Filter: sealed filter holder, wide-mouth amber glass jar with PTFE-lined cap, or glass petri dish sealed with PTFE tape Amber glass bottle, 500-mL or 1-L, w/ leak free PTFE-lined caps Adsorbent module: ends covered with fitting caps and PTFE tape	Field/Shipping: ≤ 20 ºC (68 ºF); Remove from light Laboratory: Store ≤ 6 ºC (43 ºF); Remove from light; Extract and Archive can be kept at room temperature	One year
	Diphenylamine (POHC)	SW-846 Method 0010/ SW-846 Method 8270	Filter: glass petri dish sealed with PTFE tape Chemically resistant borosilicate amber glass, 1-L, w/Teflon lined screw cap or crimp cap Aluminum foil for sorbent module	Ship particulate filters unrefrigerated; Ship liquid samples upright on ice	7 days to extraction, 40 days to analysis

Notes:

[a] The analytical method listed or an equivalent method will be used.

6.0 CALIBRATION PROCEDURES AND FREQUENCY

Calibration is the process of determining the correctness of the assigned values of the physical standards or the scales of the measuring instruments. Instruments used for measurements must be calibrated frequently in order to minimize bias in the measurement. Reference methods listed in this QAPP that are to be used for testing and analysis give calibration specifications for instrumentation. These requirements are listed in the following sections. Additionally, each laboratory will meet or exceed the calibration requirements for the methods they are using and for which their accreditation to TNI is required by the TCEQ to demonstrate compliance.

6.1 Sampling Equipment

All sampling equipment is calibrated according to the criteria specified in the reference method being employed. Dry gas meters, orifices, nozzles, and pitot tubes are calibrated in accordance with these documents. The range of calibration is specified for all environmental measurements to encompass the range of probable experimental values. This approach ensures that all results are based on interpolative analyses rather than extrapolative analyses. Calibrations are designed to include, where practical, at least four measurement points evenly spaced over the range. This practice minimizes the probability that false assumptions of calibration linearity will be made. In addition, it is common practice to select, when practical, at least one calibration value that approximates the levels anticipated in the actual measurement.

Typically, calibration frequency is dictated by the need to demonstrate the stability of the calibration value over the course of the measurements. Calibrations are made both pre-test 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 according to the procedures outlined in this section.

New instruments or 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.

Calibrations are conducted in a manner and at a frequency that meets or exceeds U.S. EPA specifications. Calibration procedures outlined in the EPA Methods and those recommended within the *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III,*

Stationary Source-Specific Methods (EPA-600/R-94/038c, September 1994) will be followed. When these methods are inapplicable, methods such as those prescribed by the American Society for Testing Materials (ASTM) will be used. Data obtained during calibrations are recorded on standardized forms, which are checked for completeness and accuracy by the QA Manager.

Data reduction and subsequent calculations are checked at least twice for accuracy. Copies of calibration forms are included in the test or project reports.

Emissions sampling equipment that requires calibration includes pitot tubes, pressure gauges, thermometers, dry gas meters, and barometers. Table I-6-1 gives calibration requirements for sampling equipment that will be used in the Trial Burn. The following sections elaborate on the calibration procedures followed for these items of equipment.

6.1.1 Pitot Tubes

All Type S pitot tubes are inspected in accordance with the geometry standards contained in EPA Method 2. If the pitot tube does not conform to the geometric specifications outlined in EPA Method 2, it will not be used for testing. Once the geometric specifications are confirmed, a baseline coefficient of 0.84 will be assigned to the pitot tube. In order to ensure that the baseline coefficient is valid, the pitot tube assembly will be configured to eliminate aerodynamic interference effects as described in EPA Method 2.

Each pitot tube is inspected visually upon return from the field. If a cursory inspection indicates damage or raises doubt that the pitot remains in accordance with the EPA geometry standards, the pitot tube is first calibrated, then repaired, and recalibrated.

6.1.2 Differential Pressure Gauges

Meter consoles used by the stack sampling team are equipped with 10-inch water column (in w.c.) inclined-vertical manometers. Fluid manometers do not require calibration other than leak-checks. Pitot tubes and manometers are leak-checked before and after each run in the field.

6.1.3 Digital Temperature Indicator

One digital temperature indicator is used to determine the flue gas, probe, oven, train, and dry gas meter temperatures. The digital temperature indicator is calibrated with the use of a signal generator, simulating temperature signals over a range of 32 to 600 °F. The calibration is acceptable if the agreement is within the value specified in Table I-6-1.

Table I-6-1
Sampling Equipment Calibration Requirements

Stack Gas Parameter	Quality Parameter	Method of Determination	Frequency	Criteria
Gas Flow	Pitot tube angle and dimensions	Measurements with a micrometer and an angle indicator	Pre-test	To specifications in EPA Method 2
	Stack gas digital temperature indicator	Calibrated with signal generator	Annually	Within 1.5% of reference temperature simulated
	Stack thermocouple/indicator	Checked against NIST traceable measurement at ambient temperature	Post-test	Within 2 °F
Isokinetic Sampling Trains	Dry gas meter	Calibrated against a reference wet test meter	Initially after purchase & semiannually	Y ± 0.02 from average ΔH@ ± 0.20 from average
		Calibrated at a single, intermediate orifice setting with vacuum at max from test	Post-test	Average value of calibration factor (Y) within 5% of pre-test
	Metering system	Leak check	Pre-test/post-test	Leak < 0.02 cfm
	Probe nozzle	Measurements with micrometer to nearest 0.001 inch	Pre-test	Maximum difference in high & low numbers within 0.004 inch
	Digital temperature indicators	Calibrated with signal generator	Annually	Within 1.5% of reference temperature simulated
	Thermocouple/indicators	Checked against NIST traceable measurement at ambient temperature	Post-test	Within 2 °F
	Analytical balance	Checked vs. standard weights	Day of use	Within 0.5 mg
	Top-loading balance	Checked vs. standard weights	Day of use	Within 0.5 g

Notes:
NIST National Institute of Standards and Technology
cfm Cubic foot per minute
mg Milligram
g Gram

The thermocouple and digital temperature indicator combined system is checked at ambient temperature. The check is acceptable if the agreement with a NIST-traceable temperature measurement is within the value specified in Table I-6-1.

6.1.4 Dry Gas Meter and Orifice

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

Each metering system receives full calibration at the time of purchase and semiannually. During the full calibration, the meter calibration factor shall not vary by more than the value specified in Table I-6-1. In addition to the initial and semiannual full calibrations, a post-test calibration check is performed after each field use. If during this post-test calibration, the calibration factor (Y) deviates by less than 5 the value specified in Table I-6-1, the test data is acceptable. If Y deviates by more than the value specified in Table I-6-1, the meter is recalibrated and the calibration factor (initial or recalibrated) that yields the lowest sample volume for the test run 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 the value specified in Table I-6-1. Standard practice is to recalibrate the dry gas meter semiannually and check the calibration factor after each field use.

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

6.1.5 Barometer

A reference barometer is used for all stack calculations. This barometer reading is corrected for elevation as necessary.

6.2 Analytical Instruments

Calibration of the analytical instruments is conducted in accordance to the procedures outlined in the EPA publication SW-846 entitled, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition* and other applicable reference methods. Table I-6-2 gives a summary of the calibration requirements for analytical equipment that will be used for analysis of samples generated during the Trial Burn.

Table I-6-2
Analytical Instrument Calibration Requirements

Analytical Parameter	Quality Parameter	Method of Determination	Frequency	Criteria
Particulate Matter (EPA Method 5)	Electronic balance calibration	Calibrated against NIST Class S weights	Post-test	Within 0.5 mg
HCl/Cl_2 (EPA Method 26A)	Ion Chromatograph: Calibration	Development of calibration curve with calibration standards	Before and after injection of the quality control check sample, reagent blanks, and field samples	Duplicate injections should agree within 5% of their mean
Metals (EPA Method 29)	Inductively Coupled Argon Plasma Spectrometer Calibration	Calibrate instrument according to the manufacturer's procedures using prepared standards	Once per hour	Reproduce standard concentrations within 10% (if this is not achieved, perform the complete calibration procedures)
PCDDs/PCDFs (EPA Method 23)	HRGC/HRMS calibration - initial calibration			
	Mass resolution	Tune the HRMS instrument to a resolving power of at least 10,000 at 10% percent of the peak height or 25,000 at 50% percent of the peak height. Assess the resolution at three exact m/z's representing the low-, mid-, and high-m/z range of the masses used to measure the target compound class.	Not specified	Verify that the exact mass is within 5 ppm of the required value
	Initial calibration	Initial analysis of 5 concentrations (shown in Table 23-11 of Method 23)	Prior to sample analysis; Repeated if Continuing Calibration Verification (CCV) requirements are not met	RRF RSD ≤ the values shown in Table 23-14 of Method 23; Signal to noise ratio ≥ 10; Ion abundance ratio (see Table 23-15 of Method 23)

Notes:
IS – Internal Standard PD - Percent difference RRF - Relative response factor RSD - Relative standard deviation

Table I-6-2
Analytical Instrument Calibration Requirements (continued)

Analytical Parameter	Quality Parameter	Method of Determination	Frequency	Criteria
PCDDs/PCDFs (EPA Method 23)	Continuing Calibration Verification (CCV)	Prepare CCV standards at mid-level of the calibration (C3 level from Table 23-11).	At least once every 12 hours during an analysis sequence	Continuing Calibration RRF compared to Initial Calibration RRF ≤ the values shown in Table 23-14 of Method 23 Signal to noise ratio ≥ 10; Ion abundance ratio (see Table 23-15 of Method 23)
	Lock-Mass Ions	Monitor the QC check ions specified in Table 23-4 of Method 23 to verify instrument stability during the analysis	Daily	The QC check ions may not vary > 25% from the average response.
Diphenylamine (SW-846 Method 8270)	Instrument performance check	Inject 50 ng of decafluorotriphenylphosphine (DFTPP)	Before initial calibration	Must meet mass intensity criteria specified in method
	Initial calibration (ICAL)	5 points minimum for response factor (RF) and linear regressions (LR), 6 points minimum for quadratic regression (QR) >90% of reported target analytes meet ICAL criteria	Prior to sample analysis	Calibration standard must meet criteria in Table 6 of SW-846 Method 8270.
	Initial calibration verification (ICV)	Prepared from different source of target analytes than ICAL standards	Prior to sample analysis	Calculated concentrations of target analytes are ±30% of true value
	Continuing Calibration Verification (CCV)	>80% of target analytes meet CCV criteria	Once at least every 12 hours	Targets are ≤20% difference or drift; IS responses are within 50% to 200% of mid-point of ICAL or average of ICAL ISs; and retention times for ISs have not shifted >30 seconds relative to ICAL

Notes:
IS – Internal Standard PD - Percent difference RRF - Relative response factor RSD - Relative standard deviation

7.0 ANALYTICAL PROCEDURES

Table I-4-1 provides a summary of all sampling and analytical procedures to be used during the project. All of the analytical methods listed are common procedures and do not require additional definition or description. Each analytical method was selected based on matrix applicability, target analytes, detection limits, sample quantitation limits, interferences, and other factors specific to the Trial Burn.

8.0 DATA REDUCTION, VALIDATION, AND REPORTING

Data reduction, validation, and reporting will follow standard conventions and guidelines to ensure that all data used is of sufficient quality. Technical review of the field and laboratory data will be performed by the appropriate personnel with a final review performed by the QA Manager.

8.1 Field Data Reduction

Extreme care will be exercised to ensure that hand recorded data is written accurately and legibly. Additionally, the use of prepared and conveniently formatted data recording forms is an important aid to verify that all necessary data items are recorded. Errors or discrepancies will be noted in the field project logbook. Calculation worksheets will be used in the field to check on isokinetic sampling conditions and stack flow gas rates. The analyst and the Trial Burn Coordinator will review the collected field laboratory data. A list of validation qualifiers will be included, as appropriate, in the Trial Burn Report and/or appendices with the field/analytical data packages. Any pertinent information that may materially affect the results of the test will also be noted in the Trial Burn Report.

Data reduction follows guidelines published in EPA Reference Methods, where applicable and in guidance documents where EPA Reference Methods are not available. Computer programs will be used to calculate all reported values.

8.2 Laboratory Data Reduction

The reduction of data generated at the laboratory bench will be the responsibility of the analyst producing the data. The data manipulation required to calculate sample concentrations will be performed according to the methodology described in the specific analytical method or Standard Operating Procedure (SOP). After all of the analyses have been completed, a preliminary report will be generated for review by the QA Manager or designee to verify that the analyses were performed and interpreted properly and that all QA/QC criteria were met. Samples and analyses not meeting all QA/QC criteria will be evaluated on a case-by-case basis and appropriate corrective action, possibly including rework, will be taken as necessary. After review by the QA Manager or designee, the raw data will be filed by the individual responsible for the analyses and archived.

The QA Manager or an appointee will also review the data for adherence to the project's quality control objectives. Additionally, the data will be reviewed for the presence of outliers. An outlier is an unusually large (or small) value in a set of observations. Among the many possible reasons for outliers are:

- Faulty instruments or component parts
- Inaccurate reading of a record, dialing error, etc.
- Errors in transcribing data
- Calculation errors
- Statistical variation resulting from inherent random error

All real-time measurement analytical data will be recorded on laboratory preprinted bench summary sheets unless computer generated summaries are produced.

Electronic spreadsheet calculation routines will be used where applicable and result printouts will be attached to the bench summary sheet. The reported data will be verified by the QA Manager for completeness.

8.3 Blank Correction Procedures

If a blank correction procedure exists for a particular stack sampling method, that method will be used if determined necessary. If a blank correction procedure does not exist or contamination appears only in field blank samples, the following blank correction procedure may be used. The blank correction procedures are presented in Section 2.5.1 of the handbook, *Hazardous Waste Incineration Measurement Guidance Manual, Volume III of the Hazardous Waste Incineration Guidance Series.*[2]

- Assemble data for each organic compound from all of the field and trip blanks.
- Determine whether the field blanks are statistically different from the trip blanks by using the paired t-test.
- If the field blanks are significantly higher than the trip blanks, use the field blank data only. If the blanks are not significantly different, use all of the blank values. Higher field blanks indicate background due to field exposure, which trip blanks do not measure.
- Calculate the average and standard deviation of the blanks.
- Determine whether each measured sample value is different from the blank value by using the following test for each sample:

s = sample value (µg)
b = blank average + 3 x standard deviation of blanks (µg)

[2] (EPA/625/6-89/021, June 1989)

Where: µg = microgram

If "s" is greater than "b," then the sample is different from the blanks.

If the measured sample value is different from the blank value, then the blank correction procedure is applied as follows:

Blank corrected emission value (µg) = measured sample value (µg) – average blank value (µg).

Where: µg = microgram

If the measured sample value is not different from the blank value, then the measured sample is used as an upper bound emission value and the emission rate is considered less than (<) or equal to (=) the measured value. This results in the reporting of emission concentration and mass emissions rate with a (<) sign. Consequently, removal efficiencies would be reported with a greater than (>) sign.

8.4 Data Validation

Data validation is the process of filtering data and accepting or rejecting it based on sound criteria. Project coordinators and QC personnel will use validation methods and criteria appropriate to the type of data and the purpose of the measurement. The data from field sampling activities and from laboratory analyses will be reviewed for completeness and comparability. Field sampling data will be validated by the Trial Burn Coordinator based on their judgment of the representativeness of the sample, the maintenance and cleanliness of sampling equipment and the adherence to an approved, written sample collection procedure. A cursory review of the completed data sheets would indicate missing data necessary for accomplishing the objectives of the test. The Trial Burn Coordinator will review the field data and the calculated results. The Trial Burn Coordinator and the laboratory QA Manager will perform the same function for analytical data.

Records of all data will be maintained, even those judged to be of "outlying" or suspicious value. The person(s) validating the data will have sufficient knowledge of the technical work to identify questionable values.

All laboratory data (100%) will be validated according to the criteria discussed in this QAPP. The results from the field, laboratory method blanks, replicate samples, and internal QC samples

will be used to further validate analytical results. Analytical results on field blanks and replicate field samples are valuable for validation of sample collection as well.

The following criteria will be used to evaluate the field sampling data:

- Use of approved test procedures
- Proper operation of process being tested
- Use of properly operating and calibrated equipment
- Leak checks conducted before and after tests
- Use of reagents that have conformed to QC specified criteria
- Use of National Institute of Standards and Technology (NIST) – traceable CEM calibration gases
- Proper chain-of-custody maintained for all sample trains – check to ensure proper sample gas volume collected

The criteria listed below will be used to evaluate the analytical data:

- Use of approved analytical procedures
- Use of properly operating and calibrated instrumentation
- Acceptable results from analyses of QC samples
- Precision and accuracy achieved should be comparable to that achieved in previous analytical programs and consistent with objectives stated in Sections 1.0 and 3.0 of this QAPP

8.5 Data Reporting and Test Report Contents

The concentrations and emission rates for the compounds of interest will be presented in the final report in the units set forth by the analysis method and/or guidance documents. Copies of this report will be filed with ESD and will remain on file for a minimum of five years following conclusion of the Trial Burn.

Copies of the test report will be submitted to all parties after the Trial Burn has been completed. Results reported will include, but will not be limited to, emission rates and/or concentrations of particulates and gaseous pollutants, the dilution factors, the method detection limits or estimated quantitation limits where appropriate, and any other type of data that is required. This report will also include a list of all personnel present during testing, summary of results, descriptions of test procedures used, a description of the source and its operation during testing, test location drawings, example calculations, raw field data, equipment calibrations, and QA/QC results. The

report will include information and supporting documentation needed to demonstrate that the data gathered during the Trial Burn is of sufficient quality to serve as the basis for demonstration of system compliance with the emission limits.

9.0 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

Internal quality control procedures are routine internal operations for assuring that the data output of a measurement system meets prescribed criteria for data quality. Quality control checks will be performed to ensure the collection of representative samples and the generation of valid analytical results for these samples. Section 3.0 specified the QA objectives; this section describes how these specifications will be met. These checks will be performed by project participants throughout the program, under the guidance of the participant's respective QC Coordinators.

Checks for the process data collection and sampling aspects of this program will include, but will not be limited to, the following:

- Use of standardized field data sheets to ensure accuracy and completeness, traceability, and comparability of the process information and samples collected
- Field checking of standardized forms by a second person to ensure accuracy and completeness
- Strict adherence to the sample traceability procedures outlined in Section 5.0 of this plan
- Submission of field blanks, as required by the method
- Leak checks of sample trains before and after sample collection, as required by the method

9.1 Sampling Equipment Operational QC Checks and Frequency

Calibration of the field sampling equipment will be performed prior to and at the conclusion of the field sampling effort. Copies of the calibration sheets will be available during testing for reference, and will be placed into the project file for the permanent testing record. Calibration will be performed as described in the EPA publication *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, Stationary Source-Specific Methods (EPA-600/R-94/038c, September 1994*), and in the procedures of the *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, Third Edition*. Section 8.0 presents the acceptance limits for calibrations.

Specific pretest QC checks for the sampling trains include:

- All sampling equipment will be maintained and calibrated according to the procedures described in EPA's Quality Assurance Handbook and the respective method.
- All filters will be visually inspected for irregularities and flaws, or pinhole leaks.

- The filters will be placed in the shipping containers and will remain in these containers at all times, except during sampling and weighing.
- All glassware will be cleaned according to the procedures described in the respective method.
- All glassware openings where contamination could occur will be covered and will remain covered until the sampling train is assembled.
- A leak check of the pitot lines will be conducted according to Method 2.
- All openings on the train where contamination could occur will be covered with Teflon film or aluminum foil until just prior to assembly or until sampling is about to begin.
- All containers to be used during the sampling and recovery efforts will be stored in clean places, free from uncontrolled dust and other sources of contamination.
- After placed in the filter holder, the filter will be visually inspected for tears.
- The sampling train will be visually inspected for proper assembly.
- A pre-test leak check will be performed, as required by the method.

During sampling:

- Prior to insertion of the train, the access ports will be cleaned to eliminate the chance of sampling deposited material.
- The filter and probe heating system temperatures will be checked to ensure that they are operating at the specified temperature.
- The pitot tube and probe will be checked to ensure that they are properly positioned.
- An isokinetic sampling rate of 90-110% will be maintained.
- A temperature around the filter of 120 ± 14 °C will be maintained.
- A gas temperature at the condenser/silica gel outlet will be maintained below 20 °C.
- Periodic checks will be made on the manometer level and zero during testing, as these may drift due to vibrations and temperature changes.
- Periodic checks will be made of the pH in the first sodium hydroxide impinger in the Method 5/26A train. The solution will be changed if it is below 10.
- Leak checks will be conducted before and after each port change, as required by the method.

After testing:

- A post-test leak check will be performed on the sampling train.
- A post-test leak check will be performed on the pitot lines.

- The sampling train, including the nozzle and pitot tubes, will be inspected for visual defects.

The following QC checks for the volumetric air flow rate determinations will be emphasized:

Flue Gas Velocity: Data required to determine the flue gas velocity will be collected using the methodology specified in EPA Method 2. Quality control procedures are as follows:

- Visually inspect the Type S pitot tube before and after sampling.
- Leak-check both legs of the pitot tube before and after sampling.
- Verify the location of the sampling traverse point before taking measurements.

Flue Gas Molecular Weight: Samples to be used for determination of flue gas molecular weight will be collected using the sampling technique specified in EPA Method 3A. Quality control will focus on the following procedures:

- A constant sampling rate will be used in withdrawing a sample.
- The sampling train will be purged prior to sample collection.
- The sampling port will be properly sealed to prevent air in-leakage.

Moisture Content: The moisture content of the gas stream will be determined using the technique specified in EPA Method 4. The following QC checks will be performed:

- The sampling train will be leak-checked before and after each run.
- Ice will be maintained in the ice bath throughout each run.

9.2 Sample Collection QC Checks and Frequency

Field blanks of reagents and collection media (deionized water, filters, impinger solutions, rinse solutions, etc.) will be placed in appropriately cleaned and sized sample containers in the field and handled in the same way as actual field samples to provide a QC check on sample handling.

For the test program, sample collection QC checks and frequency for blank samples to be collected are listed below:[3]

[3] NOTE: Not all blanks are to be analyzed.

- Field blanks will be generated and analyzed for appropriate trains.
- Laboratory blanks will be generated according to method protocol.
- Reagent blanks will be analyzed according to method protocol.

Laboratory method blanks will also be used with the gas sample methods that use absorption or adsorption media. Procedures for blank correction are discussed in Section 8.3.

9.3 Analytical Quality Control Checks

Laboratory analysis methods make use of a number of different types of QC checks to ensure the validity of the generated data. All QC activities are documented as part of the analysis data. Table I-9-1 summarizes the QC checks to be performed during each analysis as part of the test program. Some are detailed below.

9.3.1 Laboratory Quality Control Samples and Blanks

Method Blanks: Method blanks contain all of the reagents used in the preparation and analysis of samples and are processed through the entire analytical scheme to assess spurious contamination arising from reagents, glassware, and other materials used in the analysis.

Calibration Blank: The standard used for calibration that is void of all analytes. This standard is periodically used to check for carryover contamination.

Calibration Check or Verification Sample: These are working calibration standards or a standard prepared from the same stock solutions as the calibration standards that are periodically used to check that the original calibration is still valid.

Laboratory Control Sample (LCS): These samples are prepared or purchased from an independent source than that used for the calibration standards. An LCS is used to establish that an instrument or procedure is in control. An LCS is normally carried through the entire sample preparation and analysis procedure. For Method 23, the results of the Method Blank fulfill the function of the LCS. Therefore, no separate LCS is required for Method 23.

Matrix Spike: This sample is prepared by spiking one sample in a batch with a known amount of analyte(s). Then the spiked sample is carried through the entire analytical process. Recovery of the spiked analyte is a measure of accuracy. For Method 23, the isotopically labeled compounds

Table I-9-1
Quality Control Validity Checks

Analytical Parameter	Quality Parameter	Method of Determination	Frequency	Criteria
HCl/Cl_2 (EPA Method 26A)	Quality Control Sample	Duplicate injections of a QC sample	Between injections of the appropriate series of calibration standards	Values from duplicate injections should agree within 5% of their mean
	Reagent Blanks	Duplicate injections of reagent blanks	Between injections of the appropriate series of calibration standards	Values from duplicate injections should agree within 5% of their mean
PCDD/ PCDF (EPA Method 23)	Accuracy and precision	Initial Demonstration of Capability (IDC)	Prior to analyzing field samples, then quarterly; Repeated if changes are made to analytical parameters not previously validated during the IDC	See Section 9.3 of Method 23, Table 23-18 of Method 23
	Laboratory Method Blanks (LMB)	LMBs are prepared in the laboratory. Follow all sample preparation and analysis steps for field samples.	An LMB must be extracted with every batch of samples. Analyze an LMB at least once during each analytical sequence or every 12 hours, whichever period is shorter.	Native target compound concentrations must be ≤ 3x EDL of the method or 10x lower than the quantitation limit required by HWC MACT, whichever is higher; Performance specifications in Table 23-7 of Method 23 must also be met.
	Field Train Proof Blank Assessment	A field train proof blank is prepared and assembled in the same manner as the field samples. Follow all sample preparation and analysis steps for field samples, including data reporting.	Conduct at least one field train proof blank for each test series.	Native target compound concentrations must be ≤ 3x EDL of the method or 10x lower than the quantitation limit required by HWC MACT, whichever is higher; Performance specifications in Table 23-7 of Method 23 must also be met.
Diphenylamine (SW-846 Method 8270)	Method blank	Analysis of a method blank	With each analytical batch; at reagent change	Results should be less than ½ the lower limit of quantitation or ≤ 10 % of concentration in field samples
	Precision	Analysis of a matrix spike and matrix spike duplicate	With each analytical batch	LCL
	Accuracy	Analysis of a LCS	With each analytical batch	50 - 150% Recovery, or LCL
	Accuracy	Addition of surrogates	With each blank, field sample, and QC sample	Laboratory- specific surrogate control limits

Notes:
EDL Estimated Detection Limit
IDC Initial Demonstration of Capability
LCS Laboratory control sample
LCL Laboratory Control Limit
LMB Laboratory Method Blank

in the pre-extraction standard constitute a matrix spike of the resin, so no additional matrix spike will be conducted.

Duplicate: This sample is prepared by analyzing another portion of a sample in the same batch. Both portions are carried through the entire analytical process. Comparison of the results through calculation of relative percent difference is a measure of method precision. Often, duplicate spiked samples are analyzed to gauge precision and accuracy of measurable concentrations.

9.3.2 Laboratory Data Evaluation

The relative percent difference and the percent of recovery of each applicable QC check will be calculated as noted in Section 11.0. All values that fall outside the QC limits for the analytical method will be noted. The following guidelines will be used:

- All recovery data are evaluated to determine if the QC limits are appropriate and if a problem may exist even though the limits are being achieved (e.g., one compound that is consistently barely within the lower limit).
- All recovery data that are outside the established limits are evaluated. The evaluation will include an independent check of the calculation.
- Corrective action will be performed based on the failure to meet the applicable method performance criteria.

The following general QC procedures will be incorporated into the analytical effort:

- A secondary review of the analytical data and QC data will be conducted for completeness and acceptability.
- Analytical QC data will be tabulated using the appropriate charts and forms.

All hard copy raw data (i.e., chromatograms, computer printouts, etc.) and all hard copy forms generated during the analytical process will be maintained in the project file. The results of these quality control procedures will be included in the final report.

10.0 PERFORMANCE AND SYSTEM AUDITS

EPA guidance recommends that at least one internal audit be conducted by the QA Manager or designee. These audits include performance and system audits of field and laboratory activities. Performance and system audits are routine elements of all QA/QC Programs and are used as independent checks on the quality of data obtained from sampling and analysis activities. Either type of audit may show the need for corrective action or invalidate test project data.

10.1 System Audits

System audits are qualitative evaluations of all components of field and laboratory quality control measurement systems. This determines if the measurement systems are being used appropriately. The audits may be carried out before all systems are operational, during the program, or after the completion of the program. Such audits typically involve a comparison of the activities given in the QAPP with those actually scheduled or performed.

System audits are always conducted by test team leaders prior to the start of each stack sampling project. These audits entail the use of equipment checklists, previously completed by the Stack Sampling Coordinator, to assure the inclusion of all materials and equipment necessary for the sampling task.

The laboratory staff conducts system audits of the laboratory on a regular basis and reports to the laboratory QA Manager, as conditions require.

Relative to the emissions sampling associated with this project, an on-site qualitative inspection and review of each sampling system will be performed by the Stack Sampling Coordinator.

The system audit will include observation and recording of the following activities:

- Sample train assembly and leak checks
- Post-test leak checks and sample train disassembly
- Sample recovery, labeling, and storage for shipment

10.2 Performance Audits

A performance audit is a procedure to analyze "blind" samples, the content of which is known, simultaneously with the analysis of test samples. The purpose of a performance audit is to check bias in the measurement of compounds or parameters in the test sample, i.e., to check whether the laboratory is measuring the right compound or parameter with an acceptable degree of

accuracy. Performance audits check data quality at the time of the analysis and they are specific to the equipment and personnel involved with the test.

In addition to system audits, performance audits (if applicable) of the laboratory are conducted by providing independent samples for analysis. Audit materials typically include materials available from the EPA or materials specially prepared by the QA Manager. Any applicable audit requested by the regulatory agencies will be performed.

11.0 CALCULATION OF DATA QUALITY INDICATORS

This section describes the procedures and equations that will be used to determine the precision, accuracy, and completeness of measured parameters. Additionally, the determination of method detection limits is also discussed.

11.1 Precision

When sufficient data is available, precision is determined through the analysis of replicate or replicate spiked samples and is expressed as relative percent difference (RPD), range percent (RP), or relative standard deviation (RSD). If the number of data points is less than four, precision is expressed as relative percent difference or range percent:

$$RPD \text{ or } RP = 100 \times (X_1 - X_2) / X$$

Where: X_1 = highest value
X_2 = lowest value
X = arithmetic mean

The following equations are used when four or more measurements are made:

$$RSD = 100 \times (s / X)$$

Where: s = standard deviation
X = arithmetic mean

Standard deviation will be determined as follows:

$$s = [(\sum x_i^2 - (\sum (x_i)^2/n)) / (n-1)]^{1/2}$$

Where: $x_i = i^{th}$ value of x (individual measurement)
n = number of measurements

11.2 Accuracy

Accuracy will be estimated from the analysis of matrix spiked samples and/or laboratory control samples, and will be expressed as a percent recovery or as relative error. The formulas to calculate the percent recovery and relative error are as follows:

$$\text{Percent recovery } (\%R) = 100 \times (\text{measured value} / \text{true value})$$

$$\%R = 100 \times [(\text{measured spike value} - \text{measured sample value}) / \text{spike value}]$$

$$\text{Relative error} = 100 \times (\text{measured value} - \text{true value}) / (\text{true value})$$

When the calculated percent recovery is used to correct the measured values for a batch of data, the following equation will be used:

$$\text{Corrected value} = 100 \times [\text{measured non-spiked value} / \text{percent recovery}]$$

11.3 Completeness

Completeness will be reported as the percentage of all measurements whose results are judged valid. The procedures to be used for validating data and for determining outliers are contained in Section 10.0 of this QAPP. The following formula will be used to estimate completeness:

$$C = 100 \times (V / T)$$

Where: C = percent completeness
V = number of measurements judged valid
T = total number of measurements

11.4 Method Detection Limit and Estimated Detection Limits

The method detection limit is verified periodically (e.g., annually) for analytical measurements by each laboratory using the statistical procedures given in 40 CFR 136, Appendix B. As mentioned in Section 3.3, no attempt will be made in this program to develop MDLs or reporting limits specific to this test program. The MDLs and reporting limits provided by the analytical laboratory will be noted in the analytical laboratory reports. The method detection limit (MDL) is defined as:

$$MDL = t_{(n-1,\ 1-\alpha = 0.99)} \times S$$

Where: S = standard deviation of the replicate analyses
$t_{(n-1,\ 1-\alpha = 0.99)}$ = student's t-value appropriate to a 99% confidence level and a standard deviation estimate with n-1 degrees of freedom

Estimated detection limits (EDLs) are calculated for each congener in each sample according to the formula (or an equivalent one) given in EPA Method 23. EDLs are used for Method 23 data instead of MDLs.

ESD will coordinate with the laboratories for all sample analyses to achieve the lowest detection limits for each analytical parameter. Specifically, the following information will provided in the laboratory reports.

(a) Information on how the detection limits were derived. If the detection limits were statistically derived, the laboratory will provide the statistical method used.

(b) Indicate whether the method detection limits (MDLs) were determined on the matrix (i.e., whether the laboratory added compounds to the specific sampling train component and then applied the preparation steps outlined in the specific analytical method).

(c) If the sampling train had associated condensate, the laboratory will indicate whether the condensate's laboratory-derived matrix-specific MDLs were for the condensate.

(d) The laboratory report will indicate whether the reported results and detection limits reflect sample-specific actions (i.e., splits of the sampling train, etc.).

(e) If sampling trains are being combined and/or analytical methods modified beyond approved methods listed in SW-846 or described within this QAPP, prior approval will be required from EPA Region 6 or TCEQ depending on the level of the modifications. Minor modification may be approved by TCEQ. Intermediate and minor modifications require approval from EPA Region 6.

12.0 PREVENTATIVE MAINTENANCE

Well-maintained equipment is a very important factor in assuring the quality and completeness of measurement data. Measurements conducted in the field are more sensitive to the degree of equipment maintenance than measurements conducted within a laboratory setting because the former are often performed in an uncontrolled dynamic environment.

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 *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, Stationary Source-Specific Methods (EPA-600/R-94/038c, September 1994*).

12.1 Sampling Equipment Inspection and Maintenance

Each item of field test equipment that is purchased 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, equipment is cleaned, repaired, reconditioned and recalibrated as necessary. Each item of equipment is also inspected again before being transported to the field to detect any equipment problems that may originate during periods of storage. This minimizes lost time during the sampling project due to equipment failure. Adequate spare equipment should be available in the event of failure. All inspection and maintenance records for sampling equipment are recorded in an inspection logbook.

12.2 Laboratory Analytical Instrument Maintenance

The policy of each laboratory is to follow the manufacturer's recommended schedule for maintenance and/or to have service contracts for all of its major instruments. These contracts provide for routine preventive maintenance as well as for repair service. The terms for each contract vary. Additionally, the laboratory maintains an inventory of expendable parts and supplies to minimize downtime and to allow laboratory personnel to make minor repairs as necessary. All maintenance and repair activities are recorded in instrument specific logbooks maintained in the individual laboratories.

13.0 CORRECTIVE ACTION

Any samples not collected according to the proper methods will be considered for invalidation. Any equipment found to be out of calibration or not operating properly will be repaired or replaced before additional measurements are made.

If weaknesses or problems become apparent during system or performance audits, corrective action will be initiated immediately. Examples of corrective actions that may be taken are recalibration of instruments using freshly prepared calibration standards and replacement of reagents that give unacceptable blank values.

Should performance audits indicate that any methods are out of control, the QA Manager and Trial Burn Coordinator will review the audit data and determine the appropriate action to be taken. Independent calibration checks will be used, if necessary, to resolve problems with an analytical system.

In all cases where standard procedures cannot resolve the problem, the QA Manager and the Trial Burn Coordinator will determine the appropriate action. The Trial Burn Coordinator has daily contact and detailed familiarity with the procedures. The QA Manager offers a broader background and more detached viewpoint. This combination helps in formulating quick and reliable solutions to various problems. The Trial Burn Coordinator will be responsible for initiating the action and the QA Manager will be responsible for determining if this action has resolved the problem.

Corrective action during the field sampling portion of a program is most often a result of equipment failure or an operator oversight and may require repeating a run. When equipment is discovered to be defective (i.e., pre-sampling and post-sampling leak check) it is repaired or replaced and a correction factor is established as per the appropriate EPA method. If a correction factor is unacceptable, the run is repeated. Operator oversight is best avoided by having field crew members audit each other's work before and after a test. Every effort is made by the Stack Sampling Coordinator to ensure that all QC procedures are followed. Economically, it is preferred to repeat a run during a particular field trip rather than to conduct further testing at a later date.

Corrective action for analytical work would include recalibration of instruments, reanalysis of known QC samples, and, if necessary, reanalysis of actual field samples. If the problem is not solved in this manner, more formalized long-term corrective action may be necessary.

The need for this action may be identified by standard QC procedures, control charts, and/or performance or system audits. Any quality problem that cannot be solved by immediate corrective action falls into the long-term category. The corrective action process for long-term problems involves reporting the problem to the responsible party, who is part of the closed-loop action and follow-up plan. The essential steps in the closed-loop corrective action process are:

- Identify and define the problem.
- Assign responsibility for investigating the problem.
- Investigate and determine the cause of the problem.
- Determine a corrective action to eliminate the problem.
- Assign and accept responsibility for implementing the corrective action.
- Establish an effectiveness measure of the corrective action and implement it.
- Verify that the corrective action has eliminated the problem.

Documentation of the problem is important to the corrective action process. A Corrective Action Form containing information similar to the example shown in Figure I-13-1 is filled out. This form identifies the problem, possible causes of the problem, and the person responsible for action on the problem. The responsible person may be an analyst, a field team leader, or the QA Manager. If no person is identified as responsible for action, the QA Manager investigates the situation and determines who is responsible for action in the particular case.

The Corrective Action Form includes a description of the corrective action planned and the day it was taken, as well as space for follow-up dates. The QA Manager checks that the initial action has been taken, that the action appears effective, and, at an appropriate later date, that the problem has been fully solved. The QA Manager receives a copy of all Corrective Action Forms and enters them in the Corrective Action Log. This permanent record aids the QA Manager in follow-up activities and makes any quality problems clearly visible to management. The log may also prove valuable in identifying solutions to similar problems in separate corrective action cases.

Corrective Action Form No.:

Originator:_____ Date: _____
Person Responsible for Replying: _____
Contract: _____
Description of problem and when identified: _____
_____
_____
_____

State cause of problem, if known or suspected: _____
_____
_____

Sequence of Corrective Action: (If no responsible person is identified, notify QA Manager immediately. Submit all CA forms to QA Manager for initial approval of CA.)

State Date, Person and Action Planned: _____
_____
_____
_____
_____
_____

CA Initially Approved By: _____ Date: _____

Follow up Dates: _____

Final CA Approved By: _____ Date: _____

Information copies to: Responsible Party/Department QA Manager:

QA Manager: _____
Department Manager: _____

Figure I-13-1
Example Corrective Action Form

14.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Quality assurance reporting and documentation are important elements of final project reports. Final stack sampling project reports contain sections that describe QA/QC activities and criteria relevant to the measurements reported, provide results from the application of these activities, and address the impact of these results on the measurements reported. The QA procedures used in this test program generate sufficient documentation to indicate data quality. The individuals responsible for QA reports are those referred to in Section 2.0. QA results will be included in the final Trial Burn Report. At a minimum the following QA results will be addressed in the final report:

- Percent recovery of matrix and/or surrogate spikes
- Blank analysis results
- Sampling and analysis equipment calibration
- Cylinder gas audits and on-site equipment audits
- Spike composition verification and recovery checks
- Changes or deviations from the QAPP
- Discussion of whether QA objectives were met and the resulting impact on decision making
- Corrective actions taken that affect the project's data quality

Management reviews all evidence of the execution of the QA guidelines. In addition, all aspects of the project are discussed during regular project meetings, including the QA of each task.

Emissions testing and laboratory groups participate in independent audit checks. Subcontracted laboratories will report the QC data as an inclusion to their data summary package.

ATTACHMENT 1

QUALITY ASSURANCE AND PERSONNEL QUALIFICATION INFORMATION

ALLIANCE SOURCE TESTING, LLC

CAREER SUMMARY

Mr. Barquero is an Operations Manager for the Dallas Regional Office for Alliance Technical Group, LLC(ATG). He has worked in the environmental field for over 7 years and provides technical support for source emission testing for industrial clients. Francisco is experienced in U.S. EPA Reference Test Methods used for instrumental testing as well as stack gas velocity, moisture, and a variety of isokinetic testing.

Education
B.S., Biology, University of Texas as Dallas, 2018

Professional Affiliations / Certifications
QI Certified in Group I & III

Joined Firm
2018

CORE SKILLS

- Conducting Instrumental Methods
- Conducting Isokinetic/Wet Chemistry Test Methods

PROFESSIONAL WORK SUMMARY

- Familiar with all EPA emissions testing methods, and has planned and executed flow and gas RATAs, Hg RATAs, VOC compliance, $CO/O_2/NOx$ acceptance, gas turbine startup/shutdown, and MATS particulate and HCl compliance testing.
- Experienced with mass-spectrometer based mercury concentration analysis for certifying Hg emissions limits at coal-fired boiler generating stations.
- Proficient in USEPA testing regulations, including 40 CFR Part 60 and Part 75.
- Proficient in requirements and procedures for the testing and analysis of Continuous Emission Monitoring Systems (CEMS) and Predictive Emissions Monitoring Systems (PEMS) in accordance with Title 30 of the Texas Administrative Code, Chapter 117.
- Experienced for source compliance testing and emission sampling methodologies for stack gas velocity, moisture, and a variety of isokinetic (wet chemistry/particulate) testing.
- Responsible for performing maintenance and calibrations on a variety of air testing equipment.

WORK EXPERIENCE

Alliance Technical Group, LLC (2020 - Present)
Position: Operations Manager

METCO Environmental (2018 - 2020)
Position: Environmental Scientist

CAREER SUMMARY

Mr. Rocha is a Regional Vice President of Stack Testing Operations for Alliance Technical Group, LLC. He has worked in the environmental and engineering fields for over 33 years. As Regional Vice President, Mr. Rocha is responsible for overseeing field testing for his respective offices. Because of his long work experience and association with hazardous waste combustion and government projects, Mr. Rocha leads the group as the Senior Technical Advisor for these projects and other specialty projects, such as PFAS testing. He is heavily involved is test planning, coordination, protocol, and report preparation. He is also involved in the field-testing activities where his knowledge of source testing is used to coordinate large scale projects.

Education

B.S., Chemistry & Biology, West Texas State University, Canyon, TX
1992

Certification

Source Evaluation Society (SES)
Safety Trained Supervisor

Joined Firm

2018

CORE SKILLS

- Source Testing Project Management
- Operations Management
- Perform multiple EPA Reference Test Methods
- Performed multiple NCASI Test Methods
- Performed multiple SW-846 Test Methods
- Performed multiple CARB Test Methods
- Perform Visual Emission Testing
- Perform and advise on OTM-45 and OTM-50 PFAS Testing

PROFESSIONAL WORK SUMMARY

- Regional Vice President, Alliance Technical Group (2020-Present)
- Senior Project Manager / Business Development Manager, METCO Environmental (2018-2020) – Responsible for leading the Business Development groups in Dallas, Houston, and Baton Rouge. Functioned as a lead and Senior Technical Advisor for large scale and complex testing programs, including government projects.
- Senior Project Manager / Source Testing Section Manager, URS Corporation/AECOM (2012-2018) – Responsible for leading the Source Testing Program in Austin, Texas. Duties included office and personnel management, Project Management, and industry consulting. Functioned as a lead and Senior Technical Advisor for large scale and complex testing programs, including government projects. Led test teams on various research projects directed by the oil and gas industry, utilities, and the DOE.
- Trial Burn Manager, URS Corporation (2001-2012) - Trial Burn Manager for the US Chemical Demilitarization Program from 2001 through 2012. Oversaw and managed compliance and performance testing for three HWC MACT incinerators at the Pine Bluff Chemical Agent Disposal Facility (PBCDF). Responsible for designing, planning, and managing sampling programs, managing subcontractors, review of sample analysis and data reduction, QA/QC, and reporting activities. In addition, functioned as a source testing subject matter expert at multiple demilitarization facilities across the country.
- Project Manager – METCO Environmental (1992-2001) – Broad background in environmental compliance and regulatory issues. Extensive experience designing and managing test programs to meet federal, state and local compliance demonstration requirements. Held office manager positions for offices in Baton Rouge, LA, Auburn, AL, and Houston, TX.

- Proficient in USEPA testing regulations, including 40 CFR Parts 60, 61, 63 and 75.
- Proficient in testing requirements and procedures for the testing and analysis of Continuous Emission Monitoring Systems (CEMS) in accordance with Title 30 of the Texas Administrative Code, Chapter 117.
- Participated in over 1,000 stack tests including hazardous waste incinerator trial burns, risk assessments, CEMS certifications, and compliance testing.

REPRESENTATIVE PROJECTS:

Pueblo Chemical Agent Destruction Pilot Plant, Pueblo, CO
(Chemical Stockpile Elimination Project)

Senior Technical Advisor of the Conditional Performance Tests on the Agent Filtration Area exhaust stack for Title V, Subpart EEE compliance. Assisted in pre-test planning, field execution, sample management and report summaries for multiple pollutants including hydrogen chloride, particulate matter, multi-metals, mercury sorbent traps, volatile organic compounds, dioxins and furans.

Anniston Army Depot Static Detonation Chamber, Anniston, AL
(Chemical Stockpile Elimination Project)

Project Manager for the Anniston Army Depot Static Detonation Chamber (SDC) Comprehensive Performance Test. Assisted in pre-test planning, field execution, sample management and report creation for multiple pollutants including hydrogen chloride, particulate matter, multi-metals, volatile organic compounds, semi-volatile organic compounds, total organic compounds (SW-846 Method 0040), energetics, PCBs, and dioxin and furans.

Pine Bluff Chemical Agent Disposal Facility, Pine Bluff, AR
(Chemical Stockpile Elimination Project)

Managed and coordinated all phases of the 11 Comprehensive Performance Tests conducted on the Deactivation Furnace System (DFS), Liquid Incinerator (LIC) and the Metal Parts Furnaces (MPF) for Title V and Subpart EEE compliance at the Pine Bluff Chemical Agent Disposal Facility (PBCDF). Assisted in pre-test planning, field execution, sample management and report creation for multiple pollutants including hydrogen chloride, particulate matter, multi-metals, volatile organic compounds, semi-volatile organic compounds, total organic compounds (SW-846 Method 0040), energetics, PCBs, and dioxin and furans. Coordinated munition processing during normal operations and during compliance testing. Provided engineering support as the lead engineer on the Pollution Abatement System for the DFS, LIC, and MPF. Participated in stretch assignments as the Plant Outage Manager on two occasions.

CAREER SUMMARY

Mr. Galloway is a Senior Project Manager for the Dallas Regional Office at Alliance Technical Group, LLC (ATG). He has worked in the environmental field for over 10 years and provides technical support for source emission testing for industrial clients. Robert is experienced in U.S. EPA Reference Test Methods used for instrumental testing as well as stack gas velocity, moisture and a variety of isokinetic testing.

Education
BS in Engineering Technology, West Texas A&M University, 2014

Professional Affiliations / Certifications
Source Evaluation Society (SES)
QSTI – Groups I & III

Joined Firm
2018

CORE SKILLS

- Conducting Instrumental Methods
- Conducting Isokinetic/Wet Chemistry Test Methods

PROFESSIONAL WORK SUMMARY

- Familiar with all EPA emissions testing methods, and has planned and executed flow and gas RATAs, Hg RATAs, VOC compliance, $CO/O_2/NOx$ acceptance, gas turbine startup/shutdown, and MATS particulate and HCl compliance testing.
- Experienced with mass-spectrometer based mercury concentration analysis for certifying Hg emissions limits at coal-fired boiler generating stations.
- Experienced in steam boiler inspection, testing, and analysis, particularly air heater testing. Experienced in data reduction and analysis relating to proper air heater operation.
- Experienced for source compliance testing and emission sampling methodologies for stack gas velocity, moisture, and a variety of isokinetic (wet chemistry/particulate) testing.
- Responsible for performing maintenance and calibrations on a variety of air testing equipment.
- Computer skills include: Microsoft© Office Suite

WORK EXPERIENCE

Alliance Technical Group, LLC (August 2018 – Present)
Position: Project Manager

Xcel Energy (February 2016 – February 2017)
Position: Emissions Testing Technician II

Xcel Energy (February 2015 – February 2016)
Position: Testing Technician II

Double U Marketing (July 2013 – February 2015)
Position: Videographer/Engineer/Drone Systems Manager

Texas Tech School of Medicine (January 2010 – July 2013)
Position: Library Associate

KAMR NBC4, KCIT Fox14, KCNP (February 2008 – January 2010)
Position: Commercial Director

KFDA NewsChannel 10 (July 1998 – February 2008)
Position: Commercial Producer/Chief Photographer/News Producer/Technical Director

Project Scientist II
Minimum Qualifications

Name: _____
Date Hired: _____
Location: _____

	PS 1 Initials	OM Initials	OE Initials
Experience, Performance & Training			
* Minimum 6 months Field Testing Experience	_____	_____	_____
* Completed Project Scientist 2 Internal Training	_____	_____	_____
* Follows Chain of Custody procedures at all times	_____	_____	_____
Safety and DOT Compliance			
* Successfully adheres to ***AST Health and Safety Program Manual***	_____	_____	_____
* Demonstrates ability to work safely in office	_____	_____	_____
* Demonstrates ability to work safely in field and lead toolbox meetings	_____	_____	_____
* No ***DOT Compliance*** Issues	_____	_____	_____
Timesheets and Expenses			
* Shows consistent ability to submit ***Timesheets Daily*** in Paycom	_____	_____	_____
* Shows consistent ability to correctly submit receipts for expenses	_____	_____	_____
* ***Sound Judgment to Minimize Expenses*** in field and office	_____	_____	_____
Lab Responsibilities			
* Verify equipment needed for a project on mobile lab prior to departure	_____	_____	_____
* Properly clean glassware, sampling equipment and mobile labs	_____	_____	_____
* Complete assigned task; pick up work area when task is complete	_____	_____	_____
* Efficient, unsupervised use of time in the office	_____	_____	_____
* Properly calibrate pitots, control modules and nozzles.	_____	_____	_____
Field Responsibilities			
* Able to perform successfully on stack platform with minimal assistance	_____	_____	_____
* Properly transport, set up and safely use pulley rope. Ties correct knots.	_____	_____	_____
* Always checks integrity of equipment before hooking onto a rope	_____	_____	_____
* Properly transport, set up and safely use monorails.	_____	_____	_____
* Demonstrates ability to properly assemble sampling trains on stack	_____	_____	_____
* Properly keeps sampling train iced down without oversight	_____	_____	_____
* Changes sampling ports correctly as trained to do so	_____	_____	_____
* Properly ***Isolates and Solves*** leaks and thermocouple issues	_____	_____	_____
* Able to make basic repairs to thermocouples and fittings	_____	_____	_____
* Proper static pressure, pitot traverse and cyclonic flow measurements	_____	_____	_____
* Marks traverse points correctly per Method 1 criteria and as trained	_____	_____	_____

Attestation

I attest that all of the above requirements for Project Supervisor II have been met and competency demonstrated.

_____
Project Scientist I Signature

_____
Operations Manager Signature

_____
Operations Excellence Signature

Project Scientist III
Minimum Qualifications

Name: _____
Date Hired: _____
Location: _____

	PS1 Initials	OM Initials	OE Initials
Experience, Performance & Training			
* Minimum 12 months Field Testing Experience			
* Completed Project Scientist III Internal Training			
* Completed Project Scientist III In-field Training			
(Service hours per DAS Tasks and/or OPEX coaching)			
* Reads and follows test protocol instructions for tasks assigned			
* Demonstrates ability to operate a meter box for both isokinetic and non-isokinetic tests with little or no supervision			
* Demonstrates ability to recover basic sample trains with little or no supervision			
* Demonstrates the ability to perform field QA and obtain weights properly with a field balance with little or no supervision			
* Demonstrates ability to download record data properly using the required templates with little or no supervision			
* Demonstrates ability to properly download/upload data to server with little or no supervision			
* Demonstrates ability to properly set up mobile lab for a CEMs project			
* Demonstrates ability to determine CEM analyzer ranges and pick appropriate calibration gasses based on the test protocol			
* Demonstrates ability to delegate tasks to PS1s, and follow up to make sure that they are completed			
Safety and DOT Compliance			
* Successfully adheres to **ATG Health and Safety Manual and policies**			
* All ELD logs are up to date, submitted with acceptable record keeping			
* Shows willingness to assist PS1s with using ELDs and proper recordkeeping			
* Good driving records with Alliance vehicles			
* Demonstrates ability to work safely in office			
* Demonstrates ability to work safely in the field and participate in toolbox and other safety meetings			
* Demonstrates ability to lead toolbox meetings			
* Demonstrates familiarity with the job hazard analysis process			
* Demonstrates ability to pick and use the proper PPE for the task at hand			
Timesheets and Expenses			
* Consistently meets expectations for timeliness for in-field projects and office work responsibilities			
* Shows consistent ability to submit time sheets on time without errors			
* Shows consistent ability to submit expense reports on a weekly schedule, appropriately coded without errors, and following Alliance expense policies			
* Uses **Sound Judgment to Minimize Expenses** in field and office			
* Shows willingness to assist PS1s with filling out time sheets and expense reports			
Lab and Warehouse Responsibilities			
* Maintains a clean and organized facility			
* Performs quarterly rope and extension cord inspections			
* Capable of performing minor repairs on sampling equipment and general equipment maintenance			
* Cleans and maintains trailers and vehicles in good condition			
* Supports Project Managers and Equipment Coordinators with mobilization and demobilization of project equipment while maintaining shop organizational functions			
* Properly cleans and prepares glassware prior to and in between projects			
* Consistently completes assigned tasks; picks up work area when task is complete			
* Demonstrates efficient, unsupervised use of time in the office			
* Capable of properly calibrating pitots, consoles/meter boxes, and nozzles			
* Shows willingness to direct and train PS1s in how to perform lab and warehouse duties			
Field Responsibilities			
* Demonstrates leadership on stack platform			
* Able to perform tasks successfully on stack platform with minimal assistance			
* Properly transport, set up, and safely use hand-over-hand and pulley ropes; Ties correct knots			
* Always checks integrity of equipment before hooking onto a rope			
* Properly transport, set up, and safely use monorails			
* Demonstrates ability to properly assemble sampling trains on stack			
* Demonstrates familiarity with operating CEMs analyzers and mobile laboratory			
* Demonstrates ability to train PS1s how to set up and sample trains			
Testing Methods, Knowledge, and Education			
* Proven practiced knowledge of isokinetic methods for particulate, condensable particulate, PM10/2.5, HCl, mutlimetals, mercury sampling, dioxan/furans, semivolatiles, Basic CEMs (performance specification 2), and non-isokinetic mini impinger methods.			
* Proven familiarity with or ability to research and perform advanced CEMs methods/RATAs (performance specs 1-4, 8, and 8A), and advanced wet chemistry methods (VOST, Tedlar bag methods, SUMMA can methods, Hexavalent chromium, Mercury RATAs, and non-sulfate particulate)			
* Demonstrates willingness to learn mobile lab, and CEMs methods and equipment operation			
* Demonstrates willingness to learn industrial process operations and how they affect the test program			
* Demonstrates willingness to learn how to interact with both clients and test observers			

Attestation
I attest that all of the above requirements for Project Scientist III have been met and competency demonstrated.

Project Scientist II Signature

Operations Manager Signature

Operations Excellence Signature

Project Manager I
Minimum Qualifications

Name: _____
Date Hired: _____
Location: _____

	PS3 Initials	OM Initials	OE Initials
Experience, Performance & Training			
* Minimum 18 months Field Testing Experience			
* Completed Project Manager I In-field Training (Service hours per DAS Tasks and/or OPEX/OM coaching)			
* Passed written Project Manager I exam			
* Is a QI in either group 1 or 3. If QI certifications is not achieved during the review process, then the candidate must receive approval from both the OM and RM to advance.			
* Maintains a professional attitude, behavior, and appearance.			
* Has successfully supervised at least 3 isokinetic projects			
* Has successfully supervised at least 3 CEMs projects			
* Has demonstrated the ability to properly collect and handle project data by having the 5 most recently supervised projects at (**100% On Server Date**)			
* Has demonstrated the ability to properly QC field data by showing zero **Data Quality** issues from the 5 most recently supervised projects			
* Has demonstrated the ability to proper handle and ship field samples and having all COCs for recently supervised projects submitted on time			
* Has had zero 40 CFR60 App. A Method 1 issues from recently supervised projects			
* Demonstrates the ability to read, understand, and follow test protocols			
* Demonstrates the ability to interact with OM and assigned Field Technical Specialist for a pre-job briefing			
* Demonstrates the ability to download, review, approve, and use the proper templates, COCs, and sample labels for projects			
* Demonstrates the ability to interact with clients and regulators			
* Demonstrates basic knowledge of industrial processes			
* Demonstrates the ability to interact with clients on logistical issues before arriving on jobsite			
* Demonstrates ability to review project data for accuracy and completeness			
* Demonstrates ability to delegate tasks to PS1s and PS2s, and follow up to make sure that they are completed			
Safety and DOT Compliance			
* Successfully adheres to **ATG Health and Safety Manual and policies** and ensures that team members under supervision also comply			
* Ensure that team members under supervision comply with all DOT requirements including proper ELD use			
* Has good driving records with Alliance vehicles with all ELD records up to date			
* Demonstrates ability to work safely in office			
* Demonstrates ability to work safely in the field and lead toolbox and other safety meetings			
* Has completed Hazard Awareness training assigned by Safety Department			
* Demonstrates the ability to lead the job hazard analysis process			
* Demonstrates ability to pick and use the proper PPE for the task at hand and ensure that team members are using it			
* Demonstrates the ability to interact with client to understand specific safety issues at their jobsite			
* Demonstrates the ability to instruct others on health and safety especially in the field			
Timesheets and Expenses			
* Consistently meets expectations for timeliness for in-field projects and office work responsibilities			
* Shows consistent ability to submit time sheets on time without errors			
* Shows consistent ability to submit expense reports on a weekly schedule, appropriately coded without errors and following Alliance expense policies			
* Uses **Sound Judgment to Minimize Expenses** in field and office			
* Ensures that field team members properly fill out and submit time sheets and expense reports			
Lab and Warehouse Responsibilities			
* Maintains a clean and organized facility			
* Demonstrates the ability to ensure that the equipment needed for the project is correct, has the proper calibrations, and is in proper working order			
* Demonstrates the ability to properly maintain and repair all sampling train components			
* Demonstrates the ability to evaluate and set up the CEMs and DAS for projects			
* Helps to ensure cylinder inventory			
* Demonstrates the ability to train PS1s and PS2s in lab and warehouse tasks			
* Properly cleans and prepares glassware prior to and in between projects			
* Consistently completes assigned tasks; picks up work area when task is complete			
* Demonstrates efficient, unsupervised use of time in the office			
* Capable of properly calibrating pitots, consoles/meter boxes, and nozzles			
Field Responsibilities			
* Follows the methodology in Part 60, Part 75, and specific test protocol for projects			
* Demonstrates effective and consistent leadership of field teams			
* Demonstrates the ability to complete the Daily Activities Summary			
* Demonstrates the ability to collect the proper preliminary data for isokinetic testing			
* Ensures that a cyclonic flow traverse is conducted on all projects that require flow rate measurement prior to testing			
* Demonstrates the ability to review all project preliminary data for accuracy and completeness, prior to submittal			
* Demonstrates ability to properly diagnose and solve sampling equipment issues			

* Demonstrates the ability to supervise sample collection, COC use and, shipment	____	____	____
* Demonstrates the ability to site and power up mobile laboratory			
* Demonstrates the ability to set up CEMs sampling system and diagnose field issues	____	____	____
* Demonstrates the ability to operate mobile laboratory without supervision	____	____	____
* Demonstrates the ability to effectively communicate and interact with clients, regulators, and filed team	____	____	____
* Demonstrates the ability to collect and upload required plant and process data for project	____	____	____
* Demonstrates the ability to train PS1s and PS2s in their proper field duties	____	____	____

Testing Methods, Knowledge, and Education

* Proven practiced knowledge of isokinetic methods for particulate, condensable particulate, PM10/2.5, HCl, multimetals, dioxan/furans, CEMs methods/RATAs (Part 75 and performance specs 1-4, 8, and 8A)	____	____	____
* Proven practiced knowledge of Quality Assurance Procedures for Performance Specifications (40CFR60 App. F)	____	____	____
* Demonstrates ability to study and correctly perform infrequently used test methods such as CTMs, OTMs, SW846, NIOSH, and NCASI, (Tedlar bag methods, SUMMA can methods, and non-isokinetic mini impinger methods)	____	____	____
* Demonstrates willingness to learn industrial process operations and how they affect the test program	____	____	____

Attestation

I attest that all of the above requirements for Project Manager I have been met and competency demonstrated.

Project Scientist III Signature

Operations Manager Signature

Operations Excellence Signature

Project Manager III
Minimum Qualifications

Name: _____
Date Hired: _____
Location: _____

	PS3 Initials	OM Initials	OE Initials
Experience, Performance & Training			
* Has managed at least 200 projects encompassing both wet chemistry and instrumental methods, including mutli source/mutli method types			
* Completed Project Manager III In-field Training (Service hours per DAS Tasks and/or OPEX/OM coaching)			
* Passed written Project Manager III exam			
* Is at a minimum, a QI in both groups 1, 3 and either 2 or 4. If QI certifications are not achieved during the review process, then the candidate must receive approval from both the OM and RM to advance.			
* Demonstrates the ability to establish and maintain effective client relationships			
* Demonstrates the ability to recognize a clients needs and recommend solutions			
* Demonstrates the ability to represent Alliance in interaction with clients and regulators			
* Demonstrates advanced knowledge of industrial processes, test method theory, and testing equipment			
* Demonstrates advanced knowledge of Federal and State regulations, and performance standards pertaining to emissions testing			
* Maintains a professional attitude, behavior and appearance, and ensures that Alliance is represented thusly			
* Demonstrates the ability to handle conflict in a professional manner			
* Demonstrates awareness of revenue/cost relationship and how it applies to projects			
* Demonstrates the ability to successfully complete projects on time and within budgets			
* Demonstrates the ability to use change orders and renegotiate budgets as test conditions change			
* Demonstrates the ability to assist OM with sales using the relationships developed as a PM			
* Demonstrates the ability to fill in for the OM when needed			
* Demonstrates the ability to ensure quality data collection			
* Demonstrates the ability to delegate tasks to PS1s, PS2s, and PS3s, and follow up to make sure that they are completed			
Safety and DOT Compliance			
* Successfully adheres to **ATG Health and Safety Manual and policies** and ensures that team members under supervision also comply			
* Ensure that team members under supervision comply with all DOT requirements including proper ELD use			
* Has good driving records with Alliance vehicles with all ELD records up to date			
* Demonstrates ability to work safely in office			
* Demonstrates ability to work safely in the field and lead toolbox and other safety meetings			
* Demonstrates the ability to lead the job hazard analysis process			
* Demonstrates ability to pick and use the proper PPE for the task at hand and ensure that team members are using it			
* Demonstrates the ability to interact with client to understand specific safety issues at their jobsite			
* Demonstrates the ability to perform field safety inspections			
* Demonstrates the ability to instruct others on health and safety especially in the field			
Timesheets and Expenses			
* Consistently meets expectations for timeliness for in-field projects and office work responsibilities			
* Shows consistent ability to submit time sheets on time without errors			
* Shows consistent ability to submit expense reports on a weekly schedule, appropriately coded without errors and following Alliance expense policies			
* Uses **Sound Judgment to Minimize Expenses** in field and office			
* Ensures that field team members properly fill out and submit time sheets and expense reports			
Lab and Warehouse Responsibilities			
* Maintains a clean and organized facility			
* Demonstrates the ability to keep personnel productive in the office, lab, and warehouse			
* Collaborates with Operations Excellence to provide standardized training of field personnel for test methods and procedures			
* Demonstrates the ability to ensure that the equipment needed for the project is correct, has the proper calibrations, and is in proper working order			
* Demonstrates the ability to properly supervise the maintenance and repair of all sampling train components, and to train PSs how to perform these actions			
* Demonstrates the ability to evaluate and set up the CEMs and DAS for projects, and to train PSs how to perform these actions			
* Helps to ensure cylinder inventory			
* Demonstrates the ability to train PSs in lab and warehouse tasks			
* Demonstrates the ability to train PSs in proper calibration of pitots, consoles/meter boxes, and nozzles			
Field Responsibilities			
* Demonstrates the ability to recognize potential testing issues and proactively address them			
* Demonstrates the ability to assist clients in negotiations with regulators as issues develop			
* Demonstrates the ability to recognize potential business opportunities and pursue them			
* Follows the methodology in Part 60, 63, Part 75 and specific test protocol for projects			
* Demonstrates the ability to prepare test team for the required scope of work			
* Demonstrates the ability to conduct site surveys			
* Demonstrates the ability to participate in pre-test client/regulatory meetings			
* Demonstrates effective and consistent leadership of field teams			
* Demonstrates the ability to effectively multi-task and delegate responsibilities in order to manage complex projects			
* Demonstrates the ability to update ATLAS with project information			
* Demonstrates the ability to complete the Daily Activities Summary			
* Demonstrates the ability to ensure that proper preliminary data is collected, sample systems are properly set up, and process is at test condition before turning pumps on			
* Ensures that a cyclonic flow traverse is conducted on all projects that require flow rate measurement prior to testing			
* Demonstrates the ability provide oversite of console and CEM operators			
* Demonstrates the ability to manage sample collection, COC use, and shipment			
* Demonstrates the ability to effectively communicate and interact with clients, regulators, and field team			
* Demonstrates the ability to collect and upload required plant and process data for project			
* Demonstrates the ability to perform field quality inspections			
* Demonstrates the ability to train PM1s, PM2, and PSs in their proper field duties			
* Demonstrates the ability to assist PS3s for promotion to PM1s through cross-training and working with guidance from Operations Excellence			

Testing Methods, Knowledge and Education

* Proven practiced knowledge of isokinetic methods for particulate, condensable particulate, PM10/2.5, HCl, mutlimetals, dioxan/furans, CEMs methods/RATAs (Part 75 and performance specs 1-4, 8, and 8A),	____	____	____
* Proven practiced knowledge of Quality Assurance Procedures for Performance Specifications (40CFR60 App. F)	____	____	____
* Demonstrates ability to study and correctly perform infrequently used test methods such as CTMs, OTMs, SW846, NIOSH, and NCASI, (Tedlar bag methods, SUMMA can methods, and non-isokinetic mini impinger methods).	____	____	____
* Demonstrates awareness of state-specific test methodology and ability to perform those tests	____	____	____
* Demonstrates the willingness to participate in professional conferences and organizations	____	____	____

Attestation

I attest that all of the above requirements for Project Manager III have been met and competency demonstrated.

Project Manager II Signature

Operations Manager Signature

Operations Excellence Signature

Management Approach

Alliance provides a fully integrated management structure designed to deliver technically precise data, efficient onsite execution, and timely, accurate reporting. Our model brings together multiple specialized business units that operate in seamless coordination, ensuring every aspect of your project benefits from the right expertise at the right time. Within each business unit, our professionals are highly trained and deeply focused on their area of specialization - yet they work collectively as one team, combining their strengths to produce the highest-quality source test data. With strategically positioned locations across the country, Alliance deploys resources quickly and efficiently to your sites, ensuring unmatched consistency, reliability, and service excellence.

Stack Testing Operations Manager – Francisco Barquero

Francisco Barquero, the Alliance Operations Manager located in Dallas, TX office will be the primary contact for the client for all projects. Mr. Barquero will oversee the Field Services portion of each project including pretest scheduling, onsite project coordination and communication. The Operations Lead also works directly with technical services, analytical services and quality management divisions to ensure all deliverables are met.

Technical Services Lead – Laura Aymett

Laura Aymett, the Alliance Senior Vice President-Technical Services, is an environmental manager with professional experience including environmental field testing, permit application preparation and compliance management system implementation. Ms. Aymett will manage the technical services portion of each project which includes field data template oversight, data quality review, protocol and report management and electronic data submittal.

Analytical Services Lead – Jordan Laster

Jordan Laster is the Senior Vice President of Analytical Services. Mr. Laster has worked in the environmental and analyzer technology field since 2007 and has experience in a variety of areas. Mr. Laster will be involved in confirming suitability of selected test methods and assisting with results interpretation. Additionally, he serves as Technical Director for our TNI accredited particulate laboratory.

Quality Lead – Kathleen Shonk

Katie Shonk, Senior Quality Manager, has worked in the environmental field for over ten (10) years and has experience in a variety of areas, including but not limited to, data review and reporting as well as regulatory interpretation and application. Ms. Shonk oversees the Alliance quality program which follows ASTM D7036 and maintains accreditation through the Louisiana Environmental Laboratory Accreditation Program (LELAP) program, the Texas Commission of Environmental Quality (TCEQ) program, and several other regional programs.

Safety Lead – Lisa Marriott-Smith

Lisa Marriott-Smith is Safety Manager who has worked in safety management for over fifteen (15) years and has experience in a variety of areas. Ms. Marriott-Smith manages Alliance's Safety Program and ensures that all personnel are adequately trained, provided with the necessary personal protective equipment (PPE) and prepared to conduct onsite testing in a safe manner.

Stack Testing Operations

Alliance executes stack testing through a proven, multi-step process designed to ensure accuracy, efficiency, and seamless delivery. Leveraging our **companywide scheduling system**, Alliance deploys technical resources, equipment, and personnel from the most effective regional office to meet project needs efficiently. For this engagement, resources will be provided through our **Dallas, TX** office. From project initiation to final reporting, each specialized role contributes expertise within a coordinated workflow that guarantees precision and quality.

Planning & Preparation

- Project Managers coordinate scheduling, manage client communication, and serve as the primary point of contact - ensuring scope, requirements, and deliverables remain aligned.
- Technical Services develops draft test protocols for client review and develops field data collection forms to ensure consistent and accurate data collection.

Mobilization & Execution

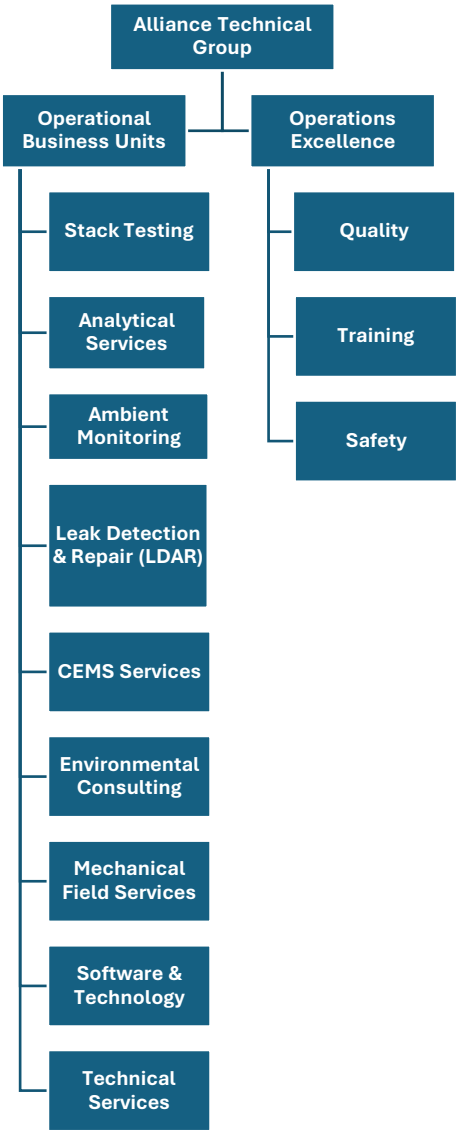
- Operations Managers oversee mobilization, verify equipment and supplies, and supervise readiness to ensure every detail is accounted for.
- Senior Project Managers lead the assigned field team, provide technical oversight, and ensure onsite testing is executed safely, efficiently, and in compliance with regulations.
- Operations Personnel complete equipment preparations, calibrations, and pre-test checks, guaranteeing field readiness and reliable execution.

Data Management & Reporting

- Technical Services and QA staff maintain continuous oversight throughout testing, validating data integrity and supporting quality assurance.
- Laboratory samples are transferred to Alliance's accredited laboratories for processing (if applicable). Lab results are integrated into the overall data set.
- Data is then reviewed, validated, and incorporated into draft and final reports.
- Technical Services develops final reports, ensuring timely delivery, accuracy, and future accessibility for analysis or compliance needs.

By combining this structured delivery process with seamless coordination across specialized roles, Alliance ensures every project is executed with the right resources, efficiency, and the highest quality results.

Alliance Operations Organizational Chart



Quality Plan

Alliance also maintains LELAP accreditation for stack testing services and holds LELAP, NELAP, TNI and NELAC accreditations for our in-house laboratory. We are dedicated to setting the standard for stack testing services. Alliance is committed to the quality requirements as documented in ASTM D-7036 and the most current Quality Assurance/Quality Control Management Plan (QA/QC MP). Alliance will meet or exceed the expectations of our clients by providing technically sound, scientifically valid and legally defensible emissions data. To accomplish this, we will work diligently to understand your needs; will prepare test programs that address those needs; will conduct test programs using appropriate measurement methods; and will prepare technical reports that clearly communicate test program results. We also work with our employees to create an environment of constant learning, including but not limited to, providing opportunities for continued education and strongly encouraging the pursuit of all applicable certifications.

The QA/QC MP is a part of a procedural framework designed to provide high quality source testing services for our clients. Other parts of the framework are Standard Operating Procedures (SOPs), standard test methods published by state, federal, and industrial organizations, manufacturer equipment and calibration manuals and other internally generated quality documents. The policies and procedures provided within this QA/QC MP are presented as minimum instruction to all testing personnel. All management, field and laboratory personnel employed are subject to the established policies and procedures within this QA/QC MP. This QA/QC MP is intended to serve the needs of employees, clients, quality accrediting and registering organizations and other entities that require knowledge of the quality system procedures and practices we have established. This QA/QC MP applies to work conducted in the field offices, warehouses, mobile laboratories and on the client site.

Corrective action identification and closure tracking is part of the QA/QC MP. The process of identifying, investigating, approving, implementing and validating measures to counter unacceptable deviations from policies and procedures or non-conformances which can affect data quality. Corrective actions are required to ensure that conditions adverse to quality, such as errors in or inappropriateness of reports, failures, malfunctions, deficiencies, deviations, defective material and equipment and nonconformance are promptly corrected. Non-conformance with policies and non-test procedures follow a root cause analysis and corrective action process. These non-conformances typically result from unacceptable data quality trends, deficiencies found by internal or external audits or compliance and management review. The QAM is responsible for evaluating and documenting the corrective action events, implement changes, monitoring corrective actions taken for effectiveness, tracking trends and ensuring the elimination of issues. Clients will be notified promptly, within thirty (30) business days at a minimum, in writing of any event that indicates results may have been affected.

EUROFINS KNOXVILLE

PERSONNEL RESUME

ANNA BARLOZHETSKAYA

Quality Assurance Manager

QUALIFICATIONS SUMMARY

Ms. Barlozhetskaya has worked in the environmental laboratory testing industry since 2007. She serves as the Quality Assurance Manager for Knoxville and is responsible for the development and management of the laboratory's quality assurance program. Her experience is in the operation of Gas Chromatograph/Mass Spectrum in order to quantify volatile contaminants in various organic and inorganic matrixes. Anna takes great pride and care that her work, and those under her supervision, complies with EPA regulations, Quality Assurance programs and Standard Operating procedures. Anna is very proactive. Over years she has cross-trained and helped in different analytical groups as the work load shifted. She is skilled with working under pressure and performing multiple tasks at once. She is also highly motivated and committed to delivering high quality testing and analysis.

PROFESSIONAL EXPERIENCE

QUALITY ASSURANCE MANAGER | *Eurofins Knoxville – 2024 to Present*

Responsible for assuring and improving quality within facility operations. Specific duties include:

- Recommending resolutions for ongoing or recurrent nonconformances within the laboratory.
- Supervising and providing guidance to laboratory QA staff.
- Suspending processing when quality requirements are not met.
- Performing QA assessments of the laboratory.
- Coordinating audit activities at the laboratory.
- Providing timely responses to audit findings and performance evaluation sample deficiencies through cooperative effort with facility operations representatives.
- Closing findings of QA audits.
- Providing training for the laboratory on issues pertaining to the QA program.
- Assisting in preparation of and approving Quality Assurance Project Plans.
- Maintaining certification and accreditation programs.
- Maintaining controlled quality documents.
- Preparing monthly quality reports to management.

GC/MS VOLATILES AND AIR GROUP LEADER | *Eurofins Knoxville – 2018 to 2024*

Primary responsibilities include supervising the production activities of the VOA analyses, along with TO14A & TO15 analyses. Responsible for maintenance of sensitive laboratory equipment and assets. Frequently manages a large backlog with short turnaround times. Responsible for the analyses of routine and non-routine GC/MS techniques. Also responsible for the review of analytical data and training new personnel. Has the knowledge of all duties within the group.

ANALYTICAL CHEMIST | *2007 to 2018*

Directly involved in preparation of the environmental samples according to scientific and EPA methodology in compliance with regulatory agencies. Fully proficient and certified in Fixed Gas, Helium, TO14A, TO15 and VOST air analysis. In addition to analysis of soil, waste and water by method 8260B. Other responsibilities include receipt of samples, followed by their screening and preparation for analysis. Cleaning, maintenance and calibration of the mass spectrometers and auto-samplers. Preparation of standards for initial calibration as well as daily calibration to ensure compliant data. Critical interpretation of the data, followed by its primary and secondary level review. Upload of the data into laboratory reporting system to generate data packages for delivery to the clients. Also involved in TO canister maintenance, cleaning, and their preparation for client use, along with other related sampling equipment. Frequently fills large air canister orders on short notice yet timely matter.

EDUCATION

- B.A. Biology – Maryville College, Maryville, TN (2007)
    - Minor in Chemistry and International studies

PERSONNEL RESUME

DAVID
STOUT
Organic Extractions /GC and Semivolatile Supervisor

QUALIFICATIONS SUMMARY

Mr. Stout is currently the organic extraction supervisor. He has worked in the environment testing field since 2007, and has extensive experience in extraction of various samples/matrices using EPA approved methods. He has also experience in many areas of the laboratory including extraction of PFAS, PCBs, dioxins and furans, semivolatiles, pesticides, halogens, sulfur, and heats of combustion from a variety of matrices, experience in TO-14 and TO-15 can cleaning procedures and shipping can orders to clients for field sampling from a variety of matrices and has several years of experience in Wet Chemistry, GC/HPLC and GCMS. Mr. Stout has a B.S. in Chemistry from University of Tennessee, Knoxville, TN.

PROFESSIONAL EXPERIENCE

ORGANIC EXTRACTIONS SUPERVISOR | *Eurofins Knoxville – 2022 to Present*

Responsibilities include:

- Supervision of extraction lab and sample receiving activities and personnel.
- Maintenance and improvement of productivity of the group by meeting deadlines.
- Preparation of spiking solutions used during the extraction of samples and the analytical standards used in the analysis of dioxins, furans and PCB's.
- Maintenance of the inventory of the dioxin extraction lab by ordering supplies.
- Assistance in the calculation and reviewing of GC/MS data.

GROUP LEADER, SEMIVOLATILE AND GC ANALYSIS | *2021 to Present*

Responsible for extractions for Isotope Dilution analysis of Per and Polyfluorinated Alkyl Substances (PFAS) based on methods 537 and 537.1(Modified) using LC/MS/MS. Standard analysis of semivolatile compounds by EPA SW-846- 8270C, 8270D, and TO-13 methodologies utilizing a gas chromatograph/mass spectrometry (GC/MS). Standard analysis of pesticide and PCB compounds by EPA 8081B, 8082A, TO-4, and TO-10 methodologies utilizing a gas chromatograph (GC).

GC, GC/MS ANALYST | *2014 to 2021*

Standard analysis of semivolatile compounds by EPA SW-846- 8270C, 8270D, and TO-13 methodologies utilizing a gas chromatograph/mass spectrometry (GC/MS). Standard analysis of pesticide and PCB compounds by EPA 8081B, 8082A, TO-4, and TO-10 methodologies utilizing a gas chromatograph (GC).

ORGANIC EXTRACTIONS ANALYST | *2008 to 2014*

Responsibilities include the extraction of soil, water, and other sample matrices, performing appropriate cleanups of sample extracts, training and supervising analysts performing extractions and cleanups, and reviewing and updating sample preparation procedures.

CHEMIST | *Galbraith Laboratories, Knoxville, TN – 2007 to 2008*
Responsibilities included the analyses of samples using several classical chemistry procedures such as colorimetric, volumetric, pH, GC/HPLC and GCMS.

RESEARCH ASSISTANT | *University of Tennessee, Knoxville, TN – 2005 to 2007*
Responsible for polymer synthesis including decomposing "polymers" into free radical monomers then recombined with other molecules to produce new polymers. Responsible for multivariate analysis involving the use of infrared, UV/visible spectrometry, NMR (PMR and CMR). Dataset resulting collected from these instruments were then used as applications to identify the relationships between the properties of chemical systems and to predict the new properties.

EDUCATION

- B.S., Chemistry, University of Tennessee, Knoxville, TN 2005-2006
- Attended Austin Peay State University, Clarksville, TN 2001-2004

PERSONNEL RESUME

Jon
Nordquist
SOG Analysis Supervisor

QUALIFICATIONS SUMMARY

Mr. Nordquist started his career in the environmental laboratory in 1988 and is currently the supervisor of the specialty organics analysis group. He is responsible for analyzing samples by HRGC/HRMS using EPA approved methodology. He also has a broad range of experience in various areas of the laboratory including analysis of VOA, BNA and has developed special non-routine analyses such as SIM-PAH (selected ion monitoring polyalkylated hydrocarbon), SPME (solid phase microextraction), and pesticides by EPA method 1699. Mr. Nordquist has a B.A., in Biology from the University of Tennessee, Knoxville, TN.

PROFESSIONAL EXPERIENCE

SPECIALTY ORGANICS MANAGER | *Eurofins Knoxville – 2022 to Present*
Mr. Nordquist supervises the production activities of the Specialty Organics Analysis Laboratory. Responsibilities include review of analytical data/reports, training new personnel in isotope dilution and high-resolution mass spectrometric methodologies. Responsible for the analyses of dioxins, pesticides and polychlorinated biphenyls (PCBs) using routine and non-routine high resolution GC/MS techniques and for the interpretation and reporting of the data. Also involved in non-routine special analytical projects utilizing HRMS systems.

CHEMIST, SPECIALTY ORGANICS GROUP | *Eurofins Knoxville – 2000 to 2022*
Responsible for the analysis of compounds by high resolution GCMS, the operation and maintenance of high resolution GCMS systems, interpretation of chromatographic and mass spectrometer data, data review, data reporting and sample tracking.

CHEMIST | *1988 to 2000*
Responsibilities include the planning and scheduling of samples in the GC/MS semivolatile laboratory, the training and supervision of analysts in the semivolatile laboratory, reviewing and interpreting data, recommending procedure changes, and semivolatile instrument maintenance and inventory.

RESEARCH CHEMIST | *University of Tennessee Center for Health Sciences, Knoxville, TN 1987 to 1988*

EDUCATION

- B.A., Biology, University of Tennessee, Knoxville, Tennessee (1988)

PERSONNEL RESUME

DAVID L.
WILES
Technical Director

QUALIFICATIONS SUMMARY

Mr. Wiles has been in the environmental laboratory industry since 1991, with extensive experience in volatile and semi-volatile organics analysis by GC/MS using EPA methods for samples of various matrices, and GC/MS data review. Specialty experience includes TO-14A/ TO-15, TO-13, and VOST analysis and review.

PROFESSIONAL EXPERIENCE

TECHNICAL DIRECTOR | *Eurofins Knoxville – 2017 to Present*

Provide technical support to operations. Troubleshooting method or process problems. Maintain in-house testing documentation. Method development. Process improvement for existing methods/ procedures. SOP review/editing for all groups. Data review checklist preparation/ revision.

PM Support. Consult with PMs regarding analytical techniques and capabilities, narrative issues, report issues, project setup. Investigate issues raised by clients, PMs, etc. to find root cause and implement corrective action and proper response.

QA Support. Maintain LODV/LOQV schedule – Create projects, monitor MDL schedule and login new jobs each month, monitor progress, prepare control charts, evaluate results (control charts and Denver software), modify spike levels and MDLs as needed. Provide input for corrective actions and QA findings. Audit support where needed. Provide guidance/input for QA procedures. Review training documentation. Back-up for TALS reference data.

TALS Operation Support. Maintain Decoder Ring. Maintain DRC→NCM (Autotext) system. Training for analysts Review NCM's for accuracy and presentation.

GC/MS DEPARTMENT MANAGER | *1998 to 2018*

Planning, scheduling and supervision. Reviews and interprets results. Recommends methods and/or operating procedure changes. Develops and reviews SOPs. Sets standards for and monitors productivity. Responsible for H&S and QC practices, controlling costs, instrumentation and upgrades, instrument maintenance/troubleshooting/repair and inventory. Provides training and support to other Eurofins facilities of Entech autosampler/concentrator for TO-15 analysis. Provide support for QA, EH&S, project management, operations manager and lab director. Communicate with clients and validators to ensure project success and resolve technical issues. Analyst training, coordinate cylinder standard purchasing and evaluation with other facilities. TO-15 labs to maintain ISO-17025 certification

CHEMIST II & III | *1994 to 1998*

Operate Finnigan INCOS 500 Quadrupole Mass Spec, GC/MS system maintenance, volatile organics analysis, data verification, and report generation using EPA/CLP protocols. Other duties include data archival, sample tracking, and sample storage

CHEMIST | *1993 to 1994*
GC/MS Operations Reporting Group using Finnigan FORMASTER version 3.3 database for EPA CLP 3/90 and 2/88, Appendix IX, SW846, 524.2, TCLP, 624, OLV01, OLM01, OLM01.8, and control charts. Implementing FORMASTER in the GC Pesticides/Herbicides department, and Metals department. Member of IT Health and Safety Council Committee. GC operator in Volatiles department analyzing soil, water, and TCLP extracts via EPA SW-846 methods 8010, 8015, and 8020; EPA methods 601 and 602. Tennessee DRO/GRO, Washington (State) DRO/GRO. Operated Varian GC 3400, 3600, 3700 and HP GC model 5890. All GCs were equipped with a Tekmar LSC 2000 & ALS 2016. Performed daily routine preventative maintenance on GCs, P&T systems and detectors, which include FID, PID, and HECD. Maintained rigorous QC program through SW-846 and I.T. SOP, including validation and MDL studies. Worked independently on second shift. Responsible for daily QC and recordings of all balances.

LABORATORY TECHNICIAN | *Technical Laboratories, Inc. – Chattanooga, TN – 1991 to 1993*
Operated Perkin Elmer GC models 900, 2000, 3920, and 8500 equipped with FID, ECD, TCD and GC/MS-Ion trap. Perkin Elmer Infrared Spectrophotometer models 727 and 599. Prepared, extracted and analyzed soil, air, water and oil for VOC, BTEX, pesticides, herbicides, PCB, hydrocarbons, base/neutral and acids, fire debris for accelerants, and transformer oils for combustible and noncombustible gases. Used EPA SW-846 8000 series methodology, EPA 500 and 600 series and 418.1. Experienced in non-routine special analysis. Used pyrolysis to identify unknowns. Also used Tekmar P&T. Experience in industrial hygiene/air monitoring for asbestos (via NIOSH 582), metals, total and respirable dust, and organics using Gillian personal air samplers. Used a phase-contrast microscope for asbestos analysis.

STUDENT TEACHER | *West Wilkes High School, North Wilkesboro, NC – Jan to March 1990*

EDUCATION

- B.S. in Mathematics, Minor in Physics – Appalachian State University (1990)
- Associate in Science – Wilkes Community College (1987)
- Chattanooga State Technical Community College (1993)
- Pellissippi State Community College (1996)

PROFESSIONAL TRAINING

- Skill Path Seminars
  - Managing Multiple Projects Objectives and Deadlines
  - Coaching and Teambuilding Skills for Managers and Supervisors
  - How to Become a Better Communicator
- Agilent's How-To and Economic Benefits of Fast Semivolatiles for GC/MS
- Restek's Comprehensive Capillary Gas Chromatography Seminar
- University of Tennessee 16-Hour DOT Hazardous Waste Generator Training (1997)
- University of Tennessee One-Day Industrial Waste Basics Workshop (1998)
- TestAmerica Training – Ethics, Leadership, H&S

PERSONNEL RESUME

Solana
Forrest-Bank
Wet Chemistry Supervisor

QUALIFICATIONS SUMMARY

Ms. Forrest-Bank is currently the Wet Chemistry supervisor. She has worked in the environment testing field since 2021. Her experience includes ion chromatography and several wet chemistry methods including ash content, water content and particulates. Ms. Forrest-Bank has a B.S. in Biology from Eckerd College, St. Petersburg, Florida.

PROFESSIONAL EXPERIENCE

WET CHEMISTRY SUPERVISOR | *Eurofins Knoxville – 8/2024 to Present*
Responsibilities include:

- Supervision of Wet Chemistry lab activities and personnel.
- Maintenance and improvement of productivity of the group by meeting deadlines.
- Preparation of spiking solutions used during the analysis of ion chromatography.
- Maintenance of the inventory of the dioxin extraction lab by ordering supplies.
- Assistance in the calculation and reviewing of Wet Chemistry data.

CHEMIST | *Eurofins Knoxville – 5/2022 to 8/2024*
Responsibilities included the analysis of samples using several wet chemistry procedures such as ash by D482, viscosity by D445, and particulates by Methods 5, 202, 201A, PM10, NIOSH0500, and CTM-039.

LAB TECHNICIAN CONTRACTOR | – *12/2021 to 5/2022*

Assisted in heat of combustion by D240 and prep for particulates methods.

EDUCATION

- B.S., Biology, Eckerd College, St. Petersburg, FL

The information contained herein is of a highly confidential and proprietary nature. Eurofins Environment Testing specifically prohibits the dissemination, copy, disclosure, transfer, or modification of this information without the express written approval of Eurofins Environment Testing NBLSC QA.

1) Title Page
2) Revision Log
3) Introduction, Scope and Applicability
   - 3.1) Introduction and Compliance References
   - 3.2) Terms and Definitions
   - 3.3) Scope / Fields of Testing
   - 3.4) Quality Manual Review Process
4) Management Requirements
   - 4.1) Overview
   - 4.2) Roles and Responsibilities
     - 4.2.1) Business Unit Manager (BUMA) / Lab Director (LD)
     - 4.2.2) Quality Assurance (QA) Manager or Designee
     - 4.2.3) Technical Manager or Designee
     - 4.2.4) Operations Manager
     - 4.2.5) Project Manager (PM)
     - 4.2.6) Department Supervisors
     - 4.2.7) Laboratory Analysts/Technicians
     - 4.2.8) Environmental Health and Safety Coordinator and Radiation Safety Officer
   - 4.3) Business Continuity and Contingency Plans
5) Personnel
   - 5.1) Overview
   - 5.2) Education and Experience Requirements for Technical Personnel
   - 5.3) Training
     - 5.3.1) Initial Demonstration of Capability (IDOC)
     - 5.3.2) Ongoing (Continuing) Demonstration of Capability (ODOC)
   - 5.4) Ethics and Data Integrity Training
6) Accommodations and Environmental Conditions
   - 6.1) Overview
   - 6.2) Environment
   - 6.3) Work Areas
   - 6.4) Responding to Emergencies
   - 6.5) Building Security
7) Quality System
   - 7.1) Quality Policy Statement
   - 7.2) Ethics and Data integrity
   - 7.3) Quality System Documentation
   - 7.4) Quality Control (QC) Objectives for the Measurement of Data
     - 7.4.1) Precision
     - 7.4.2) Accuracy
     - 7.4.3) Representativeness
     - 7.4.4) Comparability
     - 7.4.5) Completeness
     - 7.4.6) Selectivity
     - 7.4.7) Sensitivity
   - 7.5) Criteria for Quality Indicators
   - 7.6) Statistical Quality Control
     - 7.6.1) Quality Control Charts
   - 7.7) Quality System Metrics
   - 7.8) Management of Change
8) Document Control
   - 8.1) Overview
   - 8.2) Document Approval and Issuance
   - 8.3) Procedures for Document Control
   - 8.4) Obsolete Documents
9) Service to the Client
   - 9.1) Overview
   - 9.2) Project Review
     - 9.2.1) Project Specific Quality Planning
   - 9.3) Balancing Laboratory Capacity and Workload
   - 9.4) Project Contracts/Records
     - 9.4.1) Project-Specific Quality Planning

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9.5) Special Services
9.6) Client Communication
9.7) Reporting
9.8) Client Feedback and Surveys
9.9) Client Confidentiality
10) Subcontracting
10.1) Overview
10.2) Qualifying and Monitoring Subcontractors
10.3) Oversight and Reporting
10.4) Contingency Planning
10.5) Use of NELAP and A2LA Logo
11) Purchasing Services and Supplies
11.1) Overview
11.2) Glassware
11.3) Reagents, Standards, and Supplies
11.3.1) Purchasing
11.3.2) Receiving
11.3.3) Specifications
11.3.4) Storage
11.4) Purchase of Equipment / Instruments / Software
11.5) Service
11.6) Suppliers
11.6.1) New Vendor Procedure
12) Complaints
12.1) Overview
12.2) External Complaint Processing
12.2.3) Internal Complaints
12.2.4) Management Review
13) Control of Nonconforming Work
13.1) Overview
13.2) Responsibilities and Authorities
13.3) Evaluation of Significance and Actions Taken
13.4) Method Suspension / Restriction (Stop Work Procedures)
14) Corrective Action
14.1) Overview
14.2) General Processes
14.2.1) Non-Conformance Memo (NCM)
14.2.2) Corrective Actions Documented in the ICAT Database
14.3) Corrective Action Process Steps
14.3.1) Cause Analysis
14.3.2) Selection and Implementation of Corrective Actions
14.3.3) Root Cause
14.3.4) Monitoring of the Corrective Actions
14.3.5) Follow-Up Audits
14.4) Technical Data Corrective Actions
14.5) Corrections to Data/Records
15) Preventive Action / Improvement
15.1) Management of Change
16) Control of Records
16.1) Overview
16.2) Programs with Longer Retention Requirements
16.3) Technical and Analytical Records
16.4) Laboratory Support Activities
16.4.1) Sample Handling Records
16.5) Administrative Records
16.6) Records Management, Storage and Disposal
16.6.1) Transfer of Ownership
16.6.2) Records Disposal
17) Audits
17.1) Internal Audits
17.1.1) Annual Quality Systems Audit
17.1.2) QA Technical Audits
17.1.3) SOP Method Compliance
17.1.4) Special Audits
17.1.5) Performance Testing

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17.2) External Audits
17.3) Audit Findings
18) Management Reviews
18.1) Quality Metrics Report
18.2) Annual Management Review
18.3) Potential Integrity Related Managerial Reviews
19) Test Methods and Method Validation
19.1) Overview
19.2) Standard Operating Procedures (SOPs)
19.3) Laboratory Methods Manual
19.4) Selection of Methods
19.4.1) Sources of Methods
19.4.1.1) Client Supplied Methods
19.4.1.2) Procedural Deviations
19.4.2) Demonstration of Capability
19.4.3) Initial Demonstration of Capability (IDOC) Procedure
19.5) Laboratory Developed Methods and Non-Standard Methods
19.6) Validation of Methods
19.6.1) Method Validation and Verification Activities for All New Methods
19.7) Method Detection Limit (MDL) / Limits of Detection (LOD)
19.8) Verification of Detection Limits
19.9) Instrument Detection Limits (IDL)
19.10) Limit of Quantitation
19.11) Retention Time Windows
19.12) Evaluation of Selectivity
19.13) Estimation of Uncertainty of Measurement
19.14) Sample Reanalysis Guidelines
19.15) Control of Data
19.15.1) Computer and Electronic Data Related Requirements
19.15.2) Data Reduction
19.15.3) Logbook / Worksheet Use Guidelines
19.15.4) Review / Verification Procedures
19.15.5) Manual Integrations
20) Instruments, Equipment, and Calibration
20.1) Overview
20.2) Instrument/Equipment Maintenance
20.3) Support Equipment
20.3.1) Weights and Balances
20.3.2) pH, Conductivity, and Turbidity Meters
20.3.3) Temperature Measuring Devices
20.3.4) Refrigerators, Freezer, Water baths, Ovens and Incubators
20.3.5) Autopipettors, Dilutors, and Syringes
20.4) Instrument Calibration
20.4.1) Calibration Standards
20.4.1.1) Calibration Verification
20.4.1.2) Verification of Linear and Non-Linear Calibrations
20.5) Tentatively Identified Compounds (TICs) – GC/MS Analysis
20.6) GC/MS Tuning
21) Measurement Traceability
21.1) Overview
21.2) Reference Weights and Thermometers
21.3) Reference Standards, Materials, and Reagents
21.4) Documentation and Labeling of Standards, Reagents, and Reference Materials
22) Sampling
22.1) Overview
22.2) Sampling Containers
22.2.1) Preservatives
22.3) Definition of Holding Time
22.4) Sampling Containers, Preservation Requirements, Holding Times
22.5) Sample Aliquots / Subsampling
23) Sample Handling
23.1) Chain of Custody (COC)
23.1.1) Field Documentation
23.1.2) Legal / Evidentiary Chain-of-Custody
23.2) Sample Receipt

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23.2.1) Laboratory Receipt
23.3) Sample Acceptance Policy
23.4) Sample Storage
23.5) Hazardous Samples and Foreign Soils
23.6) Sample Shipping
23.7) Sample Disposal
23.8) Figure 23-1 Example: Sample Acceptance Policy
23.9) Figure 23-2. Example: Condition Upon Receipt Form
24) Assuring the Quality of Test Results
24.1) Overview
24.2) Controls
24.3) Negative Controls
24.4) Positive Controls
24.4.1) Method Performance Control - Laboratory Control Sample (LCS)
24.5) Sample Matrix Controls
24.6) Acceptance Criteria (Quality Control Limits)
24.7) Additional Procedures to Assure Quality Control
25) Reporting Results
25.1) Overview
25.2) Test Reports
25.3) Reporting Level or Report Type
25.4) Electronic Data Deliverable (EDD)
25.5) Supplemental Information
25.6) Environmental Testing Obtained From Subcontractors
25.7) Client Confidentiality
25.8) Format of Reports
25.9) Amendments to Test Reports
25.10) Policies on Client Requests for Amendments
25.10.1) Policy on Data Omissions or Reporting Limit Increases
25.10.2) Multiple Reports
26) Appendices
26.1) Appendix 1 - List of Governing Documents applicable to the QA Manual
26.2) Appendix 2 - Certification List
26.3) Appendix 3 - References
26.4) Appendix 4 - QA Manual Crosswalk with TNI and ISO/IEC 17025 Standards
26.5) Appendix 5 - Terms/Glossary and Acronyms (EL-V1M2 Sec. 3.1)
26.6) Appendix 6 - Analytical Methods and Matrices
26.7) Appendix 7- Example Data Qualifiers (Standard Flagging Suite)1

1) Title Page

Quality Assurance Manual

Eurofins Knoxville

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

Reviewed and Approved by:
Laboratory Director
Technical Director
Technical Director
Quality Assurance Manager
Health & Safety Coordinator
(as recorded in the electronic document control system)

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2) Revision Log

	Revision: 7	**Effective date:**
Section	**Justification**	**Changes**
Entire document	OH VAP program no longer exists	Removed all references to OH VAP
4.2.13	New manual ID	Updated Environmental Health and Safety Manual (*NDSC-US EHS-QP46060*).
Figure 4.1	New BUMA/Lab Director added and lab reorganized	Updated Knoxville Organization Chart
Throughout document	Knoxville should be converting to D4 for SOPs.	Added D4 SOP reference ID's
Appendix 1	Cross reference new terminology and old terminology	Added NDSC Document Identifications column
Appendix 2	Current certification listing	Updated Certification Listing
Entire document	Format change	put content into D4 format

3) Introduction, Scope and Applicability

3.1) Introduction and Compliance References

Eurofins Knoxville's Quality Assurance (QA) Manual is a document prepared to define the overall policies, organization objectives and functional responsibilities for maintaining the laboratory's QA Program. Governing SOPs are in place within the organization to ensure the proper execution of this QA Manual (refer to Appendix 1). This manual is required reading for all personnel. Supporting SOPs are assigned reading for relevant personnel.

The laboratory is a team of people who work together to serve the health and environmental needs of society through science and technology. We offer comprehensive expertise in environmental laboratory applications OR maintain a local perspective in its scope of services and client relations and maintain a national perspective in terms of quality.

As such, this QA Manual has been prepared to assure compliance with the applicable versions of The NELAC Institute (TNI) Standard; ISO/IEC Guide 17025; the Department of Defense (DoD)/Department of Energy (DOE) Quality Systems Manual (QSM). Policies and procedures listed in Appendix 1 are compliant with the Eurofins Environment Testing (EET) National Business Line Service Center (NBLSC) procedures; Eurofins Knoxville and the associated accreditation and certification programs held by the laboratory to support environmental work (Appendix 2). The QMP provides a summary of Eurofins quality and data integrity system. It contains requirements and general guidelines under which all Eurofins facilities shall conduct their operations.

Refer to Appendix 3 for a list of additional references for which this QA Manual is compliant; and Appendix 4 for the compliance crosswalk of this manual to the TNI & ISO/IEC Guide 17025 requirements.

3.2) Terms and Definitions

A Quality Management Program is a system designed to ensure that data produced by the laboratory conforms to the standards set by state and/or federal regulations. The program functions at the local management level through company goals, from guidance at the executive management level, and at the analytical level through Standard Operating Procedures (SOPs) and quality control. Our program is designed to minimize systematic error, encourage constructive, documented problem solving, and provide a framework for continuous improvement within the organization to better serve our clients.

Refer to Appendix 5 for a list of Terms and Acronyms.

3.3) Scope / Fields of Testing

The laboratory analyzes a broad range of environmental and industrial samples. Sample matrices include but are not limited to among air (source and ambient), drinking water, effluent water, groundwater, soils, sediment, biological, hazardous waste, and sludge. The QA Program contains specific procedures and methods to test samples of differing matrices for chemical, physical and biological parameters. The Program also contains guidelines on maintaining documentation of analytical processes, reviewing results, servicing clients and tracking samples through the laboratory. The technical and service requirements of all analytical requests are thoroughly evaluated before commitments are made to accept the work. Measurements are made using published reference methods or methods developed and validated by the laboratory.

The methods covered by this manual include the most frequently requested methodologies needed to provide analytical services in the United States and its territories. The specific list of test methods used by the laboratory can be found in Appendix 6. Our areas of expertise include:

Standard Services	Specialty Services
• Volatiles • Semivolatiles • Metals • Pesticides/PCBs • Waste Characterization • Non-Potable Water Testing • Drinking Water Testing • Soil and Surface Water Testing • Vapor and Air Analysis • Sediment and Tissue Testing • Method Development	• Dioxins & Furans • PCB Congeners • Pesticides • Alkyl PAHs • PFAS • Source Air Analysis including PFAS • Metals–Sequential Extraction Procedure

NOTE: All current certificates and scopes of accreditation are available on the Eurofins' website at https://www.eurofinsus.com/environment-testing/resources/certifications/.

The approach of this manual is to define the minimum level of quality assurance and quality control necessary to meet these requirements. All methods performed by the laboratory shall meet these criteria as appropriate. In some instances, quality assurance project plans (QAPPs), project specific data quality objectives (DQOs) or local regulations may require criteria other than those contained in this manual. In these cases, the laboratory will abide by the requested criteria following review and acceptance of the requirements by the Business Unit Manager (BUMA), and/or Laboratory Director (LD) and the Quality Assurance (QA) Manager. In some cases, QAPPs and DQOs may specify less stringent requirements. The BUMA, and/or LD and the QA Manager must determine if it is in the lab's best interest to follow the less stringent requirements.

3.4) Quality Manual Review Process

The template on which this manual is based is reviewed annually by the NBLSC Quality Assurance leadership team. NBLSC QA will assure that the template complies with Section 3.1.

This manual itself is reviewed annually by senior laboratory management to assure that it reflects current practices and meets the requirements of the laboratory's clients and regulators. Occasionally, the manual may need to be revised in order to meet new or changing regulations and operations. The QA Manager (or designee) will review the changes in the normal course of business and incorporate changes into revised sections of the document. All updates will be reviewed by the designated senior laboratory management staff. The laboratory updates and approves such changes in accordance with our Document Control processes.

4) Management Requirements

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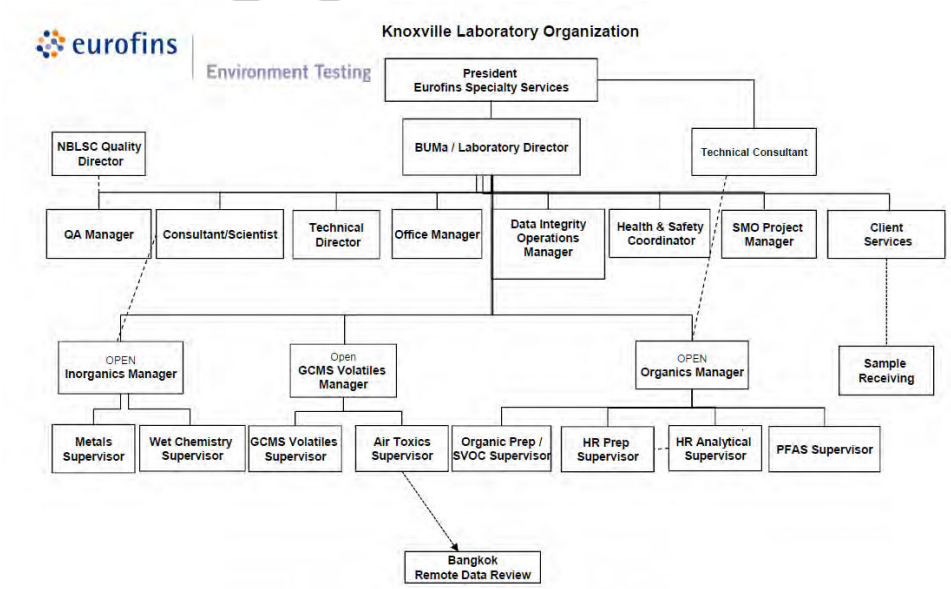
4.1) Overview

The laboratory is an independent business unit within the Eurofins Environment Testing group of companies. The laboratory's operational and support staff have the day-to-day independent operational authority under the direction of the Laboratory President and BUMA and/or LD and is supported by the NDSC QA team. The laboratory management staff includes directors, managers and group leaders.

The organizational chart of the management staff Titles included in the manual is current as of the effective date of this document. Contact QA if a current version is needed or if an org chart with the employee names is needed. Individual departmental staff lists are maintained in the laboratory's internal records.



4.2) Roles and Responsibilities

In order for the QA Program to function properly, all members of the staff must clearly understand and meet their individual responsibilities as they relate to the quality program. The responsibility for quality resides with every employee of the laboratory. All employees have access to and are trained on the QA Manual and are responsible for upholding the standards therein. Each person carries out his/her daily tasks impartially and in a manner consistent with the goals and in accordance with the procedures in this manual and the laboratory's SOPs.

All Eurofins Knoxville employees and their respective roles can be identified by referencing the organization chart maintained on the local network. The following employees are responsible for the implementation of, and compliance with this document.

Position	Name
Laboratory Director / BUMa	Kevin Woodcock
Operations Manager	Carole Jackson
Technical Manager	David Wiles
Technical Manager	Don Wasmund
Quality Assurance Manager	Anna Barlozhetskaya
Health and Safety Coordinator	Lewis Osborne

The following descriptions briefly define each role in its relationship to the Quality Assurance Program.

4.2.1) Business Unit Manager (BUMA) / Lab Director (LD)

The Laboratory Director is responsible for the overall quality, safety, financial, technical, human resource and service performance of the whole laboratory and reports to their business unit President. The Laboratory Director is also responsible for any service centers connected with their laboratory that perform analytical tests, such as short holding time analyses for

pH. The Laboratory Director provides the resources necessary to implement and maintain an effective and comprehensive Quality Assurance and Data Integrity Program.

Specific responsibilities include, but are not limited to:

- Provides one or more technical managers for the appropriate fields of testing. If the Technical Manager is absent for a period of time exceeding 15 consecutive calendar days, the Laboratory Director must designate another full time staff member meeting the qualifications of the Technical Manager to temporarily perform this function. If the absence exceeds 35 consecutive calendar days, the primary accrediting authority must be notified in writing.
- Ensures that all analysts and supervisors have the appropriate education and training to properly carry out the duties assigned to them and ensures that this training has been documented. Works with Eurofins Environment Testing Human Resources for hiring of new personnel.
- Ensures that personnel are free from any commercial, financial and other undue pressures which might adversely affect the quality of their work.
- Ensures company human resource policies are adhered to and maintained.
- Ensures that sufficient numbers of qualified personnel are employed to supervise and perform the work of the laboratory. Assesses laboratory capacity and workload.
- Ensures that appropriate corrective actions are taken to address analyses identified as requiring such actions by internal and external performance or procedural audits. Procedures that do not meet the standards set forth in the QA Manual or laboratory SOPs may be temporarily suspended by the Laboratory Director.
- Reviews and approves all SOPs prior to their implementation and ensures all approved SOPs are implemented and adhered to.
- Pursues and maintains appropriate laboratory certification and contract approvals. Supports ISO 17025 requirements.
- Ensures client specific reporting and quality control requirements are met.
- Contributes to the continuous improvement of the laboratory operations.
- Maintains an awareness of technical developments and regulatory requirements.
- Captains the management team, consisting of the QA Manager, the Technical Manager, and the Operations Manager as direct reports.

4.2.2) Quality Assurance (QA) Manager or Designee

The QA Manager has responsibility and authority to ensure the continuous implementation of the local quality system.

The QA Manager reports directly to the Laboratory Director and their NBLSC Quality Director. This position is able to evaluate data objectively and perform assessments without outside influence. The NBLSC QA Team may be used as a resource in dealing with regulatory requirements, certifications, and other quality assurance related items. The QA Manager directs activities to accomplish specific responsibilities, which include, but are not limited to:

- Serves as the focal point for QA/QC in the laboratory.
- Have functions independent from laboratory operations for which they have quality assurance oversight.
- Have documented training and/or experience in QA/QC procedures and the laboratory's Quality System.
- Have a general knowledge of the analytical test methods for which data audit/review is performed (and/or having the means of getting this information when needed).
- Arrange for or conducting internal audits on quality systems and the technical operation
- Notifying laboratory management of deficiencies in the quality system and ensuring corrective action is taken.
- Maintaining and updating this document.
- Monitoring and evaluating laboratory certifications; scheduling proficiency testing samples.
- Monitoring and communicating regulatory changes that may affect the laboratory to management.
- Training and advising the laboratory staff on quality assurance/quality control procedures that are pertinent to their daily activities.
- Maintain records of all ethics-related training, including the type and proof of attendance.
- Maintain, improve, and evaluate the corrective action database and the corrective and preventive action systems.
- Objectively monitor standards of performance in quality control and quality assurance without outside influence.
- Coordinating of document control of SOPs, MDLs, control limits, and miscellaneous forms and information.
- Performing technical data audits and method audits to ensure consistency and compliance with regulatory requirements.
- Review of external audit reports and data validation requests.
- Follow-up with audits to ensure client QAPP requirements are met.
- Establishment of reporting schedule and preparation of various quality reports for the Laboratory Director, clients, and/or NBLSC QA Team.

- Development of suggestions and recommendations to improve quality systems.
- Research of current state and federal requirements and guidelines.
- Participate in the vendor and supplier approval process, including subcontractors.
- Captains the QA team to enable communication and to distribute duties and responsibilities.
- Communication to the relevant regulatory authorities when there are management or facility changes that impact the laboratory.
- Ensuring communication & monitoring standards of performance to ensure that systems are in place to produce the level of quality as defined in this document.
- Evaluation of the thoroughness and effectiveness of training.
- Compliance with ISO 17025.
- Compliance with the DoD/DOE QSM.
- Assuring compliance with The NELAC Institute (TNI) Standard.

4.2.3) Technical Manager or Designee

The Technical Manager reports directly to the Laboratory Director. Technical Manager is accountable for all analyses and analysts under their experienced supervision and for compliance with the ISO 17025:2017 Standard. The scope of responsibility ranges from the new-hire process and existing technology through the ongoing training and development programs for existing analysts and new instrumentation. Specific responsibilities include, but are not limited to:

- Exercises day-to-day supervision of laboratory operations for the appropriate field of accreditation and reporting of results. Coordinating, writing, and reviewing preparation of all test methods, i.e., SOPs, with regard to quality, integrity, regulatory and optimum and efficient production techniques, and subsequent analyst training and interpretation of the SOPs for implementation and unusual project samples. Technical Manager ensures that the SOPs are properly managed and adhered to at the bench. Technical Manager develops standard costing of SOPs to include supplies, labor, overhead, and capacity (design vs. demonstrated versus first-run yield) utilization.

Reviewing and approving, with input from the QA Manager, proposals from marketing, in accordance with an established procedure for the review of requests and contracts. This procedure addresses the adequate definition of methods to be used for analysis and any limitations, the laboratory's capability and resources, the client's expectations. Differences are resolved before the contract is signed and work begins. A system documenting any significant changes is maintained, as well as pertinent discussions with the client regarding their requirements or the results of the analyses during the performance of the contract. All work subcontracted by the laboratory must be approved by the client. Any deviations from the contract must be disclosed to the client. Once the work has begun, any amendments to the contract must be discussed with the client and so documented.

- Monitoring the validity of the analyses performed and data generated in the laboratory. This activity begins with reviewing and supporting all new business contracts, ensuring data quality, analyzing internal and external non-conformances to identify root cause issues and implementing the resulting corrective and preventive actions, facilitating the data review process (training, development, and accountability at the bench), and providing technical and troubleshooting expertise on routine and unusual or complex problems.
- Providing training and development programs to applicable laboratory staff as new hires and, subsequently, on a scheduled basis. Training includes instruction on calculations, instrumentation management to include troubleshooting and preventive maintenance.
- Enhancing efficiency and improving quality through technical advances and improved LIMS utilization. Capital forecasting and instrument life cycle planning for second generation methods and instruments as well as asset inventory management.
- Coordinating sample management from "cradle to grave," ensuring that no time is lost in locating samples.
- Scheduling all QA/QC-related requirements for compliance, e.g., MDLs, etc.
- Captains department personnel to communicate quality, technical, personnel, and instrumental issues for a consistent team approach.
- Coordinates audit responses with the QA Manager.
- Compliance with ISO 17025.

Compliance with the DoD/DOE QSM. (where applicable)

4.2.4) Operations Manager

The Operations Manager manages and directs the analytical production sections of the laboratory. Operations Manager reports directly to the BUMA or LD. Operations Manager assists the Technical Manager in determining the most efficient instrument utilization.

More specifically, Operations Manager:

- Evaluates the level of internal/external non-conformances for all departments.
- Continuously evaluates production capacity and improves capacity utilization.
- Continuously evaluates turnaround time and addresses any problems that may hinder meeting the required and committed turnaround time from the various departments.
- Develops and improves the training of all analysts in cooperation with the Technical Manager and QA Manager and in compliance with regulatory requirements.
- Works with the technical department management and staff to ensure that scheduled instrument maintenance is completed.
- Is responsible for efficient utilization of supplies.
- Constantly monitors and modifies the processing of samples through the departments.
- Fully supports the quality system and, if called upon in the absence of the QA Manager, serves as the substitute in the interim.
- Complying with ISO17025:2017, The NELAC Institute (TNI) Standard, DoD/DOE QSM and the various QC programs implemented at the laboratory.

4.2.5) Project Manager (PM)

The members of the laboratory Client Services/Project Management Group are responsible for organizing and managing client projects. Clients are assigned a project manager who serves as their primary contact at the laboratory. It is the PM's responsibility to act as the client advocate by communicating client requirements to laboratory personnel and ensuring that clients provide complete information needed by the laboratory to meet those requirements – including all verbal communications.

With the overall goal of total client satisfaction, the functions of this position are outlined below:

- Scheduling sample submissions, sample container orders and sample pick-up via the laboratory courier service.
- Coordinating subcontract work.
- Confirming certification status.
- Coordinating and communicating turnaround time (TAT) requirements for high priority samples/projects.
- Answering common technical questions, facilitating problem resolution and coordinating technical details with the laboratory staff.
- Ensuring that client specifications, when known, are met by communicating project and quality assurance requirements to the laboratory.
- Notifying the supervisors of incoming projects and sample delivery schedules.
- Accountable to clients for communicating sample status reports or results prior to receipt of the final report.
- Monitor the status of all data package projects in-house to ensure timely and accurate delivery of reports.
- Inform clients of data package-related problems and resolve service issues.

4.2.6) Department Supervisors

Supervisors report to the Operations Manager. Each one is responsible to:

- Ensure that staff in their department adheres to applicable SOPs and the QA Manual. They perform scheduled SOP and QA Manual review to determine if staff and processes are in compliance and if new, modified, and optimized measures are feasible and should be added to these documents.
- With regard to staff, participates in the selection, training (as documented in Section 5.3), development of performance objectives and standards of performance, appraisal (measurement of objectives), scheduling, counseling, discipline, and motivation of the staff and documents these activities in accordance with systems developed by the QA and Personnel Departments. They evaluate staffing sufficiency and overtime needs. Training consists of familiarization with SOP, QC, Safety, and computer systems.
- Encourage the development of staff to become cross-trained in various methods, processes, and/or operate multiple instruments efficiently while performing maintenance and documentation, self-supervise, and function as a department team.
- In conjunction with the Technical Manager, Operations Manager, and/or QA Manager, provide guidance to staff in resolving problems encountered during performance of their duties. Each is responsible for ensuring 100% of the data review and documentation, non-conformance issues, the timely and accurate completion of performance testing (PT) samples and MDLs, for the department.
- Ensure all logbooks are maintained, current, and properly labeled or archived.
- Report all non-conformance conditions to the QA Manager, Technical Manager, Operations Manager, and/or BU / Laboratory Director.
- Ensure that preventive maintenance is performed on instrumentation as detailed in the QA Manual or SOPs and is responsible for developing and implementing a system for preventive maintenance, troubleshooting, and repairing or arranging for repair of instruments.

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- Maintain adequate and valid inventory of reagents, standards, spare parts, and other relevant resources required to perform daily analysis.
- Achieve optimum turnaround time on analyses and compliance with holding times.
- Conduct efficiency and cost control evaluations on an ongoing basis to determine optimization of labor, supplies, overtime, first-run yield, capacity (designed vs. demonstrated), second- and third-generation production techniques/instruments, and long-term needs for budgetary planning.
- Develop, implement, and enhance calibration programs.
- Provide written responses to external and internal audit issues.
- Complying with ISO17025:2017, The NELAC Institute (TNI) Standard, DoD/DOE QSM and the various QC programs implemented at the laboratory.

4.2.7) Laboratory Analysts/Technicians

Laboratory analysts/technicians are responsible for conducting analyses and performing all tasks assigned to them by the group leader or supervisor.

The responsibilities of the analysts are listed below:

- Perform analyses by adhering to analytical and quality control protocols prescribed by current SOPs, this QA Manual, and project-specific plans honestly, accurately, timely, safely, and in the most cost-effective manner.
- As applicable to their assigned tasks, document standard, reagent, and sample preparation, instrument calibration and maintenance, data calculations, sample matrix effects, and any observed nonconformance on worklists, benchsheets, lab notebooks and/or the LIMS.
- Report all nonconformance situations, instrument problems, matrix problems and QC failures, which might affect the reliability of the data, to their supervisor, the Technical Manager, and/or the QA Manager or member of QA staff.
- Perform 100% review of the data generated prior to submitting for secondary level review.
- Suggest method improvements to their supervisor, the Technical Manager, and the QA Manager. These improvements, if method compliant and approved, will be incorporated. Ideas for the optimum performance of their assigned area, for example, through the proper cleaning and maintenance of the assigned instruments and equipment, are encouraged.
- Work cohesively as a team in their department to achieve the goals of accurate results, data quality, optimum turnaround time, cost effectiveness, cleanliness, complete documentation, and personal knowledge of environmental analysis.

4.2.8) Environmental Health and Safety Coordinator and Radiation Safety Officer

The Environmental Health and Safety Coordinator reports directly to the Laboratory Director. Responsibilities include, but are not limited to:

- Staying current with the hazardous waste regulations.
- Continuing training on hazardous waste issues.
- Reviewing and updating annually the Hazardous Waste Contingency Plan.
- Auditing the staff with regard to compliance with the Eurofins Knoxville Specific Emergency Contingency Plan and the NBLSC Environmental Health and Safety Manual (*NDSC-US EHS-QP46060*).
- Contacting the hazardous waste subcontractors for review of procedures and opportunities for minimization of waste.
- Conducting ongoing, necessary safety training and conduct new employee safety orientation.
- Assisting in developing and maintaining the Chemical Hygiene/Safety Manual.
- Administering dispersal of all Safety Data Sheet (SDS) information.
- Performing regular chemical hygiene and housekeeping instruction.
- Giving instruction on proper labeling and practice; Serving as chair of the laboratory safety committee.
- Overseeing the inspection and maintenance of general safety equipment – fire extinguishers, safety showers, eyewash fountains, etc. and ensure prompt repairs as needed.
- Supervising and scheduling fire drills and emergency evacuation drills.

As Radiation Safety Officer (RSO), responsibilities include but are not limited to:

- Ensuring that all uses of radioactive materials and radiation sources are conducted safely, in accordance with the conditions of the license and applicable regulations, and result in exposures to personnel which are as low as reasonably achievable

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- Apprising and informing management of the radiation safety status of the facility and for keeping them aware of their responsibility in maintaining an adequate radiation protection program.

4.3) Business Continuity and Contingency Plans

Various policies and practices are in place to address continuity of business and contingency plans to ensure continued operations or minimal disruption in operations should unplanned events (natural disasters, unexpected management changes, etc.) occur. Deputies are identified for all key management personnel. Deputies would temporarily fill a role if the primary is unavailable for more than 15 consecutive calendar days. The deputies must meet the same qualifications as the primary person should they be required to take on the responsibilities. The QA Manager communicates to the relevant regulatory authorities when there are management or facility changes that impact the laboratory. Changes in the technical director must be communicated within a period of time and in the manner dictated by each regulatory authority.

The following table defines who assumes the responsibilities of key personnel in their absence:

Key Personnel	Deputy
Kevin Woodcock Business Unit Manager (BUMA) / Laboratory Director	David Stout Organic Prep/SVOC Supervisor
Carole Jackson Operations Manager	Kevin Woodcock Business Unit Manager (BUMA) / Laboratory Director
Anna Barlozhetskaya Quality Assurance Manager	Annette Ribet Quality Assurance Specialist
David Wiles Technical Manager	Don Wasmund Technical Manager
Lewis Osborne EHS Coordinator	Andrew West Analyst
Lewis Osborne Radiation Safety Officer (RSO)	Mike Ridenhower NBLSC RSO

Note: Organization Charts are subject to change - the most recent version can be found on the local network.

5) Personnel

5.1) Overview

The laboratory's management believes that its highly qualified and professional staff is the single most important aspect in assuring a high level of data quality and service. The staff consists of professionals and support personnel. The laboratory employs sufficient personnel with the necessary education, training, technical knowledge and experience for their assigned responsibilities.

All personnel must demonstrate competence in the areas where they have responsibility. Any staff that is undergoing training shall have appropriate supervision until they have demonstrated their ability to independently perform their job functions. Staff shall be qualified for their tasks based on appropriate education, training, experience and/or demonstrated skills as required.

All personnel are responsible for complying with all QA/QC requirements that pertain to the laboratory and their area of responsibility. Each staff member must have a combination of experience and education to adequately demonstrate a specific knowledge of their particular area of responsibility. Technical staff must also have a general knowledge of lab operations, test methods, QA/QC procedures and records management.

Laboratory management is responsible for formulating goals for staff with respect to education, training, and skills and for ensuring that the laboratory has a policy and procedures for identifying training needs and providing training of personnel. The training shall be relevant to the present and anticipated responsibilities of the laboratory staff.

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The laboratory only uses personnel that are employed by or under contract to, the laboratory. Contracted personnel, when used, must meet competency standards of the laboratory and work in accordance to the laboratory's quality system.

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5.2) Education and Experience Requirements for Technical Personnel

The laboratory makes every effort to hire analytical staff that possesses a college degree (AA, BA, BS) in an applied science with some chemistry in the curriculum. Exceptions can be made based upon the individual's experience and ability to learn. Selection of qualified candidates for laboratory employment begins with documentation of the minimum levels of education, training, and experience needed to perform the prescribed tasks.

Minimum education and training requirements for employees are outlined in job descriptions maintained by Eurofins Environment Testing Human Resources group and posted on the sharepoint site at this link https://testamerica365.sharepoint.com/sites/EETAIntranet/SitePages/Job-Descriptions.aspx.

The TNI Standard includes specific requirements for Technical Managers (however named) as detailed in this table:

NOTE: Individual accreditation bodies and/or programs may have different requirements.
BU must revise this table if there are additional/different requirements under their regulatory programs.

Specialty	Education	Experience
Extractions, Digestions, some electrode methods (pH, DO, Redox, etc.), or Titrimetric and Gravimetric Analyses	H.S. Diploma	On the job training (OJT)
CVAA, Single component or short list Chromatography (e.g., Fuels, BTEX-GC, IC)	A college degree in an applied science or 2 years of college and at least 1 year of college chemistry	Or 2 years prior analytical experience is required
ICP, ICPMS, Long List or complex chromatography (e.g., Pesticides, PCB, Herbicides, HPLC, etc.), GCMS	A college degree in an applied science or 2 years of college chemistry	or 5 years of prior analytical experience
Spectra Interpretation	A college degree in an applied science or 2 years of college chemistry	And 2 years relevant experience Or 5 years of prior analytical experience
Technical Managers – **General**	Bachelor's Degree in an applied science or engineering with 24 semester hours in chemistry An advanced (MS, PhD.) degree may substitute for one year of experience	and 2 years experience in environmental analysis of representative analytes for which they will oversee
Technical Managers – **Wet Chem** only (no advanced instrumentation)	Associates degree in an applied science or engineering or 2 years of college with 16 semester hours in chemistry	and 2 years relevant experience

- When an analyst does not meet these requirements, they can perform a task under the direct supervision of a qualified analyst/trainer, peer reviewer or Technical Manager, and are considered an analyst in training. The person supervising an analyst in training is accountable for the quality of the analytical data and must review and approve data and associated corrective actions.

5.3) Training

The laboratory is committed to furthering the professional and technical development of employees at all levels. Orientation to the laboratory's policies and procedures, in-house method training, and employee attendance at outside training courses and conferences all contribute toward employee proficiency.

Eurofins trainings are achieved through a combination of in-person presentations, recorded/electronic presentations/courses managed through the Eurofins Learning Centre (ELC) platform, supervised on the job training, and SOP reading. All training is documented with employee acknowledgement of completion.

New hire orientation and training begins the first week of employment. These initial sessions include overviews of the business, quality system policies and procedures, ethics and data integrity, resources, health and safety, and introduction of their job specific tasks.

Comprehensive **Environmental Health and Safety** training and review of the EHS Manual must be completed prior to performance of work in the laboratories.

Formal **Ethics and Data Integrity** and, where applicable, **Manual Integration** trainings are completed within the first 60 days of employment and include reading the associated policies and completing the assigned courses and presentations, in person and/or on-line.

Initial Demonstration of Capability (IDOC) must be completed and approved prior to independent performance of analytical method testing. See section 5.3.1.

The following occur annually:

- Ethics and Data Integrity Refresher training - all employees
- Manual Integration Training - applicable employees
- Ongoing Demonstration of Capability (ODOC) - technical staff - see section 5.3.2

The laboratory maintains records of relevant authorization/competence, education, professional qualifications, training, skills and experience of technical personnel (including contracted personnel) as well as the date that approval/authorization was given. These records are kept on file at the laboratory.

The training of technical staff is kept up to date by:

- Each employee must have documentation in their training file that they have read, understood and agreed to follow the most recent version of the laboratory QA Manual and SOPs in their area of responsibility. This documentation is updated as SOPs are updated.
- Documentation from any training courses or workshops on specific equipment, analytical techniques or other relevant topics
- Documentation of proficiency
- An Ethics Agreement signed by each staff member (renewed each year) and evidence of annual ethics training
- A Confidentiality Agreement signed by each staff member signed at the time of employment
- Human Resources maintains documentation and attestation forms on employment status and records; benefit programs; timekeeping/payroll; and employee conduct (e.g., ethics violations). This information is maintained in the employee's secured personnel file.

Evidence of successful training could include such items as:

- Adequate documentation of training within operational areas, including one-on-one technical training for individual technologies, and particularly for people cross-trained
- Analysts knowledge to refer to QA Manual for quality issues
- Analysts following SOPs, i.e., practice matches SOPs
- Analysts regularly communicate to supervisors and QA if SOPs need revision, rather than waiting for auditors to find problems

5.3.1) Initial Demonstration of Capability (IDOC)

An individual must successfully perform an IDOC prior to independently analyzing and reporting client samples, and any time there is a change in instrument type, method, or any time that a method has not been performed by the analyst in a twelve (12) month period.

If the method or regulation does not specify an IDOC, it
is the responsibility of the laboratory to document in their SOP what other approaches to the IDOC can be used.

The laboratory SOP KNOX-QA-0009 (QA-SOP75852) current revision details the following:

- the preparation and analysis of 4 laboratory fortified blanks (LFB or LCS), prepared at 1 to 4 times the limit of quantitation (LOQ)
- the evaluation criteria
- actions to be taken for IDOC failure

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5.3.2) Ongoing (Continuing) Demonstration of Capability (ODOC)

The ODOC procedure is detailed in the laboratory SOP KNOX-QA-0009 (*QA-SOP75852*). This process must be completed annually for each employee for the tests that they are performing. If the method has not been performed by the analyst in a twelve (12) month period, an IDOC shall be performed.

This on-going demonstration may be one of the following:

- acceptable performance of a blind sample (single blind to the analyst) or successful analysis of a blind performance sample on a similar method using the same technology (e.g., GC/MS volatiles by purge and trap for Methods 524.2, 624 or 5030/8260)
- another IDOC
- at least four (4) consecutive laboratory control samples with acceptable levels of precision and accuracy
- for methods that do not lend themselves to spiking - documented process of observing the analyst performing the process and/or comparison of results between two analysts with documented evaluation of the precision

5.4) Ethics and Data Integrity Training

The laboratory's Ethics and Data Integrity Program is discussed in Section 7.2. Employees are trained as to the legal and environmental repercussions that result from data misrepresentation. Key topics covered in the presentation include:

- Organizational mission and its relationship to the critical need for honesty and full disclosure in all analytical reporting and business practices
- Ethics and Data Integrity Policy and the Eurofins Ethics Statement
- Consequences for infractions including potential for immediate termination, debarment, or criminal prosecution
- How and when to report ethical/data integrity issues. Confidential reporting.
- Record keeping
- Discussion regarding data integrity procedures
- Specific examples of breaches of ethical behavior (e.g. peak shaving, altering data or computer clocks, improper macros, etc., accepting/offering kickbacks, illegal accounting practices, unfair competition/collusion)
- Internal monitoring, investigations, and data recalls
- Importance of proper written narration / data qualification by the analyst and project manager with respect to those cases where the data may still be of use to the client but have some method or project deficiencies

Additionally, an anonymous third party run hotline is available to all employees as a means of reporting ethics and/or data integrity issues or concerns.

- Lighthouse Services hotline at www.lighthouse-services.com/eurofinsus
- via e-mail [redacted] (include company name)
- or call 855-910-0005 (Spanish speaking 800-216-1288)

6) Accommodations and Environmental Conditions

6.1) Overview

The laboratory is a 28,000 ft2 secure laboratory facility with controlled access and designed to accommodate an efficient workflow and to provide a safe and comfortable work environment for employees. All visitors sign in and are escorted by laboratory personnel. Access is controlled by various measures.

The laboratory is equipped with structural safety features. Each employee is familiar with the location, use, and capabilities of general and specialized safety features associated with their workplace. The laboratory provides and requires the use of protective equipment including safety glasses, protective clothing, gloves, etc., OSHA and other regulatory agency guidelines regarding required amounts of bench and fume hood space, lighting, ventilation (temperature and humidity controlled), access, and safety equipment are met or exceeded.

Traffic flow through sample preparation and analysis areas is minimized to reduce the likelihood of contamination. Adequate floor space and bench top area is provided to allow unencumbered sample preparation and analysis space. Sufficient space is also provided for storage of reagents and media, glassware, and portable equipment. Ample space is also provided for refrigerated sample storage before analysis and archival storage of samples after analysis. Laboratory HVAC and deionized water systems are designed to minimize potential trace contaminants.

The laboratory is separated into specific areas for sample receiving, sample preparation, volatile organic sample analysis, non-volatile organic sample analysis, specialty organics sample preparation, specialty organics analysis, metals sample preparation, metals analysis, inorganic sample analysis, and administrative functions.

6.2) Environment

Laboratory accommodation, test areas, energy sources, and lighting are adequate to facilitate proper performance of tests. The facility is equipped with heating, ventilation, and air conditioning (HVAC) systems appropriate to the needs of environmental testing performed at this laboratory.

The environment in which these activities are undertaken does not invalidate the results or adversely affect the required accuracy of any measurements.

The laboratory provides for the effective monitoring, control and recording of environmental conditions that may affect the results of environmental tests as required by the relevant specifications, methods, and procedures. Such environmental conditions include humidity controls, temperature controls, and voltage conditioning with an uninterruptible backup power supply. When any of the method or regulatory required environmental conditions change to a point where they may adversely affect test results, analytical testing will be discontinued until the environmental conditions are returned to the required levels.

Environmental conditions of the facility housing the computer network and LIMS are regulated to protect against raw data loss.

When the laboratory performs laboratory activities at sites or facilities outside its permanent control, it shall ensure that the requirements related to facilities and environmental conditions of this document are met.

Specific requirements for facility and environmental conditions, as well as periodic monitoring of conditions, are given in the NDLSC Document *NDSC-US-EHS-QP46060* Environmental Health & Safety Manual plus each laboratory's Facility Addendum.

6.3) Work Areas

There is effective separation between neighboring areas when the activities therein are incompatible with each other. Examples include:

- Volatile organic chemical handling areas, including sample preparation and waste disposal, and volatile organic chemical analysis areas.

Access to and use of all areas affecting the quality of analytical testing is defined and controlled by secure access to the laboratory building as described in the Building Security section 6.5 of this manual.

Adequate measures are taken to ensure good housekeeping in the laboratory and to ensure that any contamination does not adversely affect data quality. These measures include regular cleaning to control dirt and dust within the laboratory. Work areas are available to ensure an unencumbered work area. Work areas include:

- Access and entryways to the laboratory.
- Sample receipt areas.
- Sample storage areas.
- Chemical and waste storage areas.
- Data handling and storage areas.
- Sample processing areas.
- Sample analysis areas.

6.4) Responding to Emergencies

Employees are trained in the procedures to respond to all emergencies that might occur in the workplace. Employees have been trained in the location and proper operation of all emergency equipment, evacuation routes and designated assembly areas for all areas where they work.

Refer to the *NDSC-US-EHS-QP46060* EH&S Manual and the laboratory's local EH&S addendum for complete details. The document provides direction for situations where normal operations of the laboratory are not possible (e.g., electrical failures, heating/air conditioning failures, fire/building evacuation, computer failures, hazardous material spills, injury to employees, pandemic flu, disruption of phone service, etc.)

In the event that the building or information technology (IT) systems would be severely challenged, a designated disaster recovery team, which includes Facility Management, Maintenance, Safety, Laboratory/Executive Management, Public Relations,

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IT, QA and other applicable personnel, depending on the scope of the disaster, would assemble at a designated area to assess the situation and formulate a plan.

6.5) Building Security

The laboratory is considered a secure facility. All outside doors are locked during normal business hours to prevent unauthorized entry. (An attendant monitors this entrance at all times.) Building access codes and alarm codes are distributed to employees as necessary.

All visitors to the facility must sign in and out in a visitor's logbook that is located in the lobby. A visitor is defined as any person who visits the laboratory who is not an employee of the laboratory. Both visitors and vendors must review and sign specific EH&S forms; and are escorted by laboratory personnel at all times, or the location of the visitor is noted in the visitor's logbook.

7) Quality System

7.1) Quality Policy Statement

The Quality Policy statement gives employees clear requirements for the production of analytical data. As an organization, all personnel are committed to high quality professional practice, testing and data, and service to our clients.

We strive to provide the highest quality data achievable by:

- ❖ Reading and understanding all of the quality documents applicable to each position and implementing the process in our work.
- ❖ Following all recordkeeping requirements; describing clearly and accurately all activities performed; recording "real time" as the task is carried out; understanding that it is never acceptable to "back date" entries and should additional information be required at a later date, the actual date and by whom the notation is made must be documented.
- ❖ Ensuring data integrity through the completeness, consistency, impartiality and accuracy of the data generated. Data is attributable, legible, contemporaneously recorded, original or a true copy, and accurate (ALCOA). This applies to manual paper documentation and electronic records.
- ❖ Providing accountability and traceability for each sample analyzed through proper sample handling, labeling, preparation, instrument calibration/qualification/validation, analysis, and reporting; establishing an audit trail (the who, what, when, and why) that identifies date, time, analyst, instrument used, instrument conditions, quality control samples (where appropriate and/or required by the method), and associated standard material.
- ❖ Emphasizing a total quality management process which provides impartiality, accuracy, and strict compliance with agency regulations and client requirements, giving the highest degree of confidence; understanding that meeting the requirements of the next employee in the work flow process is just as important as meeting the needs of the external client.
- ❖ Providing thorough documentation and explanation to qualify reported data that may not meet all requirements and specifications, but is still of use to the client; understanding this occurs only after discussion with the client on the data limitations and acceptability of this approach.
- ❖ Responding immediately to indications of questionable data, out-of-specification occurrences, equipment malfunctions, and other types of laboratory problems, with investigation and applicable corrective action; documenting these activities completely, including the reasons for the decisions made.
- ❖ Providing a work environment that ensures accessibility to all levels of management and encourages questions and expression of concerns on quality issues to management. Eurofins recognizes that the implementation of a quality assurance program requires management's commitment and support as well as the involvement of the entire staff
- ❖ Continually improve systems and manage risk to support quality improvement efforts in laboratory, administrative and managerial activities
- ❖ To comply with the ISO/IEC 17025:2005 and 2017 International Standard, the 2009 and 2016 TNI Standard and to continually improve the effectiveness of the management system.

7.2) Ethics and Data integrity

The Eurofins Environment Testing group of companies is committed to ensuring the integrity of its data and meeting the quality needs of its clients. The laboratory operates our Ethics and Data Integrity program under the guidance of Eurofins Key Guidance Documents (KGD) and the Eurofins NBLSC Ethics and Data Integrity Policy.

The elements of the our Ethics and Data Integrity Program include:

- Ethics and Data Integrity Policy and Eurofins Ethics and Quality Policy Statements.
- Ethics and Compliance Officer(s) (ECOs)
- A Training Program

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- Self-governance through disciplinary action for violations
- A confidential mechanism for anonymously reporting alleged misconduct (see section 6.2 of this manual) and a process for conducting internal investigations of all alleged misconduct
- Procedures and guidance for recalling data if necessary
- Effective external and internal monitoring system that includes procedures for internal audits (Section 17)
- Produce results, which are accurate and include QA/QC information that is method compliant and/or meets client pre-defined Data Quality Objectives (DQOs)
- Present services in a confidential, honest and forthright manner
- Provide employees with guidelines and an understanding of the Ethical and Quality Standards of our Industry
- Provide procedures and guidance to ensure the impartiality and confidentiality of all data and customer information
- Operate our facilities in a manner that protects the environment and the health and safety of employees and the public
- Obey all pertinent federal, state and local laws and regulations and encourage other members of our industry to do the same
- Educate clients as to the extent and kinds of services available
- Assert competency only for work for which adequate personnel and equipment are available and for which adequate preparation has been made
- Promote the status of environmental laboratories, their employees, and the value of services rendered by them

7.3) Quality System Documentation

The BU's quality system is defined and communicated through a variety of documents. There is a hierarchy of documents within Eurofins and for the local BU.

The top EET level documents are the NBLSC policies and procedures. These are written, approved, and released by the NBLSC QA team with input from NBLSC IT and EHS staff, where applicable. These documents provide procedures that can be used as guidance or a template for establishing local procedures or may be used directly as the local BU SOP by assigning the local staff to train on the NBLSC document. This level of document is written to address Environment US regulatory processes and requirements (i.e. ISO17025, TNI, DOE/DoD). Any individual state agency requirements are addressed locally.

The local BU defines its quality system through its own policies and procedures which must at a minimum meet the guidance set forth in the NBLSC SOPs. The BU documents are established using the following structure/hierarchy:

- Quality Manual
- Laboratory Operational SOPs and policies
  - those that apply to the BU as a whole
  - those that apply to specific areas of the BU
- Laboratory Analytical SOPs - define method specific processes to be followed in the laboratory tests
- Forms and Instruction Sheets - e.g., checklists, preformatted bench sheets, job aids

All of the documents described here are controlled with defined versioning, review, and approval processes. The BU management and QA staff have the responsibility and authority to operate in compliance with regulatory requirements of the jurisdiction in which the work is performed.

7.4) Quality Control (QC) Objectives for the Measurement of Data

Quality Assurance (QA) is responsible for developing planned activities whose purpose is to provide assurance to all levels of management that a quality program is in place within the laboratory, and that it is functioning in an effective manner that is consistent with the requirements of NELAP, ISO 17025, DoD and any other regulatory agencies (i.e., states) in which the laboratory maintains accreditation.

Quality Control (QC) is generally understood to be limited to the analyses of samples and to be synonymous with the term "analytical quality control". QC refers to the routine application of statistically based procedures to evaluate and control the accuracy of results from analytical measurements. The QC program includes procedures for estimating and controlling precision and bias and for determining reporting limits.

Request for Proposals (RFPs) and Quality Assurance Project Plans (QAPP) provide a mechanism for the client and the laboratory to discuss the data quality objectives in order to ensure that analytical services closely correspond to client needs. In order to ensure the ability of the laboratory to meet the Data Quality Objectives (DQOs) specified in the QAPP, clients are advised to allow time for the laboratory to review the QAPP before being finalized. The client is responsible for developing the QAPP; however, the laboratory will provide support to the client for developing the sections of the QAPP that concern laboratory activities.

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Historically, laboratories have described their QC objectives in terms of precision, accuracy, representativeness, comparability, completeness, selectivity and sensitivity (PARCCSS). See NBLSC Document *NDSC-QA-FRM68791* Common Terms, Definitions, and Acronyms for explanation. Each laboratory SOP defines the required QC parameters and criteria.

7.4.1) Precision
The objective is to meet the performance for precision demonstrated for the methods on similar samples and to meet DQOs of the EPA and/or other regulatory programs. Precision is defined as the degree of reproducibility of measurements under a given set of analytical conditions (exclusive of field sampling variability). Precision is documented on the basis of replicate analysis, usually duplicate or matrix spike (MS) duplicate samples.

7.4.2) Accuracy
The objective is to meet the performance for accuracy demonstrated for the methods on similar samples and to meet DQOs of the EPA and/or other regulatory programs. Accuracy is defined as the degree of bias in a measurement system. Accuracy may be documented through the use of laboratory control samples (LCS) and/or MS. A statement of accuracy is expressed as an interval of acceptance recovery about the mean recovery.

7.4.3) Representativeness
The objective is to provide data which is representative of the sampled medium. Representativeness is defined as the degree to which data represent a characteristic of a population or set of samples and is a measurement of both analytical and field sampling precision. The representativeness of the analytical data is a function of the procedures used in procuring and processing the samples. The representativeness can be documented by the relative percent difference between separately procured, but otherwise identical samples or sample aliquots.

The representativeness of the data from the sampling sites depends on both the sampling procedures and the analytical procedures. Refer to laboratory SOPs for subsampling and homogenization techniques appropriate to the analytical method.

7.4.4) Comparability
The objective is to provide analytical data for which the accuracy, precision, representativeness, and reporting limit statistics are similar to these quality indicators generated by other laboratories for similar samples, and data generated by the laboratory over time.

Comparability is documented by inter-laboratory studies carried out by regulatory agencies or carried out for specific projects or contracts, by comparison of periodically generated statements of accuracy, precision, and reporting limits with those of other laboratories.

7.4.5) Completeness
The completeness objective for data is 90% (or as specified by a particular project), expressed as the ratio of the valid data to the total data over the course of the project. Data will be considered valid if they are adequate for their intended use. Data usability will be defined in a QAPP, project scope, or regulatory requirement. Data validation is the process for reviewing data to determine its usability and completeness. If the completeness objective is not met, actions will be taken internally and with the data user to improve performance. This may take the form of an audit to evaluate the methodology and procedures as possible sources for the difficulty or may result in a recommendation to use a different method.

7.4.6) Selectivity
Selectivity is defined as the capability of a test method or instrument to respond to a target substance or constituent in the presence of non-target substances. Target analytes are separated from non-target constituents and subsequently identified/detected through one or more of the following, depending on the analytical method: extractions (separation), digestions (separation), interelement corrections (separation), use of matrix modifiers (separation), specific retention times (separation and identification), confirmations with different columns or detectors (separation and identification), specific wavelengths (identification), specific mass spectra (identification), and specific electrodes (separation and identification).

7.4.7) Sensitivity
Sensitivity refers to the amount of analyte necessary to produce a detector response that can be reliably detected (above the Method Detection Limit, Estimated Detection Limit, or Limit of Detection) or quantified (above the Reporting Limit, Minimum Level, or Limit of Quantitation).

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7.5) Criteria for Quality Indicators

The laboratory can prepare upon request a Quality Control Limit Summary from the Laboratory Information Management System (LIMS) that summarize the precision and accuracy acceptability limits for performed analyses. This summary includes an effective date, is updated each time new limits are generated and is located in the LIMS. Current limits are controlled through the LIMS. The limits in effect for a given date are archived in the LIMS with the associated sample data. Unless otherwise noted, limits within these tables are laboratory generated. Some acceptability limits are derived from US EPA methods when they are required. Where US EPA method limits are not required, the laboratory has developed limits from evaluation of data from similar matrices. Criteria for development of control limits is contained in SOP KNOX-QA-0004 (*QA-SOP75853*) or Section 24.

7.6) Statistical Quality Control

Statistically-derived precision and accuracy limits are required by selected methods (such as SW-846) and programs. The laboratory routinely utilizes statistically-derived limits to evaluate method performance and determine when corrective action is appropriate. The analysts use the current limits entered into LIMS. The QA department maintains an archive of all limits used within the laboratory. If a method defines the QC limits, the method limits are used.

If a method requires the generation of historical limits, the lab develops such limits from recent data in the QC database of the LIMS following the guidelines described in Section 24. All calculations and limits are documented and dated when approved and effective. On occasion, a client requests contract-specified limits for a specific project.

Current QC limits are entered and maintained in the LIMS analyte database. As sample results and the related QC are entered into LIMS, the sample QC values are compared with the limits in LIMS to determine if they are within the acceptable range. The analyst then evaluates if the sample needs to be reanalyzed or re-extracted/reanalyzed or if a comment should be added to the report explaining the reason for the QC outlier.

7.6.1) Quality Control Charts

QC Charting is available in the LIMS for evaluation at any point by technical and/or QA staff. At a minimum, the charts are run annually to evaluate the statistical QC performance and set new QC limits, if warranted (and where statistical limits are allowed by the method/program). This evaluation should also be used to look for trends in the data that require further investigation. Any trend investigation needs to be documented in the corrective action database/module.

7.7) Quality System Metrics

In addition to the QC parameters discussed above, the entire Quality System is evaluated on a monthly basis through the use of specific metrics (refer to Section 18). These metrics are used to assess risk and to drive continuous improvement in the laboratory's Quality System. The metrics are reviewed by the BUMA and the QA Manager and shared with other management staff.

7.8) Management of Change

The Management of Change process is designed to manage significant events and changes that occur within the laboratory. Through these procedures, the potential risks inherent with a new event or change are identified and evaluated. The risks are minimized or eliminated through pre-planning and the development of preventive measures.

The types of changes covered under this system include (but is not limited to): Laboratory Relocation, Facility Changes, Major Accreditation Changes, Implementation of Method Updates or Program Changes (e.g., MUR, client QAPPs, Regulatory Updates), Addition or Deletion to Laboratory Capabilities or Instrumentation, Key Personnel Changes, Laboratory Information Management System (LIMS) changes.

See NBLSC Document NDSC-US-MCC-QP5339 - Change Control.

8) Document Control

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Document control is achieved through two systems. The "legacy" system, defined in SOP *KNOX-QA-0011* (*QA-SOP75849*), which is manually controlled by QA on the local network. And the "D4" document control system, where documents are created, reviewed, approved, published, archived, and controlled all within an electronic system named "D4" (https://d4-us.eurofins.local/?BookID=109). Additional guidance to Document Control change is outlined in change plan *0-QA-WI75765*.

8.1) Overview

The QA Department is responsible for the control of documents used in the laboratory to ensure that the approved current document revision is in circulation and obsolete documents are archived (original signed copy) and any obsolete hardcopies (other than the signed original) are destroyed. The laboratory's document control procedure is defined in SOP *KNOX-QA-0011* (*QA-SOP75849*).

The following documents, at a minimum, must be controlled:

- Laboratory Quality Assurance (QA) Manual
- Laboratory Policies
- Laboratory Standard Operating Procedures (SOP)
- Work Instructions, Job Aids, and Forms
- NBLSC Documents[1]

[1]Includes locally implemented documents that are controlled within the laboratory's document control system.

The NBLSC documents are considered "controlled" when they are accessed as the electronic file on the documents site. Printed copies are considered uncontrolled unless the laboratory physically distributes them as controlled documents.

The laboratory QA Department also maintains a listing of various references and document sources integral to the operation of the laboratory. This includes reference methods and regulations. Instrument manuals (hard or electronic copies) are also maintained by the laboratory.

The laboratory maintains control of records for raw analytical data and supporting records such as audit reports and responses, logbooks, standard logs, training files, MDL studies, Proficiency Testing (PT) studies, certifications and related correspondence, and corrective action reports (*ICAT)*. Raw analytical data consists of bound logbooks, instrument printouts, any other notes, magnetic media, electronic data, and final reports.

8.2) Document Approval and Issuance

The pertinent elements of the document control system includes a unique document number, title, pagination, the total number of pages of the item or an 'end of document' indicator, the effective date, expiration date, and revision number. The QA personnel are responsible for the maintenance of this system.

Controlled documents are authorized by the QA Department. In order to develop a new document, a responsible manager submits a draft to the QA Department for suggestions and approval before use. Upon approval, QA personnel add the identifying version information to the document and retains that document as the official document on file. That document is then provided to all applicable operational units. Controlled documents are identified as such and records of their distribution are kept by the QA Department. Document control may be achieved by either electronic or hardcopy distribution.

The QA Department maintains a list of the official versions of controlled documents.

Quality System Policies and Procedures will be reviewed at a minimum of every two years. Technical procedures used in support of work done for the Department of Defense (DOD) and Department of Energy (DOE), and the Eurofins Knoxville Quality Assurance Manual must be reviewed at a one year frequency and revised as appropriate. Changes to documents occur when a procedural change warrants.

8.3) Procedures for Document Control

For changes to the QAM, requests for change or revision may be made to the Eurofins QA Manager. Changes affecting the text of the NBLSC Quality Management Plan are forwarded to the NBLSC QA Director for review and approval. If the proposed

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changes are accepted, they are incorporated into the next revision of the appropriate section of the QAM. Each revision to the QAM is approved by the same authorized signatories as shown on the cover page of the QAM. Uncontrolled copies must not be used within the laboratory. Previous revisions are archived by the QA department.

For changes to SOPs, refer to SOP No. KNOX-QA-0018 (QA-SOP75854), Preparation and Management of Standard Operating Procedures. Additional guidance to Document Control change is outlined in change plan *0-QA-WI75765*.

Forms, worksheets, work instructions and information are organized by form number and revision number on the QAQC shared directory on a local area network server.

8.4) Obsolete Documents

All invalid or obsolete documents are removed, or otherwise prevented from unintended use. The laboratory has specific procedures as described above to accomplish this. In general, obsolete documents are collected from employees according to distribution lists and are marked obsolete on the cover or destroyed. At least one copy of the obsolete document is archived according to SOP *KNOX-QA-0011* (*QA-SOP75849*), Document Control and Distribution.

For documents residing in the D4 document management system, once a revision is made to a document, the prior version is automatically marked as "invalid" and redirects the user to the current version.

If a document is no longer needed at all and is made "Obsolete", it is "deleted" from the current documents but archived with the system and automatically marked as such.

All "Obsolete" and prior versions of documents can be accesses by designated personnel under the advances search function within the program.

9) Service to the Client

9.1) Overview

The laboratory has established procedures for the review of work requests and contracts, oral or written. The procedures include evaluation of the laboratory's capability and resources to meet the contract's requirements within the requested time period. All requirements, including the methods to be used, must be adequately defined, documented and understood. For many environmental sampling and analysis programs, testing design is site or program specific and does not necessarily fit into a standard laboratory service or product. It is the laboratory's intent to provide both standard and customized environmental laboratory services to our clients.

A thorough review of technical and QC requirements contained in contracts is performed to ensure project success. The appropriateness of requested methods, and the laboratory's capability to perform them must be established. Projects, proposals, and contracts are reviewed for adequately defined requirements and the laboratory's capability to meet those requirements. Alternate test methods that are capable of meeting the clients' requirements may be proposed by the laboratory. A review of the laboratory's capability to analyze non-routine analytes is also part of this review process.

All projects, proposals and contracts are reviewed for the client's requirements in terms of analyte lists, test methodology requested, sensitivity (detection and reporting levels), accuracy, and precision requirements (% Recovery and RPD). The reviewer ensures that the laboratory's test methods are suitable to achieve these requirements and that the laboratory holds the appropriate certifications and approvals to perform the work. The laboratory and any potential subcontract laboratories must be certified, as required, for all proposed tests.

Electronic or hard copy deliverable requirements are evaluated against the laboratory's capacity for production of the documentation.

If the laboratory cannot provide all services but intends to subcontract such services, whether to another Eurofins business unit operating on the same LIMS or to an outside firm, this will be documented and discussed with the client prior to contract approval. (Refer to Section 10 for Subcontracting Procedures.)

The laboratory informs the client of the results of the review if it indicates any potential conflict, deficiency, lack of accreditation, or inability of the laboratory to complete the work satisfactorily. Any discrepancy between the client's requirements and the laboratory's capability to meet those requirements is resolved in writing before acceptance of the

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contract. It is necessary that the contract be acceptable to both the laboratory and the client. Amendments initiated by the client and/or Eurofins Knoxville are documented in writing.

All contracts, QAPPs, Sampling and Analysis Plans (SAPs), contract amendments, and documented communications become part of the project record.

The same review process used for the initial review of the project documents is repeated when there are amendments to the original document(s) by the client, and the participating personnel are informed of the changes.

9.2) Project Review

Appropriate personnel will review the work request at each stage of evaluation.

For routine projects and other simple tasks, a review by the Project Manager (PM) is considered adequate. The PM confirms that the laboratory has any required certifications, that it can meet the clients' data quality and reporting requirements and that the lab has the capacity to meet the clients turn around needs. It is recommended that, where there is a sales person assigned to the account, an attempt should be made to contact that sales person to inform them of the incoming samples.

For new, complex or large projects, the proposed contract is given to the Client Relationship Manager or Proposal Team, who will decide which lab will receive the work based on the scope of work and other requirements, including certification, testing methodology, and available capacity to perform the work.

This review encompasses all facets of the operation. The scope of work is distributed to the appropriate personnel, as needed based on scope of contract, to evaluate all of the requirements shown above (not necessarily in the order below):

- Laboratory Project Manager (PM)
- BUMA/Laboratory Director
- Technical Managers and/or relevant Department Managers
- Account Executive
- QA Manager
- Laboratory Environmental Health and Safety Manager

The QA Manager performs an overall review to identify any quality systems concerns. Department Managers review the sections of the documents applicable to their assigned areas of the laboratory to identify any project specific requirements to be communicated to their staff and or any concerns with meeting the project requirements. Project specific requirements may be added as notes in the LIMS as part of the project set up. This is managed by the PM with input from the reviews.

The BUMA/Laboratory Director reviews the formal laboratory quote and makes final acceptance for their facility. The Sales Director, Contract Administrator, Account Executive or Proposal Coordinator then submits the final proposal to the client.

In the event that one of the above personnel is not available to review the contract, his or her back-up will fulfill the review requirements.

9.2.1) Project Specific Quality Planning

Communication of contract specific technical and QC criteria is an essential activity in ensuring the success of site specific testing programs. To achieve this goal, a PM is assigned to each client. It is the PM's responsibility to ensure that project-specific technical and QC requirements are effectively evaluated and communicated to the laboratory personnel before and during the project. QA department involvement may be needed to assist in the evaluation of custom QC requirements.

PMs are the primary client contact and they ensure resources are available to meet project requirements, they coordinate opportunities and work with laboratory management and supervisory staff to ensure available resources are sufficient to perform work for the client's project.

Prior to work on a new project, the dissemination of project information and/or project opening meetings may occur to discuss schedules and unique aspects of the project. Items to be discussed may include the project technical profile, turnaround times, holding times, methods, analyte lists, reporting limits, deliverables, sample hazards, or other special requirements. The PM introduces new project information to maximize production and client satisfaction, while maintaining quality. Project notes may be associated with each sample batch as requirements notifications upon sample receipt and during analytical processing.

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Any change that may occur within an active project is agreed upon between the client/regulatory agency and the PM/laboratory. These changes (e.g., use of a non-standard method or modification of a method) and approvals must be documented prior to implementation. Documentation pertains to any document (e.g., letter, e-mail, variance, contract addendum), which has been signed by both parties.

Such changes are also communicated to the laboratory through the use of notes, comments and attachments in TALS or by reference to a Quality Assurance Summary. The laboratory staff is then introduced to the modified requirements via the PM or the individual laboratory Technical Manager. After the modification is implemented into the laboratory process, documentation of the modification is made in the case narrative of the data report(s).

The laboratory strongly encourages client visits to the laboratory and for formal/informal information sharing session with employees in order to effectively communicate ongoing client needs as well as project specific details for customized testing programs.

9.3) Balancing Laboratory Capacity and Workload

Evaluating laboratory capacity to perform specific projects is the responsibility of the BUMA, Laboratory Directors and Department Managers, and the Client Services manager. Many analysts are cross-trained to perform a variety of tests, and there is redundant equipment available in case of malfunctions. This minimizes the need to evaluate small and medium size projects against capacity available to complete them. Large and complex projects are reviewed against capacity estimates before bids are submitted to ensure that the client's analysis schedule can be met. Regularly scheduled meetings are held between laboratory management, PMs, Client Services and QA personnel to review progress with current projects, as well as special requirements of new work scheduled for the laboratory. Laboratory capacity and backlog is tracked on a continuous basis using information from the Laboratory Information Management System (LIMS) including turnaround time, and work in-house.

9.4) Project Contracts/Records

The Contracts Department maintains copies of all signed contracts.

Appropriate records are maintained for every contract or work request. All stages of the contract review process are documented and include records of any significant changes. This information is archived in the project files.

The contract will be distributed to and maintained by the appropriate sales/marketing personnel and the Account Executive. A copy of the contract and formal quote will be filed with the laboratory PM and the BUMA.

Records are maintained of pertinent discussions with a client relating to the client's requirements or the results of the work during the period of execution of the contract. The PM keeps a phone log of conversations with the client.

9.4.1) Project-Specific Quality Planning

Communication of contract specific technical and QC criteria is an essential activity in ensuring the success of site specific testing programs. To achieve this goal, a PM is assigned to each client. It is the PM's responsibility to ensure that project-specific technical and QC requirements are effectively evaluated and communicated to the laboratory personnel before and during the project. QA department involvement may be needed to assist in the evaluation of custom QC requirements.

PM's are the primary client contact and they ensure resources are available to meet project requirements, they coordinate opportunities and work with laboratory management and supervisory staff to ensure available resources are sufficient to perform work for the client's project.

Prior to work on a new project, the dissemination of project information and/or project opening meetings may occur to discuss schedules and unique aspects of the project. Items to be discussed may include the project technical profile, turnaround times, holding times, methods, analyte lists, reporting limits, deliverables, sample hazards, or other special requirements. The PM introduces new project information to the laboratory staff through project kick-off meetings or to the supervisory staff during production meetings. These meetings provide direction to the laboratory staff in order to maximize production and client satisfaction, while maintaining quality.

Any change that may occur within an active project is agreed upon between the client/regulatory agency and the PM/laboratory. These changes (e.g., use of a non-standard method or modification of a method) and approvals must be documented prior to implementation. Documentation pertains to any document (e.g., letter, e-mail, variance, contract addendum), which has been signed by both parties.

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Project specific instructions are communicated to the laboratory through the use of notes, comments and attachments in TALS or by reference to a Quality Assurance Summary.

The laboratory strongly encourages client visits to the laboratory and for formal/informal information sharing session with employees in order to effectively communicate ongoing client needs as well as project specific details for customized testing programs.

9.5) Special Services

The laboratory cooperates with clients and their representatives to monitor the laboratory's performance in relation to work performed for the client. It is the laboratory's goal to meet all client requirements in addition to statutory and regulatory requirements. The laboratory has procedures to ensure confidentiality to clients.

The laboratory's standard procedures for reporting data are described in Section 25. Special services are also available and provided upon request. These services include:

- Reasonable access for our clients or their representatives to the relevant areas of the laboratory for the witnessing of tests performed for the client.
- Assisting client-specified third party data validators as specified in the client's contract.
- Supplemental information pertaining to the analysis of their samples. Note: An additional charge may apply for additional data/information that was not requested prior to the time of sample analysis or previously agreed upon.

When the client requests a statement of conformity to a specification or standard based on the analysis performed by the laboratory (e.g., pass/fail, in-tolerance/out-of-tolerance), the decision rule shall be clearly defined. Unless inherent in the requested specification or standard, the decision rule selected shall be communicated to the client.

9.6) Client Communication

PMs are the primary communication link with the clients. They shall inform their clients of any delays in project completion as well as any non-conformances in either sample receipt or sample analysis. Project management will maintain ongoing client communication throughout the entire client project.

Technical management is available to discuss any technical questions or concerns the client may have.

9.7) Reporting

The laboratory works with our clients to produce any special communication reports required by the contract.

9.8) Client Feedback and Surveys

The laboratory assesses both positive and negative client feedback. The results are used to improve overall laboratory quality and client service.

Client specific surveys to assess client satisfaction are recorded in Relationwise.

When a complaint is received, we determine, to the best of our ability, the extent of the issue and what data is in question. The person receiving the complaint documents this information and promptly forwards it to the appropriate management personnel where the work in question was performed. If a data reporting error is discovered, the final report and/or data must be regenerated with the correct value(s).

The project manager or QA is responsible for entering client concerns into iCAT. In some cases, an ICAT / ICAR (Investigation and Corrective Action Report) is initiated to address and document the situation. While an individual issue may not warrant a formal investigation, QA monitors these issues for potential trends and will issue an ICAR/ICAT if a trend is evident.

9.9) Client Confidentiality

The laboratory ensures the highest standards of quality and integrity of the data and services provided to our clients.

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The laboratory is responsible for maintaining in confidence all client information obtained or created. In situations involving the transmission of environmental test results by telephone, facsimile or other electronic means, client confidentiality must be maintained.

The laboratory will not intentionally divulge to any person (other than the client or any other person designated by the client in writing) any information regarding the services provided by the laboratory or any information disclosed to the laboratory by the client. Furthermore, information known to be potentially endangering to national security or an entity's proprietary rights will not be released.

Information about the client obtained from sources other than the client (e.g., complainant, regulator) shall be confidential between client and the laboratory. The source of this information shall be confidential to the laboratory and shall not be shared with the client, unless agreed by the source.

Note: This shall not apply to the extent that the information is required to be disclosed by the laboratory under the compulsion of legal process. The laboratory will, to the extent feasible, provide reasonable notice to the client before disclosing the information.

Note: Authorized representatives of an accrediting authority are permitted to make copies of any analyses or records relevant to the accreditation process, and copies may be removed from the laboratory for purposes of assessment.

10) Subcontracting

The laboratory may subcontract tests to other laboratories outside of Eurofins if the requested testing is not routinely performed in our laboratory. To a lesser extent, samples may need to be subcontracted to an overflow laboratory to ensure hold times and/or turn-around-times (TAT) are met.

Testing is only subcontracted with the client's knowledge and approval. The project manager must notify the client in writing when any of their requested analyses will be subcontracted to another lab. Client approval must be obtained in writing before samples are shipped.

Subcontract laboratories are selected based on their qualifications and accreditations. The subcontractor is requested to sign a Laboratory Analytical Services Subcontract. If projects require a specific agency certification (i.e. individual state agencies, NELAP, DoD, PALA, ISO 17025), only an appropriately accredited laboratory is used. The client may also have a list of laboratories to be used for subcontracting. In these cases, the evaluation of the subcontract laboratory is made by the client.

Data obtained from subcontract laboratories is clearly marked as such when reported by the laboratory. The data from non-Eurofins laboratories or from Eurofins laboratories not using the "TALS LIMS" are submitted to the client in the format obtained from the subcontractor.

10.1) Overview

For the purpose of this quality manual, the phrase subcontract laboratory refers to a laboratory external to the Eurofins Environment Testing laboratories. The phrase "work share" refers to internal transfers of samples between the Eurofins Environment Testing laboratories.

When contracting with our clients, the laboratory makes commitments regarding the services to be performed and the data quality for the results to be generated. When the need arises to outsource testing for our clients because project scope, changes in laboratory capabilities, capacity, or unforeseen circumstances, we must be assured that the subcontractors or work sharing laboratories understand the requirements and will meet the same commitments we have made to the client. Refer to the NBLSC Subcontracting SOP # *NDSC-US-SUB-SOP44936*.

When outsourcing analytical services, the laboratory will assure, to the extent necessary, that the subcontract or work sharing laboratory maintains a program consistent with the requirements of this document, the requirements specified in TNI/ISO 17025 and/or the client's Quality Assurance Project Plan (QAPP). All QC guidelines specific to the client's analytical program are transmitted to the subcontractor and agreed upon before sending the samples to the subcontract facility. Additionally, work requiring accreditation will be placed with an appropriately accredited laboratory. The laboratory performing the subcontracted work will be identified in the final report, as will non-TNI accredited work where required.

PMs or other responsible Client Service members, for the Export Lab (i.e., the Eurofins laboratory that transfers samples to another laboratory) are responsible for obtaining client approval prior to subcontracting any samples. The laboratory will advise the client of a subcontract arrangement in writing and when possible, approval from the client shall be obtained and retained in the project folder. Standard Eurofins Terms & Conditions include the flexibility to subcontract samples within the Eurofins

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laboratories. Therefore, additional advance notification to clients for intra-laboratory subcontracting is not necessary unless specifically required by a client contract.

Note: In addition to the client, some regulating agencies (e.g., USDA) or contracts (e.g., DoD and DOE projects) require notification prior to placing such work. Unless the work is done directly for the USDA, this notification is made to the client who is responsible for ensuring notification of the regulating agency.

10.2) Qualifying and Monitoring Subcontractors

Whenever a PM or Client Relationship Manager becomes aware of a client requirement or laboratory need where samples must be outsourced to another laboratory, the other laboratory(s) shall be selected based on the following:

- Subcontractors specified by the client - In these circumstances, the client assumes responsibility for the quality of the data generated from the use of a subcontractor.
- Subcontractors reviewed by Eurofins Knoxville – Firms which have been reviewed by the company and are known to meet standards for accreditations (e.g., State, TNI and DoD/DOE); technical specifications; legal and financial information.

A listing of subcontractors is available on the Eurofins intranet site.

All Eurofins laboratories are pre-qualified for work sharing provided they hold the appropriate accreditations and can adhere to the project/program requirements. Client approval is not necessary unless specifically required by the contract. In these cases, the client must provide acknowledgement that the samples can be sent to that facility (an e-mail is sufficient documentation or if acknowledgement is verbal, the date, time, and name of person providing acknowledgement must be documented). The originating laboratory is responsible for communicating all technical, quality, and deliverable requirements as well as other contract needs.

When the potential subcontract laboratory has not been previously approved, PMs may nominate a laboratory as a subcontractor based on need. The decision to nominate a laboratory must be approved by the BUMa/ Laboratory Director. The BUMa/ Laboratory Director requests that the PM begin the process of approving the subcontract laboratory. Refer to the NBLSC Subcontracting SOP *NDSC-US-SUB-SOP44936* for process details.

Once the appropriate accreditation and legal information is received by the laboratory, it is evaluated for acceptability and forwarded to the NBLSC Quality Information Manager (QIM) for review. After the NBLSC QIM reviews the documents for completeness, the subcontract agreement is forwarded to the BU's Scope President for formal signature and contracting with the laboratory. The approved company will be added to the approved subcontractor list on the intranet site, and the finance group is concurrently notified. A copy of the signed subcontract agreement is forwarded to the subcontractor.

The client will assume responsibility for the quality of the data generated from the use of a subcontractor they have requested the lab to use. The qualified subcontractors on the intranet site are known to meet minimal standards. Eurofins Knoxville does not certify laboratories. Eurofins list of subcontractors can only be recommended to the extent that we would use them.

10.3) Oversight and Reporting

The status and performance of qualified subcontractors will be monitored by local BUs and includes an annual evaluation survey conducted by the NBLSC-QIM. Any problems identified will be brought to the attention of local BU management, the legal department and the finance department.

- Complaints shall be investigated. Documentation of the complaint, investigation, and corrective action will be maintained in the subcontractor's file on the intranet site. Complaints are posted using the corrective action mechanism employed at each laboratory.
- Information shall be updated on the intranet when new information is received from the subcontracted laboratories.
- Subcontractors in good standing will be retained on the intranet listing. Client Service personnel will notify all Eurofins laboratories, NBLSC-QA, the legal department and finance department if any laboratory requires removal from the intranet site. This notification will be posted on the intranet site and e-mailed to all Client Service Personnel, Laboratory Directors, QA Managers, and Sales Personnel.

Prior to initially sending samples to the subcontracted laboratory, the PM confirms their certification status to determine if it's current and scope inclusive. The information is documented within the project records.
The laboratory's certifications can be viewed on the company's website at https://www.eurofinsus.com/environment-testing/resources/certifications/

All subcontracted samples must be accompanied by a Eurofins Knoxville Chain of Custody (COC). A copy of the original COC sent by the client must be available in LIMS for all samples work shared within Eurofins. Client COCs are only forwarded to external subcontractors when samples are shipped directly from the project site to the subcontractor lab. Under routine circumstances, to maintain client confidentiality, original client COCs are not provided to external subcontractors.

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Through communication with the subcontracted laboratory, the PM monitors the status of the subcontracted analyses, facilitates successful execution of the work, and ensures the timeliness and completeness of the analytical report.

All accredited work and non-TNI accredited work must be identified in the subcontractor's report as appropriate. If TNI accreditation is not required, the report does not need to include this information.
Reports submitted from subcontractor laboratories are not altered and are included in their original form in the final project report. This clearly identifies the data as being produced by a subcontractor facility. If subcontract laboratory data is incorporated into the laboratory's EDD (i.e., imported), the report must explicitly indicate which lab produced the data for which methods and samples.

Note: The results submitted by a Eurofins work sharing laboratory may be transferred electronically and the results reported by the Eurofins work sharing lab are identified on the final report. The report must explicitly indicate which lab produced the data for which methods and samples. The final report must include a copy of the completed COC for all work sharing reports.

10.4) Contingency Planning

The full qualification of a subcontractor may be waived to meet emergency needs. This decision and justification must be documented in the project files, and the 'Purchase Order Terms And Conditions For Subcontracted Laboratory Services' must be sent with the samples and COC.

In the event this provision is utilized, the laboratory (e.g., PM) will be required to verify and document the applicable accreditations of the subcontractor. All other quality and accreditation requirements will still be applicable, but the subcontractor need not have signed a subcontract agreement with Eurofins at this time.

The use of any emergency subcontractor will require the PM to complete a New Supplier Information Request Form in order to process payment to the subcontractor and add them to LIMS. This form requires the user to define the subcontractor's category/s of testing and the reason for testing.

10.5) Use of NELAP and A2LA Logo

It is not laboratory policy to use these logos on any company letterhead, including analytical reports.

11) Purchasing Services and Supplies

See NBSLC SOP *US-PUR-SOP62924* - Guidance for Procurement of Environmental Laboratory Supplies for guidance.

11.1) Overview

Supplier Evaluation

Procedures are in place to evaluate vendors who supply us with: new equipment, instrumentation, computerized systems and computer software; commercially purchased glassware, including sample bottleware, reagents, chemicals, solvents, gases, media, and standards; and contracted and subcontracted services.

The laboratory strives to ensure that our suppliers continually improve their quality systems and we reserve the right to purchase from suppliers of our choice in order to best fulfill the needs of our clients and our business. When directed by a client to purchase from a specific supplier, we will do so. In this instance it is the client's responsibility to "qualify" the specified supplier. We attempt to purchase from businesses that we have an established purchase history or have previously acquired information regarding the supplier's quality programs.

An approved vendor list is maintained by the laboratory for critical consumables (reagents and standards), PT services, and metrological services.

The laboratory does not evaluate every supplier. Risk assessment is taken into consideration when making this decision. The risk assessment analysis includes system, material, services, and number of samples or operations the purchase may affect or support. Evaluations are not required for computer operating systems, utilities, toolsets, or systems software. They also are not required for any off-the-shelf configurable software package that has an extensive market performance history (e.g., Microsoft Word, Excel, Access).

Procurement

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It is the responsibility of management personnel within each department to ensure that the appropriate supplies are available and/or ordered with sufficient lead-time to perform analytical testing or to provide support to the testing areas. The individual technical departments have trained personnel who enter the supply order into the company's purchasing system. The selection of these products is based on technical input at the analyst level and authorized by technical departmental management. The Purchasing Department maintains an ordering system in which purchase requisitions are managed. Common laboratory items (e.g., beakers, flasks, reagents) are ordered directly through the purchasing system. Purchase orders over a specified dollar amount require approval from the appropriate member(s) of the Executive Management Group before an order can be placed.

Upon receipt of an order, the recipient checks the order to ensure that all items were received as specified. Products that have specific storage requirements are taken to the technical area upon receipt. It is the technical area's responsibility to ensure that the product is stored in the appropriate manner. Any checks on the quality of the materials received for use in a specific test are the responsibility of the laboratory using them. This is based upon the experience of the laboratory with the usability of the product. Generally, each test has controls in place to ensure that test results are not adversely affected by the materials.

Any problems encountered when using a material in the laboratory must be brought to the attention of the BUMA/LD and/or Quality Assurance, as applicable, to ensure that follow-up and corrective action occur.

11.2) Glassware

Glassware used for volumetric measurements must be Class A or verified for accuracy according to laboratory procedure. Pyrex (or equivalent) glass should be used where possible. For safety purposes, thick-wall glassware should be used where available.

11.3) Reagents, Standards, and Supplies

Purchasing guidelines for equipment, consumables, and reagents must meet the requirements of the specific method and testing procedures for which they are being purchased. Solvents and acids are pre-tested in accordance with NBLSC Document No. *NDSC-US-PUR-SOP46704* - Acid and Solvent Testing and Approval Program. Approval information for the solvents and acids tested is distributed to the laboratory and kept on file on a shared corporate network, under QA_SolventApproval.

11.3.1) Purchasing

Chemical reagents, solvents, glassware, and general supplies are ordered as needed to maintain sufficient quantities on hand. Materials used in the analytical process must be of a known quality. The wide variety of materials and reagents available makes it advisable to specify recommendations for the name, brand, and grade of materials to be used in any determination. This information is contained in the method SOP.

If an item is needed for laboratory operations, the group leader or designee enters the request into the procurement system. The vendor item catalogue number is entered into the system to specify the required quality. Each request is reviewed and approved by the Laboratory Director or the Technical Manager (or designee) prior to purchase.

11.3.2) Receiving

It is the responsibility of the laboratory associate (typically sample receiving personnel) to receive the shipment. Once the ordered reagents or materials are received, the analyst compares the information on the label or packaging to the original order to ensure that the purchase meets the quality level specified and documents the date the materials were received. Refer to SOP *KNOX-QA-0001* (*QA-SOP75858*) for further details.

The laboratory associate verifies the lot numbers of received solvents and acids against the pre-approval lists. If a received material is listed as unapproved, or is not listed, it is sequestered and returned to the vendor. Alternatively, the laboratory may test the material for the intended use, and if it is acceptable, document the approval on the approval list. Records of any testing performed locally are maintained on the shared "public" folder on the computer network.

Materials may not be released for use in the laboratory until they have been inspected, verified as suitable for use, and the inspection/verification has been documented.

Safety Data Sheets (SDSs) are available online through a link on the Eurofins EET-Net Sharepoint site:
https://testamerica365.sharepoint.com/sites/EETAIntranet/SitePages/Environment,-Health-and-Safety.aspx
Anyone may review these for relevant information on the safe handling and emergency precautions of on-site chemicals.

11.3.3) Specifications

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Methods used in the laboratory specify the grade of reagent that must be used in the procedure. If the quality of the reagent is not specified, analytical reagent grade will be used. It is the responsibility of the analyst to check the procedure carefully for the suitability of grade of reagent.

Chemicals are assigned expiration from the manufacturer's expiration date and must not be used past any expiration period noted in a method SOP. If expiration dates are not provided, the laboratory may contact the manufacturer to determine an expiration date. The laboratory assumes a five year expiration date on inorganic dry chemicals and solvents unless noted otherwise by the manufacturer or by the reference source method.

Chemicals/solvents should not be used past the manufacturer's or SOP expiration date unless verified as outlined below.

- An expiration date cannot be extended if the dry chemical/solvent is discolored or appears otherwise physically degraded. In this case, the dry chemical/solvent must be discarded.
- Expiration dates can be extended if the dry chemical/solvent is found to be satisfactory based on acceptable performance of quality control samples (Continuing Calibration Verification (CCV), Blanks, Laboratory Control Sample (LCS), etc.).
- If the dry chemical/solvent is used for the preparation of standards, the expiration dates can be extended 6 months if the dry chemical/solvent is compared to an unexpired independent source in performing the method and the performance of the dry chemical/solvent is found to be satisfactory. The comparison must show that the dry chemical/solvent meets CCV limits. The comparison studies are maintained on-file and available for review in the group share on the local area network with the associated scanned calibration files.

Wherever possible, standards must be traceable to national or international standards of measurement or to national or international reference materials. Records to that effect are available to the user.

Compressed gases in use are checked for pressure and secure positioning daily. To prevent a tank from going to dryness, or introducing potential impurities, the pressure should be closely watched as it decreases to approximately 15% of the original reading, at which point it should be replaced. For example, a standard sized laboratory gas cylinder containing 3,000 psig of gas should be replaced when it drops to approximately 500 psig. The quality of the gases must meet method or manufacturer specification or be of a grade that does not cause any analytical interference.

Water used in the preparation of samples, standards or reagents must have a specific conductivity of less than 1-µmho/cm (or specific resistivity of greater than 1.0 megohm-cm) at 25 °C. The specific conductivity is checked and recorded daily. If the water's specific conductivity is greater than the specified limit, the Facility Manager and appropriate Technical Managers must be notified immediately in order to notify all departments, decide on cessation (based on intended use) of activities, and make arrangements for correction.

The laboratory may purchase reagent grade (or other similar quality) water for use in the laboratory. This water must be certified clean by the supplier for all target analytes or otherwise verified by the laboratory prior to use. This verification is documented.

Standard lots are verified before first time use if the laboratory switches manufacturers or has historically had a problem with the type of standard. Spiking standards are verified before use and instrument calibration standards are verified with a second source calibration verification standard.

Purchased bottleware used for sampling must be certified clean and the certificates must be maintained. If uncertified sampling bottleware is purchased, all lots must be verified clean prior to use. The verification records must be maintained.

Tedlar bags purchased by the laboratory must be certified clean and the certificates must be maintained. Tedlar bags are not recommended for trace level analyses as the lab default reporting limits are 20x higher for Tedlar bags than for Summa Canisters.

Records of manufacturer's certification and traceability statements are maintained in each laboratory section. These records include date of receipt, lot number (when applicable), and expiration date (when applicable). Incorporation of the item into the record indicates that the analyst has compared the new certificate with the previous one for the same purpose and that no difference is noted, unless approved and so documented by the Technical Manager or QA Manager.

11.3.4) Storage

Reagent and chemical storage is important from the aspects of both integrity and safety. Light-sensitive reagents may be stored in brown glass containers. Storage conditions are per the NBLSC Environmental Health & Safety Manual, Document No. *NDSC-US-EHS-QP46060*, the local laboratory EH&S manual addendum and method SOPs or manufacturer instructions.

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11.4) Purchase of Equipment / Instruments / Software

When a new piece of equipment is needed, either for additional capacity or for replacing inoperable equipment, the analyst or supervisor makes a supply request to the Technical Manager, Laboratory Director, and/or BUMA. A decision is made as to which piece of equipment can best satisfy the requirements. The appropriate written requests are completed and purchasing places the order.

Upon receipt of a new or used piece of equipment, an identification name is assigned and added to the equipment list. IT must also be notified so that they can synchronize the instrument for back-ups. Its capability is assessed to determine if it is adequate or not for the specific application. For instruments, a calibration curve is generated, followed by MDLs, Demonstration of Capabilities (DOCs), and other relevant criteria (refer to Section 20). For software, its operation must be deemed reliable, and evidence of instrument verification must be retained by the IT Department or QA Department. Software certificates supplied by the vendors are filed with the LIMS Administrator. The manufacturer's operation manual is retained at the bench.

11.5) Service

Service to analytical instruments (except analytical balances) is performed on an as needed basis. Routine preventative maintenance is discussed in Section 20.2. The need for service is determined by analysts and/or Technical Managers. The service providers that perform the services are approved by the Technical Manager.

Analytical balances are serviced and calibrated annually in accordance with SOP *QA-SOP69646*, "Balance Calibration and Weight Verification". The calibration and maintenance services are performed on-site, and the balances are returned to use immediately following successful calibration. Calibration certificates are filed for reference. If the calibration was unsuccessful, the balance is immediately removed from service and segregated pending either further maintenance or disposal.

Calibration services for support equipment such as the balances, thermometers, weight sets, autopipettors, etc., are obtained from vendors with current and valid ISO 17025 accreditation for calibration of the specific piece of equipment. Prior to utilizing the vendor's services, the vendor's accreditation status is verified. Once the equipment has been calibrated, the calibration certificates are reviewed by the QA department, and documentation of the review is filed with the calibration certificates. The equipment is then returned to service in the laboratory.

11.6) Suppliers

The laboratory selects vendors through a competitive proposal / bid process, strategic business alliances or negotiated vendor partnerships (contracts)**.**

This process is defined in the NBLSC document Procurement & Contracts Policy. The level of control used in the selection process is dependent on the anticipated spending amount and the potential impact on the laboratory's business. Vendors that provide test and measuring equipment, solvents, standards, certified containers, instrument related service contracts or subcontract laboratory services shall be subject to more rigorous controls than vendors that provide off-the-shelf items of defined quality that meet the end use requirements. The purchasing system includes all suppliers/vendors that have been approved for use.

Evaluation of suppliers is accomplished by ensuring the supplier ships the product or material ordered and that the material is of the appropriate quality. This is documented by signing off on packing slips or other supply receipt documents. The purchasing documents contain the data that adequately describe the services and supplies ordered.
Any issues of vendor performance are to be reported immediately by the laboratory staff to the Purchasing Group by completing a Vendor Performance Report.

The Purchasing Group will work through the appropriate channels to gather the information required to clearly identify the problem and will contact the vendor to report the problem and to make any necessary arrangements for exchange, return authorization, credit, etc.
Suppliers are subject to re-evaluation, as deemed appropriate, through the use of Vendor Performance Reports used to summarize and review to determine corrective action necessary, or service improvements required by vendors.

The laboratory has access to a listing of all approved suppliers of critical consumables, supplies and services. This information is provided through the purchasing system.

Proficiency testing providers and suppliers of certified reference materials must have appropriate ISO accreditation.

11.6.1) New Vendor Procedure

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Laboratory employees who wish to request the addition of a new vendor must complete a Vendor Add Request Form.

New vendors are evaluated based upon criteria appropriate to the products or services provided as well as their ability to provide those products and services at a competitive cost. Vendors are also evaluated to determine if there are ethical reasons or potential conflicts of interest with laboratory employees that would make it prohibitive to do business with them as well as their financial stability. The QA Department and/or the Technical Services Director are consulted with vendor and product selection that have an impact on quality.

12) Complaints

12.1) Overview

The laboratory considers an effective client complaint handling processes to be of significant business and strategic value. Listening to and documenting client concerns captures client knowledge that enables our operations to continually improve processes and client satisfaction. An effective client complaint handling process also provides assurance to the data user that the laboratory will stand behind its data, service obligations and products.

A client complaint is any expression of dissatisfaction with any aspect of our business services (e.g., communications, responsiveness, data, reports, invoicing and other functions) expressed by any party, whether received verbally or in written form. Client inquiries, complaints, or noted discrepancies are documented, communicated to management, and addressed promptly and thoroughly. These must also be communicated to QA for trending and/or formal investigation.

The laboratory has procedures for addressing complaints with the goal of providing satisfactory resolution in a timely and professional manner.

The nature of the complaint is identified, documented and investigated, and an appropriate action is determined and taken. In cases where a client complaint indicates that an established policy or procedure was not followed, the QA Department must evaluate whether a special audit must be conducted to assist in resolving the issue. A written confirmation or letter to the client, outlining the issue and response taken is recommended as part of the overall action taken. This may be handled by the PM following-up with the client on the resolution. If a client requires a letter detailing the investigation and actions, the letter may be written by department management and/or QA but must be approved by QA.

The process of complaint resolution and documentation utilizes the procedures outlined in Section 14 (Corrective Actions) and is documented following the procedure for Nonconformance and Corrective Action System (SOP *QA-SOP71051*). Client complaints are summarized in the monthly QA Reports to Management. It is the laboratory's goal to provide a satisfactory resolution to complaints in a timely and professional manner.

12.2) External Complaint Processing

An employee that receives a complaint initiates the complaint resolution process by first documenting the complaint.

Complaints fall into two categories: correctable and non-correctable. An example of a correctable complaint would be one where a report re-issue would resolve the complaint. An example of a non-correctable complaint would be one where a client complains that their data was repeatedly late. Non-correctable complaints should be reviewed for preventive action measures to reduce the likelihood of future occurrence and mitigation of client impact.

The general steps in the complaint handling process are:

- Receiving and documenting complaints
- Acknowledging receipt of complaint, whenever possible
- Complaint investigation and service recovery
- Process improvement

The laboratory shall inform the initiator of the complaint of the results of the investigation and the corrective action(s) taken, if any.

12.2.3) Internal Complaints

Internal complaints include, but are not limited to: errors and non-conformances, training issues, internal audit findings, and deviations from methods. Corrective actions may be initiated by any staff member who observes a nonconformance and shall follow the procedures outlined in Section 14. In addition, Executive Management, Sales and Marketing and IT may initiate a complaint by contacting the laboratory or through the corrective action system described in Section 14.

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12.2.4) Management Review
The number and nature of client complaints is reported by the QA Manager to the Laboratory Director and Quality Director in the QA Monthly report. Monitoring and addressing the overall level and nature of client complaints and the effectiveness of the solutions is part of the Annual Management Systems Review (Section 18).

13) Control of Nonconforming Work

13.1) Overview

When data discrepancies are discovered or deviations and departures from laboratory SOPs, policies and/or client requests have occurred, corrective action is taken immediately. First, the laboratory evaluates the significance of the nonconforming work. Then, a corrective action plan is initiated based on the outcome of the evaluation. If it is determined that the nonconforming work is an isolated incident, the plan could be as simple as adding a qualifier to the final results and/or making a notation in the case narrative. If it is determined that the nonconforming work is a systematic or improper practices issue, the corrective action plan could include a more in depth investigation and a possible suspension of an analytical method. In all cases, the actions taken are documented using the laboratory's corrective action system (refer to Section 14).

Due to the frequently unique nature of environmental samples, sometimes departures from documented policies and procedures are needed. When an analyst encounters such a situation, the problem is presented to the supervisor for resolution. The supervisor may elect to discuss it with the Technical Manager or have a representative contact the client to decide on a logical course of action. Once an approach is agreed upon, the analyst documents it using the laboratories corrective action system described in Section 14. This information can then be supplied to the client in the form of a footnote or a case narrative with the report.

Project Management may encounter situations where a client may request that a special procedure be applied to a sample that is not standard laboratory practice. Based on a technical evaluation, the laboratory may accept or opt to reject the request based on technical or ethical merit. An example might be the need to report a compound that the laboratory does not normally report. The laboratory would not have validated the method for this compound following the procedures in Section 21. The client may request that the compound be reported based only on the calibration. Such a request would need to be approved by the Technical Manager and QA Manager, documented and included in the project folder. Deviations must also be noted on the final report with a statement that the compound is not reported in compliance with TNI (or the analytical method) requirements and the reason. Data being reported to a non-TNI state would need to note the change made to how the method is normally run.

13.2) Responsibilities and Authorities

Under certain circumstances, the BUMA/LD, a Technical Manager, or a member of the QA team may authorize departures from documented procedures or policies. The departures may be a result of procedural changes due to the nature of the sample; a one-time procedure for a client; QC failures with insufficient sample to reanalyze, etc. In most cases, the client will be informed of the departure prior to the reporting of the data. Any departures must be well documented using the laboratory's corrective action procedures. This information may also be documented in logbooks and/or data review checklists as appropriate. Any associated data must be referenced in a case narrative and/or flagged with an appropriate data qualifier.

Any misrepresentation or possible misrepresentation of analytical data discovered by any laboratory staff member must be reported to the laboratory Senior Management within 24-hours. The Senior Management staff is comprised of the BUMA/LD, the QA Manager, and the Technical Managers. The reporting of issues involving alleged violations of the company's Ethics and Data Integrity Policy or Manual Integration procedures must be conveyed to an ECO (e.g., the VP-QA/EHS) and the laboratory's Quality Director within 24 hours of discovery.

Whether an inaccurate analytical result was reported due to calculation or quantitation errors, data entry errors, improper practices, or failure to follow SOPs, the data must be evaluated to determine the possible effect and include full root cause investigation and corrective action(s).

The BUMA/LD, QA Manager, ECOs, VP-QA/EHS, and the Quality Directors have the authority and responsibility to halt work, withhold final reports, or suspend an analysis for due cause as well as authorize the resumption of work once the investigation has been completed, root cause(s) determined and corrective action(s) implemented.

13.3) Evaluation of Significance and Actions Taken
For each nonconforming issue reported, an evaluation of its significance and the level of management involvement needed is made. This includes reviewing its effect on the final data, whether or not it is an isolated or a systematic issue, potential for recurrence and actions for prevention, and how it relates to any special client or program requirements.

The NBLSC Document *NDSC-CAR-SOP38229* – Nonconforming Work is the procedure to be followed when it is discovered that erroneous or biased data may have been reported to clients or regulatory agencies.

The NBLSC Document *NDSC-CAR-QP5341* - Investigation and Corrective Action Process Policy is the procedure to be followed for investigation and correction of situations involved alleged incidents of misconduct or violation of the company's ethics policy.

Laboratory level decisions are documented and approved using the laboratory's standard nonconformance/corrective action reporting in lieu of the data recall determination form contained in NDSC Document *NDSC-CAR-SOP38229*.

13.4) Method Suspension / Restriction (Stop Work Procedures)

In some cases, it may be necessary to suspend/restrict the use of a method or target analyte which constitutes significant risk and/or liability to the laboratory. Suspension/restriction procedures can be initiated by designated persons as noted in Section 13.2.

Prior to suspension/restriction, confidentiality will be respected, and the problem with the required corrective and preventive action(s) will be stated in writing and presented to the BUMA.

The BUMA shall arrange for the appropriate personnel to meet with the QA Manager as needed. This meeting shall be held to confirm that there is a problem, that suspension/restriction of the method is required and will be concluded with a discussion of the steps necessary to bring the method/target or test fully back on line. In some cases, that may not be necessary if all appropriate personnel have already agreed there is a problem and there is agreement on the steps needed to bring the method, target or test fully back on line. The QA Manager will initiate a corrective action report as described in Section 14 if one has not already been started. A copy of any meeting notes and agreed upon steps should be e-mailed by the laboratory to their Business Unit President and the VP-QA/EHS. This e-mail serves as notification of the incident.

After suspension/restriction, the laboratory will hold all reports to clients pending review. No faxing, mailing, or distributing through electronic means may occur. The report must not be posted for viewing on the internet. It is the responsibility of the BUMA/LD to hold all reporting and to notify all relevant laboratory personnel regarding the suspension/restriction (e.g., Project Management, Log-in, etc.). Clients, generally, will NOT be notified at this time. Analysis may proceed in some instances depending on the nonconformance issue.

Within 72 hours, the QA Manager will determine if the issue has been addressed and compliance is now met and reports can be released, OR determine the plan of action with timeline to bring work into compliance, and release work. A team, with all principals involved (e.g., BUMA/LD, Technical Manager, QA Manager) can devise a start-up plan to cover all steps from client notification through compliance and release of reports. Project Management and the Directors of Client Services and Sales and Marketing must be notified if clients must be notified or if the suspension/restriction affects the laboratory's ability to accept work.

The QA Manager must approve resumption of work or elimination of any restrictions after the investigation is complete with root cause(s) determined and corrective action(s) implemented.

14) Corrective Action
14.1) Overview

A major component of the laboratory's QA Program is the problem investigation and feedback mechanism designed to keep the laboratory staff informed on quality related issues and to provide insight to problem resolution. When nonconforming work or departures from policies and procedures in the quality system or technical operations are identified, the corrective action procedure provides a systematic approach to assess the issues, restore the laboratory's system integrity, and prevent reoccurrence.

The laboratory employs two systems to manage nonconformances. Issues suspected of being systematic in nature and for which full investigation with root cause analysis and a formal Corrective Action Report (CAR) required are documented in the

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laboratory's CAR (ICAT) database. Routine batch non-conformances, events that are understood to be isolated in nature, are documented using the LIMS nonconformance memo (NCM) system.

14.2) General Processes

Problems within the quality system or within analytical operations may be discovered in a variety of ways, such as QC sample failures, internal or external audits, proficiency testing (PT) performance, client complaints, staff observation, etc.

The purpose of a corrective action system is to:
- Identify non-conformance events and assign responsibility for investigating
- Resolve non-conformance events and assign responsibility for any required corrective action
- Identify systematic problems before they become serious
- Identify and track client complaints and provide resolution

The CAR (ICAT) database is used to document background information, assigned tasks with the responsible staff, timelines, results of corrective action investigations and root cause analysis, details of the planned corrective action(s), and follow-up.

14.2.1) Non-Conformance Memo (NCM)

NCMs are used to document the following types of corrections / corrective actions:

- Deviations from an established procedure or SOP
- QC outside of limits
- Isolated reporting / calculation errors
- Client complaints (minor, isolated issues)
- Discrepancies in materials / goods received vs. manufacturer packing slips (documentation other than NCMs in LIMS are also acceptable)

See SOP *QA-SOP71051*, Nonconformance and Corrective Action, current revision, for details.

14.2.2) Corrective Actions Documented in the ICAT Database
- Internal and external audit findings
- Failed or unacceptable PT results
- Identified poor process or method performance trends
- Systematic reporting / calculation errors
- Data recall investigations
- Questionable trends that are found in the review of NCMs
- Client complaints
- Excessive revised reports

The ICAT database is used to document background information, track the results of corrective action investigations and root cause analysis, and to provide reports of corrective action plans.

14.3) Corrective Action Process Steps

Any employee in the company can initiate a corrective action. There are four main components to a corrective action process once an issue has been identified: Cause Analysis, Selection and Implementation of Corrective Actions (both short and long term), Monitoring of the Corrective Actions, and Follow-up.

14.3.1) Cause Analysis

- Upon discovery of a nonconformance event, the event must be defined and documented. An entry into the CAR (ICAT) system must be initiated, someone is assigned to investigate the issue and the event is investigated for cause.
- The cause analysis step is the key to the process as a long term corrective action cannot be determined until the cause is determined.
- If the cause is not readily obvious, the Technical Manager, BUMA/LD, and/or QA Manager (or QA designee) is consulted.

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14.3.2) Selection and Implementation of Corrective Actions

- Where corrective action is needed, the laboratory shall identify potential corrective actions. The action(s) most likely to eliminate the problem and prevent recurrence are selected and implemented. Responsibility for implementation is assigned.
- Corrective actions shall be to a degree appropriate to the magnitude of the problem identified through the cause analysis.
- Whatever corrective action is determined to be appropriate, the laboratory shall document and implement the changes.

The CAR record is used for this documentation.

14.3.3) Root Cause

Root Cause Analysis is a class of problem solving (investigative) methods aimed at identifying the basic or causal factor(s) that underlie variation in performance or the occurrence of a significant failure. The root cause may be buried under seemingly innocuous events, many steps preceding the perceived failure. At first glance, the immediate response is typically directed at a symptom and not the cause. Typically, root cause analysis would be best with three or more incidents to triangulate a weakness. NBLSC Document No. *NDSC-CAR-SOP43847* - Management of Root Cause Analysis, provides guidance on this describes the procedure.

Systematically analyze and document the root causes of the more significant problems that are reported. Identify, track, and implement the corrective actions required to reduce the likelihood of recurrence of significant incidents. Trend the root cause data from these incidents to identify root causes that, when corrected, can lead to dramatic improvements in performance by eliminating entire classes of problems.

Identify the one event associated with problem and ask why this event occurred. Brainstorm the root causes of failures; for example, by asking why events occurred or conditions existed; and then why the cause occurred consecutive times until you get to the root cause. For each of these sub events or causes, ask why it occurred. Repeat the process for the other events associated with the incident.

Root cause analysis does not mean the investigation is over. Look at technique or other systems outside the normal indicators. Often creative thinking will find root causes that ordinarily would be missed and continue to plague the laboratory or operation.

14.3.4) Monitoring of the Corrective Actions

- The Department Manager and QA Manager are responsible to ensure that the corrective action taken was effective.
- Ineffective actions are documented and re-evaluated until acceptable resolution is achieved. Department Managers are accountable to the BUMA/LD to ensure final acceptable resolution is achieved and documented appropriately.
- The QA Manager reviews monthly NCM and CAR records for trends. Highlights are included in the monthly quality metrics report (refer to Section 18.1.). If a significant trend develops that adversely affects quality, an audit of the area is performed and corrective action implemented.
- Any out-of-control situations that are not addressed acceptably at the laboratory level may be reported to the NBLSC Quality Director by the QA Manager, indicating the nature of the out-of-control situation and problems encountered in solving the situation.

14.3.5) Follow-Up Audits

- Follow-up audits may be initiated by the QA Manager and shall be performed as soon as possible when the identification of a nonconformance casts doubt on the laboratory's compliance with its own policies and procedures, or on its compliance with state or federal requirements.
- These audits often follow the implementation of the corrective actions to verify effectiveness. An additional audit would only be necessary when a critical issue or risk to business is discovered. (Also refer to Section 17.1.4. Special Audits)

14.4) Technical Data Corrective Actions

In addition to providing acceptance criteria and specific protocols for technical corrective actions in the method SOPs, the laboratory has general procedures to be followed to determine when departures from the documented policies and procedures and quality control have occurred (refer to Section 13). The documentation of these procedures is through the use of an NCM or record in the ICAT system.

Table 14-1 includes examples of general technical corrective actions. For specific criteria and corrective actions, refer to the analytical methods or specific method SOPs. The laboratory may also maintain Work Instructions on these items that are available upon request.

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Table 14-1 provides some general guidelines for identifying the individual(s) responsible for assessing each QC type and initiating corrective action. The table also provides general guidance on how a data set should be treated if associated QC measurements are unacceptable. Specific procedures are included in Method SOPs, Work Instructions, QA Manual Sections 19 and 20. All corrective actions are reviewed monthly, at a minimum, by the QA Manager and highlights are included in the QA monthly report.

To the extent possible, samples shall be reported only if all quality control measures are acceptable. If the deficiency does not impair the usability of the results, data will be reported with an appropriate data qualifier and/or the deficiency will be noted in the case narrative. Where sample results may be impaired, the PM is notified by an NCM and appropriate corrective action (e.g., reanalysis) is taken and documented.

14.5) Corrections to Data/Records

When mistakes occur in records, each mistake shall be crossed-out with a single line, [not obliterated (e.g. no white-out, erasure, write-overs, scribble out)], and the correct value entered alongside. All such corrections shall be initialed (or signed) and dated by the person making the correction.

This same process applies to adding additional information to a record. All additions made later than the initial must also be initialed (or signed) and dated. When corrections are due to reasons other than obvious transcription errors, the reason for the corrections (or additions) shall also be documented. In the case of records stored electronically, the original uncorrected file must be maintained intact and a second corrected file is created.

Table 14-1. Example – General Corrective Action Procedures

QC Activity (Individual Responsible for Initiation/Assessment)	Acceptance Criteria	Recommended Corrective Action
Initial Instrument Blank *(Analyst)*	- Instrument response < Reporting Limit (RL)[1]	- Prepare another instrument blank. - If same response, determine cause of contamination: reagents, environment, instrument equipment failure, etc.
Initial Calibration Standards *(Analyst, Group Leader)*	- Correlation coefficient r>0.990 for organics and r>0.995 for inorganics or - %RSD within acceptance range. - See details in Method SOP.	- Reanalyze standards. - If still unacceptable, remake standards and recalibrate instrument.
Independent Calibration Verification (Second Source) *(Analyst, Group Leaders)*	- % Recovery within control limits.	- Remake and reanalyze standard. - If still unacceptable, then remake calibration standards or use new primary standards and recalibrate instrument.
Matrix Spike / Matrix Spike Duplicate (MS/MSD) *(Analyst, Data Reviewer)*	- % Recovery within limits documented in TALS.	- If the acceptance criteria for duplicates or matrix spikes are not met because of matrix interferences, the acceptance of the analytical batch is determined by the validity of the LCS. - If the LCS is within acceptable limits the batch is acceptable. - The results of the duplicates, matrix spikes and the LCS are reported with the data set. - For matrix spike or duplicate results outside criteria the data for that sample shall be reported with qualifiers.
Laboratory Control Sample	- % Recovery within limits	- Batch must be re-prepared

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(LCS) and LCSD (where applicable) *(Analyst, Data Reviewer)*	specified in TALS. This includes any allowable marginal exceedance (Marginal Exceedances are not allowed for Ohio VAP).	and re-analyzed. Note: See Method SOPs for further details. For example, if there is insufficient sample or the holding time cannot be met, contact client and report with flags.
Surrogates *(Analyst, Data Reviewer)*	- % Recovery within limits of method or within three standard deviations of the historical mean.	- Individual sample must be repeated. Place comment in LIMS. - Surrogate results outside criteria shall be reported with qualifiers. Note: See Method SOPs for further details. For example, if there is insufficient sample or the holding time cannot be met, contact client and report with flags.
Method Blank (MB) *(Analyst, Data Reviewer)*	< Reporting Limit [1]	- Reanalyze blank. - If still positive, determine source of contamination. If necessary, reprocess (i.e. digest or extract) entire sample batch. Report blank results. - Qualify the result(s) if the concentration of a targeted analyte in the MB is at or above the reporting limit AND is > 1/10 of the amount measured in the sample.
Proficiency Testing (PT) Samples *(QA Manager, Technical Manager(s))*	- Criteria supplied by PT Supplier.	- Any failures or warnings must be investigated for cause. Failures may result in the need to repeat a PT sample to show the problem is corrected.
Internal / External Audits *(QA Manager, Technical Manager(s), Laboratory Director)*	- Defined in Quality System documentation such as SOPs, QAM, etc..	- Non-conformances must be investigated through CAR system and necessary corrections must be made.
Reporting / Calculation Errors (Depends on issue – possible individuals include: Analysts, Data Reviewers, Project Managers, Technical Managers, QA Manager, NDSC QA, Executive Management)	- NDSC Document No. *NDSC-CAR-SOP38229*, Data Recall **or** local SOP No.	- Corrective action is determined by type of error. Follow the procedures in NDSC Document No. *NDSC-ETHC-SOP38228* or *QA-SOP71051*.
Client Complaints *(Project Managers, Lab Director/Manager, Sales and Marketing)*	-	- Corrective action is determined by the type of complaint. For example, a complaint regarding an incorrect address on a report will result in the report being corrected and then follow-up must be performed on the reasons the address was incorrect (e.g., database needs to be updated).

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QA Monthly Report (Refer to Section 16 for an example) (QA Manager, Lab Director/Manager, *Technical Manager(s)*)	- QAM, SOPs.	- Corrective action is determined by the type of issue. For example, CARs for the month are reviewed and possible trends are investigated.
Health and Safety Violation (Safety Officer, Lab Director/Manager, *Technical Manager(s)*)	- Environmental Health and Safety (EHS) Manual.	- Non-conformance is investigated and corrected through CAR system.

Note:
1. See specific method SOPs for acceptance criteria. Concentrations up to five times the reporting limit may be allowed for the common laboratory and reagent contaminants: methylene chloride, toluene, acetone, 2-butanone and phthalates. Some program requirements (e.g. DOD QSM) have more stringent requirements that must be followed when performing work for those programs. For example, DOD QSM requires the Method Blanks < ½ Reporting Limit with common lab contaminants <Reporting Limit.

15) Preventive Action / Improvement

The laboratory's preventive action programs minimize or eliminate potential causes of nonconforming product and/or nonconformance to the quality system. This preventive action process is a proactive and continuous process of improvement activities that can be initiated through feedback from clients, employees, business providers, and affiliates. The QA Department has the overall responsibility to ensure that the preventive action process is in place, and that relevant information on actions is submitted for management review.

Dedicating resources to an effective preventive action system emphasizes the laboratory's commitment to its Quality Systems. It is beneficial to identify and address negative trends before they develop into complaints, problems and corrective actions. Additionally, the laboratory continually strives to improve customer service and client satisfaction through continuous improvements to laboratory systems.

Opportunities for improvement may be discovered through any or all of the following:
- review of the monthly Quality Metrics Report
- trending NCMs
- review of control charts and QC results
- trending proficiency testing (PT) results
- performance of management system reviews
- trending client complaints
- review of processing operations
- staff observations

The monthly Management Systems Metrics Report shows performance indicators in all areas of the laboratory and quality system. These areas include revised reports, corrective actions, audit findings, internal auditing and data authenticity audits, client complaints, PT samples, holding time violations, SOPs, ethics training, etc. The metrics report is reviewed monthly by the laboratory management, NBLSC QA Team, Local and NBLSC Management. These metrics are used in evaluating the management and quality system performance on an ongoing basis and provide a tool for identifying risk and areas for improvement.

Items identified as continuous improvement opportunities to the management system may be issued as goals from the annual management systems review, recommendations from internal audits, Lessons Learned, or as management or NBLSC level initiatives.

The laboratory's corrective action process is integral to implementation of preventive actions. A critical piece of the corrective action process is the implementation of actions to prevent further occurrence of a noncompliance event. Historical review of corrective action and nonconformances provides a valuable mechanism for identifying preventive action opportunities.

1. The following elements are part of a preventive action/process improvement system:

- Identification of an opportunity for preventive action or process improvement

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- Process for the preventive action or improvement
- Define the measurements of the effectiveness of the process once undertaken
- Execution of the preventive action or improvement
- Evaluation of the plan using the defined measurements
- Verification of the effectiveness of the preventive action or improvement
- Close-Out by documenting any permanent changes to the Quality System as a result of the Preventive Action or Process Improvement

Documentation of Preventive Action/Process Improvement is incorporated into the monthly QA reports, corrective action process, and management review.

2. Any preventive actions/process improvement undertaken or attempted shall be taken into account during the annual Management Systems Review (Section 18.2.). A highly detailed report is not required; however, a summary of successes and failures within the preventive action program is sufficient to provide management with a measurement for evaluation.

15.1) Management of Change

The Management of Change process is designed to manage significant events and changes that occur within the laboratory. This is routinely managed by the Laboratory Director with input from the General Manager, the QA Manager, Operations Manager, Technical Managers, Group Leaders, and IT support staff. Through these procedures, the potential risks inherent with a new event or change are identified and evaluated. The risks are minimized or eliminated through pre-planning and the development of preventive measures. The types of changes covered under this system include: Facility Changes, Major Accreditation Changes, Addition or Deletion to Division's Capabilities or Instrumentation, Key Personnel Changes, Laboratory Information Management System (LIMS) changes. See NBLSC Document *NDSC-US-MCC-QP5339* - Change Control.

16) Control of Records

The laboratory maintains a records management system appropriate to its needs and that complies with applicable standards or regulations as required. The system produces unequivocal, accurate records that document all laboratory activities. The laboratory retains all original observations, calculations and derived data, calibration records and a copy of the analytical report for a minimum of five years after it has been issued. Exceptions for programs with longer retention requirements are discussed in Section 16.2.

16.1) Overview

The laboratory has established procedures for identification, collection, indexing, access, filing, storage, maintenance and disposal of quality and technical records. A record index is listed in Table 16-1. More detailed information on retention of specific records is provided in NBLSC Document Nos. *NDSC-US-LEG-QP54927* - Records Retention Policy and *NDSC-US-LEG-FRM58366* - Records Retention / Storage Schedule. Quality records are maintained by the QA department in a database, which is backed up as part of the regular laboratory backup. Records are of two types; either electronic or hard copy paper formats depending on whether the record is computer or hand generated (some records may be in both formats). Technical records are maintained by Group Leaders and the local IT staff.

Table 16.1 Record Index

	Record Types [1]:	**Retention Time:**
Technical Records	- Raw Data - Logbooks[2] - Standards - Certificates - Analytical Records - MDLs/IDLs/DOCs - Lab Reports	5 Years from analytical report issue*
Official Documents	- Quality Assurance Manual (QAM) - Work Instructions - Policies - SOPs - Policy Memorandums - Manuals - Published Methods	Indefinitely

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	Record Types [1]:	Retention Time:
QA Records	- Certifications - Method and Software Validation / Verification Data	Indefinitely
QA Records	- Internal & External Audits/Responses - Corrective/Preventive Actions - Management Reviews - Data Investigation	5 Years from archival* **Data Investigation:** 5 years or the life of the affected raw data storage whichever is greater (beyond 5 years if ongoing project or pending investigation)
Project Records	- Sample Receipt & COC Documents - Contracts and Amendments - Correspondence - QAPP - SAP - Telephone Logbooks - Lab Reports	5 Years from analytical report issue*
Administrative Records	Financial and Business Operations	Refer to *NDSC-US-LEG-FRM58366*
	EH&S Manual, Permits	Indefinitely
	Disposal Records	Indefinitely
	Employee Handbook	Indefinitely
	Personnel files, Employee Signature & Initials, Administrative Training Records (e.g., Ethics)	Refer to HR Manual
	Administrative Policies	Indefinitely
	Technical Training Records	7 years
	Legal Records	Indefinitely
	HR Records	Refer to *NDSC-US-LEG-FRM58366*
	IT Records	Refer to *NDSC-US-LEG-FRM58366*
	NDSC Governance Records	Refer to *NDSC-US-LEG-FRM58366*
	Sales & Marketing	5 years
	Real Estate	Indefinitely

[1] Record Types encompass hardcopy and electronic records.
[2] Examples of Logbook types: Maintenance, Instrument Run, Preparation (standard and samples), Standard and Reagent Receipt, Archiving, Balance Calibration, Temperature (hardcopy or electronic records).
* Exceptions listed in Table 16-2.

All records are stored and retained in such a way that they are secure and readily retrievable at the laboratory facility. All records shall be protected against fire, theft, loss, environmental deterioration, and vermin. In the case of electronic records, electronic or magnetic sources, storage media are protected from deterioration caused by magnetic fields and/or electronic deterioration.

Access to the data is limited to laboratory and company employees and is documented with an access log. Records are maintained for a minimum of five years unless otherwise specified by a client or regulatory requirement.

For raw data and project records, record retention shall be calculated from the date the project report is issued. For other records, such as NBLSC Documents, QA, or Administrative Records, the retention time is calculated from the date the record is formally retired.

16.2) Programs with Longer Retention Requirements

Some regulatory programs have longer record retention requirements than the standard record retention time. These are detailed in the table below with their retention requirements. In these cases, the longer retention requirement is enacted. If special instructions exist such that client data cannot be destroyed prior to notification of the client, the container or box containing that data is marked as to who to contact for authorization prior to destroying the data.

Program	[1]Retention Requirement
Drinking Water – All States	10 years (lab reports and raw data) 10 years - Radiochemistry (project records)
Drinking Water Lead and Copper Rule	12 years (project records)
DOE Hanford	5 years, Written approval must be received from DOE Hanford prior to disposal of analytical data

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Commonwealth of MA – All environmental data 310 CMR 42.14	10 years
FIFRA – 40 CFR Part 160	Retain for life of research or marketing permit for pesticides regulated by EPA
Housing and Urban Development (HUD) Environmental Lead Testing	10 years
Alaska	10 years
Louisiana – All	10 years
Michigan Department of Environmental Quality – all environmental data	10 years
Navy Facilities Engineering Service Center (NFESC)	10 years
Ohio VAP	10 years and State contacted prior to disposal
OSHA	30 years

[1]Note: Extended retention requirements must be noted with the archive documents or addressed in facility-specific records retention procedures.

The laboratory has procedures to protect and back-up records stored electronically and to prevent unauthorized access to or amendment of these records. All analytical data is maintained as hard copy or in a secure readable electronic format.

The record keeping system allows for historical reconstruction of all laboratory activities that produced the analytical data, as well as rapid recovery of historical data (Records stored off site should be accessible within 2 days of a request for such records). The history of the sample from when the laboratory took possession of the samples must be readily understood through the documentation. This shall include inter-laboratory transfers of samples and/or extracts.

- The records include the identity of personnel involved in sampling, sample receipt, preparation, or testing. All analytical work contains the initials (at least) of the personnel involved. The laboratory's copy of the COC is stored with the invoice and the work order sheet generated by LIMS. The chain of custody would indicate the name of the sampler. If any sampling notes are provided with a work order, they are kept with this package.
- All information relating to the laboratory facilities' equipment, analytical test methods, and related laboratory activities, such as sample receipt, sample preparation, or data verification are documented.
- The record keeping system facilitates the retrieval of all working files and archived records for inspection and verification purposes (e.g., set format for naming electronic files, set format for what is included with a given analytical data set). Instrument data is stored sequentially by instrument. A given day's analyses are maintained in the order of the analysis. Run logs are maintained for each instrument or method; a copy of each day's run log or instrument sequence is stored with the data to aid in re-constructing an analytical sequence. Where an analysis is performed without an instrument, bound logbooks or bench sheets are used to record and file data. Standard and reagent information is recorded in logbooks or entered into LIMS for each method as required.
- Changes to electronic records in LIMS or instrument data are recorded in audit trails.
- The reason for a signature or initials on a document is clearly indicated in the records such as "sampled by," "prepared by," "reviewed by", or "analyzed by".
- All generated data except those that are generated by automated data collection systems, are recorded directly, promptly and legibly in permanent dark ink.
- Hard copy data may be scanned into PDF format for record storage as long as the scanning process can be verified in order to ensure that no data is lost and the data files and storage media must be tested to verify the laboratory's ability to retrieve the information prior to the destruction of the hard copy that was scanned. The procedure for scanning the records is discussed in *NDSC-US-LEG-QP54927*, Records Retention Policy.
- Also refer to Section 19.15.1 'Computer and Electronic Data Related Requirements'.

16.3) Technical and Analytical Records

The laboratory retains records of original observations, derived data and sufficient information to establish an audit trail, calibration records, staff records and a copy of each analytical report issued, for a minimum of five years unless otherwise specified by a client or regulatory requirement. The records for each analysis shall contain sufficient information to enable the analysis to be repeated under conditions as close as possible to the original. The records shall include the identity of laboratory personnel responsible for the sampling, performance of each analysis and reviewing results.

Observations, data and calculations are recorded real-time and are identifiable to the specific task. Changes to electronic records in LIMS or instrument data are recorded in audit trails.

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The essential information to be associated with analysis, such as instrument printouts, computer data files, analytical notebooks, and run logs, include:

- Laboratory sample ID code;
- Date of analysis; time of analysis is also required if the holding time is seventy-two (72) hours or less, or when time critical steps are included in the analysis (e.g., drying times, incubations, etc.); instrumental analyses have the date and time of analysis recorded as part of their general operations. Where a time critical step exists in an analysis, location for such a time is included as part of the documentation in a specific logbook or on a benchsheet;
- Instrumentation identification and instrument operating conditions/parameters - operating conditions/parameters are typically recorded in instrument maintenance logs where available;
- analysis type;
- all manual calculations and manual integrations;
- analyst's or operator's initials/signature;
- sample preparation including cleanup, separation protocols, incubation periods or subculture, ID codes, volumes, weights, instrument printouts, meter readings, calculations, reagents;
- test results;
- standard and reagent origin, receipt, preparation, and use;
- calibration criteria, frequency and acceptance criteria;
- data and statistical calculations, review, confirmation, interpretation, assessment and reporting conventions;
- quality control protocols and assessment;
- electronic data security, software documentation and verification, software and hardware audits, backups, and records of any changes to automated data entries; and
- Method performance criteria including expected quality control requirements. These are indicated both in LIMS and on specific analytical report formats.

All logbooks used during receipt, preparation, storage, analysis, and reporting of samples or monitoring of support equipment shall undergo a periodic, documented supervisory or peer review.

16.4) Laboratory Support Activities

In addition to documenting all the above-mentioned activities, the following are retained QA records and project records (previous discussions in this section relate where and how these data are stored):

- all original raw data, whether hard copy or electronic, for calibrations, samples and quality control measures, including analysts' work sheets and data output records (chromatograms, strip charts, and other instrument response readout records);
- a written description or reference to the specific test method used which includes a description of the specific computational steps used to translate parametric observations into a reportable analytical value;
- copies of final reports;
- archived SOPs;
- correspondence relating to laboratory activities for a specific project;
- all corrective action reports, audits and audit responses;
- proficiency test results and raw data; and
- results of data review, verification, and overchecking procedures

16.4.1) Sample Handling Records

Records of all procedures to which a sample is subjected while in the possession of the laboratory are maintained. These include but are not limited to records pertaining to:

- sample preservation including appropriateness of sample container and compliance with holding time requirement;
- sample identification, receipt, acceptance or rejection and login;
- sample storage and tracking including shipping receipts, sample transmittal / COC forms; and
- procedures for the receipt and retention of samples, including all provisions necessary to protect the integrity of samples.

16.5) Administrative Records

The laboratory also maintains the administrative records in either electronic or hard copy form. Refer to Table 16-1.

16.6) Records Management, Storage and Disposal

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All records (including those pertaining to test equipment), certificates and reports are safely stored, held secure and in confidence to the client. Certification related records are available upon request.

All information necessary for the historical reconstruction of data is maintained by the laboratory. Records that are stored only on electronic media must be supported by the hardware and software necessary for their retrieval. Records that are stored or generated by computers or personal computers have hard copy, write-protected backup copies, or an electronic audit trail controlling access**.**

The laboratory has a record management system of laboratory notebooks, instrument logbooks, standards logbooks, and records for data reduction, validation, storage and reporting. Laboratory notebooks are sequentially numbered by QA and issued to the analytical group as needed. Bench sheets are filed and archived with the project raw data. Completed logbooks are returned to QA for archive storage. Records are considered archived when moved to the archive server on the local area network or when logbooks are turned in to QA for storage. Access to archived hard-copy information is documented with in/out cards.

Additional details can be found in Document Control SOP *KNOX-QA-0011* (*QA-SOP75849*) and Instrument Records and Logbooks SOP *KNOX-QA-0013* (*QA-SOP75850*).

16.6.1) Transfer of Ownership

In the event that the laboratory transfers ownership or goes out of business, the laboratory shall ensure that the records are maintained or transferred according to client's instructions. Upon ownership transfer, record retention requirements shall be addressed in the ownership transfer agreement and the responsibility for maintaining archives is clearly established. In addition, in cases of bankruptcy, appropriate regulatory and state legal requirements concerning laboratory records must be followed. In the event of the closure of the laboratory, all records will revert to the control of NBLSC. Should the entire company cease to exist, as much notice as possible will be given to clients and the accrediting bodies who have worked with the laboratory during the previous 5 years of such action.

16.6.2) Records Disposal

Records are removed from the archive and destroyed after 5 years unless otherwise specified by a client or regulatory requirement. On a project specific or program basis, clients may need to be notified prior to record destruction. Records are destroyed in a manner that ensures their confidentiality such as shredding, mutilation or incineration. (Refer to Tables 16-1 and 16-2).

Electronic copies of records must be destroyed by erasure or physically damaging off-line storage media so no records can be read.

If a third party records management company is hired to dispose of records, a "Certificate of Destruction" is required. [Refer to Policy No. *NDSC-US-LEG-QP54927* (Records Retention).]

17) Audits

17.1) Internal Audits

Internal audits are performed to verify that laboratory operations comply with the requirements of the laboratory's quality system and with the external quality programs under which the laboratory operates. Audits are planned and organized by the QA staff. Personnel conducting the audits should be independent of the area being evaluated. Auditors will have sufficient authority, access to work areas, and organizational freedom necessary to observe all activities affecting quality and to report the assessments to laboratory management and, when requested, to NBLSC Management.

Audits are conducted and documented as described in the NDSC Policy on performing Internal Auditing, SOP *NDSC-IA-SOP5260*. The types and frequency of routine internal audits are described in Table 17-1. Special or ad hoc assessments may be conducted as needed under the direction of the QA staff.

Table 17-1. Types of Internal Audits and Frequency

Description	Performed by	Frequency

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Description	Performed by	Frequency
Quality Systems Audits	QA Department, QA approved designee, or NDSC QA	All areas of the laboratory annually
Method Audits QA Technical Audits	Joint responsibility: a) QA Manager or designee b) Technical Manager or Designee (Refer to *NDSC-IA-SOP5260*)	QA Technical Audits Frequency: 50% of methods annually
SOP Method Compliance	Joint responsibility: a) QA Manager or designee b) Technical Manager or Designee (Refer to *NDSC-IA-SOP5260*)	SOP Compliance Review Frequency: • Every 2 years • Every 1 year (Drinking Water Methods) • 100% of SOPs annually (DoD/DOE Labs)
Special	QA Department or Designee	Surveillance or spot checks performed as needed, e.g., to confirm corrective actions from other audits.
Performance Testing	Analysts with QA oversight	Two successful per year for each TNI field of testing or as dictated by regulatory requirements

17.1.1) Annual Quality Systems Audit

An annual quality systems audit is required to ensure compliance to analytical methods and SOPs, Eurofins Data Integrity and Ethics Policies (see Sec. 7.2), TNI quality systems, regulatory program, client, and state requirements, and the effectiveness of the internal controls of the analytical process, including but not limited to data review, quality controls, preventive action and corrective action. The completeness of earlier corrective actions is assessed for effectiveness & sustainability. The audit is divided into sections for each operating or support area of the lab, and each section is comprehensive for a given area. The area audits may be performed on a rotating schedule throughout the year to ensure adequate coverage of all areas. This schedule may change as situations in the laboratory warrant.

Note: Part of the quality systems audit relates to regulatory compliance. An assessment of the laboratory's compliance to regulatory requirements is performed by NBLSC QA through monthly management reports, review of client and regulatory concerns and also through periodic on-site evaluations.
The annual quality systems audit must include a review of logbooks and benchsheets used in laboratory areas as well as the items listed in the Internal Audit Checklists as described in *NDSC-IA-SOP5260*.

17.1.2) QA Technical Audits

These audits assess data authenticity and analyst integrity. These audits are based on client projects, associated sample delivery groups, and the methods performed. Reported results are compared to raw data to verify the authenticity of results. The validity of calibrations and QC results are compared to data qualifiers, footnotes, and case narratives. Documentation is assessed by examining run logs and records of manual integrations. Manual calculations are checked. Where possible, electronic audit miner programs (e.g., Chrom AuditMiner) are used to identify unusual manipulations of the data deserving closer scrutiny. QA technical audits will include all methods within a two-year period.

The QA Technical Audits must include a review of raw sample data, calibration data and QC data records.

17.1.3) SOP Method Compliance

Compliance of all SOPs with the source methods and compliance of the operational groups with the SOPs will be assessed by the Technical Manager or qualified designee at least every two years. (Annually for methods and administrative SOPs related to DoD/DOE programs and DW compliance methods - where applicable) It is also recommended that the work of each newly hired analyst is assessed within 3 months of working independently, (e.g., completion of method IDOC). In addition, as analysts add methods to their capabilities, (new IDOC) reviews of the analyst work products will be performed within 3 months of completing the documented training.

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17.1.4) Special Audits
Focused audits conducted on an as needed basis, generally as a follow up to specific issues such as client complaints, corrective actions, PT results, data audits, system audits, validation comments, regulatory audits or suspected ethical improprieties. Special audits are focused on a specific issue, and report format, distribution, and timeframes are designed to address the nature of the issue.

17.1.5) Performance Testing
The laboratory participates semi-annually in performance audits conducted through the analysis of PT samples provided by a third party. The laboratory generally participates in the following types of PT studies: Drinking Water, Non-potable Water, Soil, Tissue and Air. It is Eurofins policy that PT samples be treated as typical samples in the production process. Furthermore, where PT samples present special or unique problems, in the regular production process they may need to be treated differently, as would any special or unique request submitted by any client. The QA Manager must be consulted and in agreement with any decisions made to treat a PT sample differently due to some special circumstance. Full root cause investigations for unacceptable PT results are required. In some cases it may be necessary for blind QC samples to be submitted to the laboratory to show a return to control.

17.2) External Audits
External audits are performed when certifying agencies or clients conduct inspections (either on-site or remote) or submit performance testing samples to the laboratory for analysis. It is Eurofins policy to cooperate fully with regulatory authorities and clients. The laboratory makes every effort to provide the auditors with access to personnel, documentation, and assistance. Laboratory supervisors are responsible for providing corrective actions to the QA Manager who coordinates the response. Audit responses are due in the time allotted by the client or agency performing the audit.

The laboratory cooperates with clients and their representatives to monitor the laboratory's performance in relation to work performed for the client. The client may only view data and systems related directly to the client's work. All efforts are made to keep other client information confidential.

During audits, auditors may come into possession of information claimed as Confidential Business Information (CBI). A business confidentiality claim is defined as "a claim or allegation that business information is entitled to confidential treatment for reasons of business confidentiality or a request for a determination that such information is entitled to such treatment." When information is claimed as business confidential, the laboratory must place on (or attach to) the information at the time it is submitted to the auditor, a cover sheet, stamped or typed legend or other suitable form of notice, employing language such as "trade secret", "proprietary" or "company confidential". Confidential portions of documents otherwise non-confidential must be clearly identified. CBI may be purged of references to client identity by the responsible laboratory official at the time of removal from the laboratory. However, sample identifiers may not be obscured from the information. Additional information regarding CBI can be found in within the TNI Standard.

17.3) Audit Findings
Audit findings, deviations, or however named are documented using the corrective action process and database (see Section 14). The laboratory's corrective action documentation must include the investigation, root cause(s), actions(s) with timelines and supporting documentation of proof of completion. The responses to the agency or client may include action plans that could not be completed prior to the response due date. In these instances, a targeted completion date must be set and agreed to by operations management and the QA Manager.

Developing and implementing corrective actions to findings is the responsibility of the department manager where the finding originated. Findings that are not corrected by specified due dates are reported monthly to management in the monthly quality metrics report.

If any audit finding casts doubt on the effectiveness of the operations or on the correctness or validity of the laboratory's test results, the laboratory shall take timely corrective action, and shall notify clients in writing if the investigations show that the laboratory results have been affected. Once corrective action is implemented, a follow-up evaluation is scheduled to ensure that the problem has been corrected.

Clients must be notified promptly in writing of any event such as the identification of defective measuring or test equipment that casts doubt on the validity of results given in any test report or amendment to a test report. The investigation must begin within 24 hours of confirmation of the problem and all efforts are made to notify the client within two weeks after the completion of the investigation.

18) Management Reviews

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18.1) Quality Metrics Report

The QA Department is responsible for preparing a comprehensive monthly quality metrics report to Management to keep them apprised of current quality system related issues. This report fosters communication, review, and refinement of the quality system to evaluate the suitability of policies and procedures to meet both regulatory and laboratory quality objectives.

The NBLSC QA team compiles information from all of the Eurofins Environment Testing laboratories monthly quality metrics reports for the Executive Management team. This report includes, but is not limited to, notable information and concerns regarding the laboratory's quality system programs, overall concerns across the laboratories, information regarding new regulations that may affect the Eurofins businesses.

18.2) Annual Management Review

The BU management team (BUMA, Laboratory Director, Technical Managers, QA Manager) conducts a review annually of its quality and management systems to ensure its continuing suitability and effectiveness in meeting client and regulatory requirements and to introduce any necessary changes or improvements. It will also provide a platform for defining goals, objectives and action items that feed into the laboratory planning system. NBLSC personnel are included in this meeting at the discretion of the BUMA. The LIMS review consists of examining any audits, complaints or concerns that have been raised through the year that are related to LIMS. The laboratory will summarize any critical findings that cannot be solved by the lab and report them to NTS IT.

Details on the review process and agenda topics to be addressed are covered in SOP *IA-QP38702* Management Systems Review. Checklists/templates that are used are available under document *NDSC-IA-FRM43453* - Annual Management Systems Review Checklists. The review uses information generated during the preceding year to assess the "big picture" by ensuring that routine actions taken and reviewed on a monthly basis are not components of larger systematic concerns. The monthly review should keep the quality systems current and effective, therefore, the annual review is a formal senior management process to review specific existing documentation.

Significant issues from the following documentation are compiled or summarized by the QA Manager prior to the review meeting:

- Matters arising from the previous annual review
- Prior Monthly QA Reports issues
- Laboratory QA Metrics
- Review of report reissue requests
- Review of client feedback and complaints
- Issues arising from any prior management or staff meetings
- Minutes from prior senior lab management meetings. Issues that may be raised from these meetings include:
    - Adequacy of staff, equipment and facility resources
    - Adequacy of policies and procedures
    - Future plans for resources and testing capability and capacity
- The annual internal double blind PT program sample performance (if performed)
- Compliance to the Ethics and Data Integrity Policy. Including any evidence/incidents of inappropriate actions or vulnerabilities related to data Integrity.
- For labs analyzing radioactive samples, also include the following:
    - Radiation health and safety
    - Radioactive hazardous waste management
    - Radioactive materials management
- Evaluation of overall risk, including risks to impartiality, confidentiality, reporting statements of conformity, and nonconforming work

A report is generated by the QA Manager and management. The report is distributed to the President of the Business Unit, Business Unit Manager and NBLSC Quality Director. The report includes, but is not limited to:

- The date of the review and the names and titles of participants
- A reference to the existing data quality related documents and topics that were reviewed
- Quality system or operational changes or improvements that will be made as a result of the review [e.g., an implementation schedule including assigned responsibilities for the changes (Action Table)].

Changes to the quality systems requiring update to the laboratory QA Manual shall be included in the next revision of the QA Manual.

18.3) Potential Integrity Related Managerial Reviews

Potential integrity issues (data or business related) must be handled and reviewed in a confidential manner until such time as a follow-up evaluation, full investigation, or other appropriate actions have been completed and issues clarified. The NDSC Document No. *NDSC-ETHC-SOP38228*, Internal Ethics and Data Integrity Investigations, shall be followed. All investigations that result in finding of inappropriate activity are documented and include any disciplinary actions involved, corrective actions taken, and all appropriate notifications of clients.

The Eurofins Environment Testing America Presidents, Business Unit Managers, Laboratory Directors, NDSC Team are informed of any current data integrity or data recall investigations via the monthly metrics report.

19) Test Methods and Method Validation

19.1) Overview

The laboratory uses methods that are appropriate to meet our clients' requirements and that are within the scope of the laboratory's capabilities. These include sampling, handling, transport, storage and preparation of samples, and, where appropriate, an estimation of the measurement of uncertainty as well as statistical techniques for analysis of environmental data.

Instructions are available in the laboratory for the operation of equipment as well as for the handling and preparation of samples. All instructions, Standard Operating Procedures (SOPs), reference methods and manuals relevant to the working of the laboratory are readily available to all staff. Deviations from published methods are documented (with justification) in the laboratory's approved SOPs. SOPs are submitted to clients for review at their request. Significant deviations from published methods require client approval and regulatory approval where applicable.

19.2) Standard Operating Procedures (SOPs)

The laboratory maintains SOPs that accurately reflect all phases of the laboratory such as assessing data integrity, corrective actions, handling customer complaints as well as all analytical methods and sampling procedures. The method SOPs are derived from the most recently promulgated/approved, published methods and are specifically adapted to the laboratory facility. Modifications or clarifications to published methods are clearly noted in the SOPs. All SOPs are controlled in the laboratory.

- All SOPs contain a revision number, effective date, and appropriate approval signatures. Controlled copies are available to all staff.
- Procedures for writing an SOP are addressed in SOP KNOX-QA-0018 (QA-SOP75854) "Preparation and Management of Standard Operating Procedures."
- SOPs are reviewed at a minimum of every 2 years (annually for Drinking Water and DoD/DOE SOPs), and where necessary, revised to ensure continuing suitability and compliance with applicable requirements.

19.3) Laboratory Methods Manual

For each test method, the laboratory shall have available the published referenced method as well as the laboratory developed SOP.

Note: If more stringent standards or requirements are included in a mandated test method or regulation than those specified in this manual, the laboratory shall demonstrate that such requirements are met. If it is not clear which requirements are more stringent, the standard from the method or regulation is to be followed. Any exceptions or deviations from the referenced methods or regulations are noted in the specific analytical SOP.

The laboratory maintains an SOP Index for both technical and non-technical SOPs. Technical SOPs are maintained to describe a specific test method. Non-technical SOPs are maintained to describe functions and processes not related to a specific test method.

19.4) Selection of Methods

Since numerous methods and analytical techniques are available, continued communication between the client and laboratory is imperative to assure the correct methods are utilized. Once client methodology requirements are established, this and other pertinent information is summarized by the PM. These mechanisms ensure that the proper analytical methods are applied

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when the samples arrive for log-in. For non-routine analytical services (e.g., special matrices, non-routine compound lists), the method of choice is selected based on client needs and available technology. The methods selected should be capable of measuring the specific parameter of interest, in the concentration range of interest, and with the required precision and accuracy.

Refer to the laboratory certifications for the currently accepted referenced methods in use by the laboratory.

19.4.1) Sources of Methods

Routine analytical services are performed using standard EPA-approved methodology. In some cases, modification of standard approved methods may be necessary to provide accurate analyses of particularly complex matrices. When the use of specific methods for sample analysis is mandated through project or regulatory requirements, only those methods shall be used.

When clients do not specify the method to be used or methods are not required, the methods used will be clearly validated and documented in an SOP and available to clients and/or the end user of the data.

The laboratory reviews updated versions to all the aforementioned references for adaptation based upon capabilities, instrumentation, etc., and implements them as appropriate. As such, the laboratory strives to perform only the latest versions of each approved method as regulations allow or require.

Other reference procedures for non-routine analyses may include methods established by specific states (e.g., Underground Storage Tank methods), ASTM or equipment manufacturers. Sample type, source, and the governing regulatory agency requiring the analysis will determine the method utilized.

The laboratory shall inform the client when a method proposed by the client may be inappropriate or out of date. After the client has been informed, and they wish to proceed contrary to the laboratory's recommendation, it will be documented.

19.4.1.1) Client Supplied Methods

Most of the client-supplied method requirements presented to us involve achieving specific quality control criteria, limits of quantitation (LOQ), and/or method detection limits (MDL) using standard EPA methods. These requirements are communicated to the appropriate technical groups prior to the project start up. Each technical group evaluates the scope of work and the requirements to ensure the criteria can be met using the standard EPA method. The data is monitored to ensure the criteria are met throughout the project. The PM notifies the client if there is a more appropriate method available or if the client's criteria cannot be achieved on a certain sample matrix (i.e., due to matrix or dilutions).

Occasionally, we are asked to transfer a non-standardized method from a client into our lab or to develop a new method, when one is not available. In the case of a method transfer, we set up the client's method and perform some initial evaluation. After the initial evaluation, we may make recommendations on how to improve method performance. If the method appears to be adequate, we determine linearity, specificity, precision, accuracy, MDL, and LOQ by performing calibrations, analyzing method blanks, and carrying out method detection limit and IDOC studies.

In the case of method development, we work with the client and/or data user to determine the level of validation required ensuring that the method meets its intended purpose. In addition to the elements above, we also determine standard and sample stability and robustness depending on the scope of the project. Typically, a standard operating procedure is written and submitted to the client with the results of the validation. These steps are completed prior to analysis of field samples. Data related to the setup of the method are archived.

19.4.1.2) Procedural Deviations

Analysts are required to follow a documented method for all tests performed; and any deviations from analytical methods must be documented, approved, and justified in an appropriate and consistent manner. We classify method deviations as either being a planned deviation or an unplanned deviation. In general, the following information is captured to document both types of situations:

- Description of the situation
- Reason or justification for the deviation
- Relevance the deviation has on the testing
- Signature/date of analyst performing the test
- Signature/date of QA and laboratory management approving the deviation
- Signature/date of client approval, if necessary

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Deviations to written procedures are documented in raw data records and/or through the corrective action system. Both types of documentation require management and QA review and approval.

19.4.2) Demonstration of Capability

Before the laboratory may institute a new method and begin reporting results, the laboratory shall confirm that it can properly perform the method. In general, this demonstration does not test the performance of the method in real world samples, but in an applicable and available clean matrix sample. If the method is for the testing of analytes that are not conducive to spiking, demonstration of capability may be performed on quality control samples.

A demonstration of capability (DOC) Lab SOP # KNOX-QA-0009 (QA-SOP75852) is performed whenever there is a change in instrument type (e.g., new instrumentation), matrix, method or personnel (e.g., analyst has not performed the test within the last 12 months).

Note: The laboratory shall have a DOC for all analytes included in the methods that the laboratory performs, and proficiency DOCs for each analyst shall include all analytes that the laboratory routinely performs. Addition of non-routine analytes does not require new DOCs for all analysts if those analysts are already qualified for routine analytes tested using identical chemistry and instrument conditions.

The initial demonstration of capability must be thoroughly documented and approved by the Technical Manager and QA Manager prior to independently analyzing client samples. All associated documentation must be retained in accordance with the laboratory's archiving procedures.

The laboratory must have an approved SOP, demonstrate satisfactory performance, and conduct an MDL study (when applicable). There may be other requirements as stated within the published method or regulations (e.g., retention time window study).

Note: In some instances, a situation may arise where a client requests that an unusual analyte be reported using a method where this analyte is not normally reported. If the analyte is being reported for regulatory purposes, the method must meet all procedures outlined within this QA Manual (SOP, MDL, and Demonstration of Capability). If the client states that the information is not for regulatory purposes, the result may be reported as long as the following criteria are met:

- The instrument is calibrated for the analyte to be reported using the criteria for the method and ICV/CCV criteria are met (unless an ICV/CCV is not required by the method or criteria are per project DQOs).
- The laboratory's nominal or default reporting limit (RL) is equal to the quantitation limit (QL), must be at or above the lowest non-zero standard in the calibration curve and must be reliably determined. Project RLs are client specified reporting levels which may be higher than the QL. Results reported below the QL must be qualified as estimated values. Also, see Section 19.6.1.3, Relationship of Limit of Detection (LOD) to Quantitation Limit (QL).
- The client request is documented and the lab informs the client of its procedure for working with unusual compounds. The final report must be footnoted: Reporting Limit based on the low standard of the calibration curve.

19.4.3) Initial Demonstration of Capability (IDOC) Procedure

1. A quality control sample shall be obtained from an outside source. If not available, the QC sample may be prepared by the laboratory using stock standards that are prepared independently from those used in instrument calibration.
2. The analyte(s) shall be diluted in a volume of clean matrix sufficient to prepare four aliquots at the concentration specified by a method or the laboratory SOP.
3. At least four aliquots shall be prepared (including any applicable clean-up procedures) and analyzed according to the test method (either concurrently or over a period of days).
4. Using all of the results, calculate the mean recovery in the appropriate reporting units and the standard deviations for each parameter of interest.
5. When it is not possible to determine the mean and standard deviations, such as for presence, absence and logarithmic values, the laboratory will assess performance against criteria described in the Method SOP.
6. Compare the information obtained above to the corresponding acceptance criteria for precision and accuracy in the test method (if applicable) or in laboratory generated acceptance criteria (LCS or interim criteria) if there is no mandatory criteria established. If any one of the parameters do not meet the acceptance criteria, the performance is unacceptable for that parameter.
7. When one or more of the tested parameters fail at least one of the acceptance criteria, the analyst must proceed according to either option listed below:
   - Locate and correct the source of the problem and repeat the test for all parameters of interest beginning with step 3 above.
   - Beginning with step 3 above, repeat the test for all parameters that failed to meet criteria. Repeated failure, however, will confirm a general problem with the measurement system. If this occurs, locate and correct the source

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of the problem and repeat the test for all compounds of interest beginning with step 1 above.

Note: Results of successive LCS analyses can be used to fulfill the DOC requirement.

Refer to SOP KNOX-QA-0009 (QA-SOP75852), Personnel Orientation and Training for further details.

Methods on line prior to the effective date of this Section shall be updated to the procedures outlined above as new analysts perform their demonstrations of capability. A copy of the new record will replace that which was used for documentation in the past. At a minimum, the precision and accuracy of four mid-level laboratory control samples must have been compared to the laboratory's quality control acceptance limits.

19.5) Laboratory Developed Methods and Non-Standard Methods

Any new method developed by the laboratory must be fully defined in an SOP and validated by qualified personnel with adequate resources to perform the method. Method specifications and the relation to client requirements must be clearly conveyed to the client if the method is a non-standard method (not a published or routinely accepted method). The client must also be in agreement to the use of the non-standard method.

19.6) Validation of Methods

Validation is the confirmation by examination and the provision of objective evidence that the particular requirements for a specific intended use are fulfilled.

All non-standard methods, laboratory designed/developed methods, standard methods used outside of their scope, and major modifications to published methods must be validated to confirm they are fit for their intended use. The validation will be as extensive as necessary to meet the needs of the given application. The results are documented with the validation procedure used and contain a statement as to the fitness for use.

19.6.1) Method Validation and Verification Activities for All New Methods

While method validation can take various courses, the following activities can be required as part of method validation. Method validation records are designated QC records and are archived accordingly. When changes are made to any validated methods, the influence of such changes shall be documented and, if appropriate, a new validation shall be performed.

19.6.1.1 **Determination of Method Selectivity** – Method selectivity is the demonstrated ability to discriminate the analyte(s) of interest from other compounds in the specific matrix or matrices from other analytes or interference. In some cases to achieve the required selectivity for an analyte, a confirmation analysis is required as part of the method.

19.6.1.2 **Determination of Method Sensitivity** – Sensitivity can be both estimated and demonstrated. Whether a study is required to estimate sensitivity depends on the level of method development required when applying a particular measurement system to a specific set of samples. Detection limit studies are conducted as described in Section 19.7. Where other protocols for estimations and/or demonstrations of sensitivity are required by regulation or client agreement, these shall be followed.

19.6.1.3 **Relationship of Limit of Detection (LOD) to the Limit of Quantitation (LOQ)** – An important characteristic of expression of sensitivity is the distinction between the LOD and the LOQ. The LOD is the minimum level at which the presence of an analyte can be reliably concluded. The LOQ is the minimum concentration of analyte that can be quantitatively determined with acceptable precision and bias, equivalent to the laboratory's routine reporting limit (RL). For most instrumental measurement systems, there is a region where semi-quantitative data is generated around the LOD (both above and below the estimated MDL or LOD) and below the LOQ. In this region, detection of an analyte may be confirmed but quantification of the analyte is unreliable within the accuracy and precision guidelines of the measurement system. When an analyte is detected below the LOQ, and the presence of the analyte is confirmed by meeting the qualitative identification criteria for the analyte, the analyte can be reliably reported, but the amount of the analyte can only be estimated. If data is to be reported in this region, it must be done so with a qualification that denotes the semi-quantitative nature of the result.

19.6.1.4 **Determination of Interferences** – A determination that the method is free from interferences in a blank matrix is performed.

19.6.1.5 **Determination of Range** – Where appropriate to the method, the quantitation range is determined by comparison of the response of an analyte in a curve to established or targeted criteria. Generally the upper quantitation limit is defined by highest acceptable calibration concentration. The lower quantitation limit or QL cannot be lower than the lowest non-zero calibration level, and can be constrained by required levels of bias and precision.

19.6.1.6 **Determination of Accuracy and Precision** – Accuracy and precision studies are generally performed using replicate analyses, with a resulting percent recovery and measure of reproducibility (standard deviation, relative standard deviation) calculated and measured against a set of target criteria.

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19.6.1.7 Documentation of Method – The method is formally documented in an SOP. If the method is a minor modification of a standard laboratory method that is already documented in an SOP, an SOP Attachment describing the specific differences in the new method is acceptable in place of a separate SOP.

19.6.1.8 Continued Demonstration of Method Performance – Continued demonstration of method performance is addressed in the SOP. Continued demonstration of method performance is generally accomplished by batch specific QC samples such as LCS, method blanks or PT samples.

19.7) Method Detection Limit (MDL) / Limits of Detection (LOD)

The MDL is the minimum measured quantity of a substance that can be reported with 99% confidence that the concentration is distinguishable from method blank results, consistent with 40CFR Part 136 Appendix B, August, 2017. The MDL is equivalent to the TNI LOD or DL, and is also equivalent to the DoD/DOE Quality Systems Manual (QSM) DL. The working or final MDL is the higher of the MDL value determined from spikes (MDLs) and the MDL value determined from blanks (MDLb). An initial MDL study shall be performed during the method validation process and when the method is altered in a way that can reasonably be expected to change its sensitivity. On-going data are collected during each quarter in which samples are being analyzed. At least once every 13 months the MDLs and MDLb are re-calculated and re-evaluated using data collected during the preceding period. Details of the laboratory's procedure for conducting MDL studies are given in NDSC Document No. *NDSC-US-TS-SOP42091*.

19.8) Verification of Detection Limits

If it is found during the re-evaluation of detection limit results that more than 5% of the spiked samples do not return positive numeric results that meet all method qualitative identification criteria, then then spiking level shall be increased and the initial MDL study pre-performed at the new spiking concentration. For DoD/DOE labs, additional guidance provided in NDSC Document No. *NDSC-US-TS-WI72946*.

19.9) Instrument Detection Limits (IDL)

The IDL is sometimes used to assess the reasonableness of the MDL or in some cases required by the analytical method or program requirements. IDLs are most commonly used in metals analyses but may be useful in demonstration of instrument performance in other areas.

IDLs are calculated to determine an instrument's sensitivity independent of any preparation method. IDLs are calculated either using 7 replicate spike analyses, like MDL but without sample preparation, or by the analysis of 10 instrument blanks and calculating 3 x the absolute value of the standard deviation.

19.10) Limit of Quantitation

The LOQ shall be at a concentration equivalent to the lowest calibration standard concentration, with the exception of methods using a single-point calibration, and shall be greater than the MDL. The LOQ is verified by preparing and analyzing spikes at concentrations 1-2X the selected LOQ, employing the complete analytical process. For DoD/DOE labs, additional requirements provided in NDSC Document No. *NDSC-US-TS-WI72946*.

When the laboratory establishes a quantitation limit, it must be initially verified by the analysis of a low level standard or QC sample at 1-2 times the reporting limit or by a DL check samples at or below the LOQ. The LOQ is verified annually thereafter. The annual requirement is waived for methods that have an annually verified MDL. The laboratory will comply with any regulatory requirements.

19.11) Retention Time Windows

Most organic analyses and some inorganic analyses use chromatography techniques for qualitative and quantitative determinations. For every chromatography analysis or as specified in the reference method, each analyte will have a specific time of elution from the column to the detector. This is known as the analyte's retention time. The variance in the expected time of elution is defined as the retention time window. As the key to analyte identification in chromatography, retention time windows must be established on every column for every analyte used for that method. These records are kept on-file and available for review. Complete details are available in the laboratory SOPs.

19.12) Evaluation of Selectivity

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The laboratory evaluates selectivity by following the checks within the applicable analytical methods, which include mass spectral tuning, mass resolution, second column confirmation, ICP interelement interference checks, chromatography retention time windows, and method blanks.

19.13) Estimation of Uncertainty of Measurement

19.13.1 Uncertainty is "a parameter associated with the result of a measurement, that characterizes the dispersion of the values that could reasonably be attributed to the measurand" (as defined by the International Vocabulary of Basic and General Terms in Metrology, ISO Geneva, 1993, ISBN 92-67-10175-1). Knowledge of the uncertainty of a measurement provides additional confidence in a result's validity. Its value accounts for all the factors which could possibly affect the result, such as adequacy of analyte definition, sampling, matrix effects and interferences, climatic conditions, variances in weights, volumes, and standards, analytical procedure, and random variation. Some national accreditation organizations require the use of an "expanded uncertainty" defined as the range within which the value of the measurand is believed to lie within at least a 95% confidence level with the coverage factor k=2.

19.13.2 Uncertainty is not error. Error is a single value (i.e., the difference between the true result and the measured result). On environmental samples, the true result is never known. The measurement is the sum of the unknown true value and the unknown error. Unknown error is a combination of systematic error, or bias, and random error. Bias varies predictably, constantly, and independently from the number of measurements. Random error is unpredictable, assumed to be Gaussian in distribution, and reducible by increasing the number of measurements.

19.13.3 The minimum uncertainty associated with results generated by the laboratory can be determined by using the Laboratory Control Sample (LCS) accuracy range for a given analyte. The LCS limits are used to assess the performance of the measurement system since they take into consideration all of the laboratory variables associated with a given test over time (except for variability associated with the sampling and the variability due to matrix effects). The percent recovery of the LCS is compared either to the method-required LCS accuracy limits or to the statistical, historical, in-house LCS accuracy limits.

19.13.4 To calculate the uncertainty for the specific result reported, multiply the result by the decimal of the lower end of the LCS range percent value for the lower end of the uncertainty range, and multiply the result by the decimal of the upper end of the LCS range percent value for the upper end of the uncertainty range. These calculated values represent uncertainties at approximately the 99% confidence level with a coverage factor of k = 3. As an example, for a reported result of 1.0 mg/L with an LCS recovery range of 50 to 150%, the estimated uncertainty in the result would be 1.0 +/- 0.5 mg/L.

19.13.5 Refer to SOP *KNOX-QA-0019* (*QA-SOP75859*) "Estimation of Measurement Uncertainty" for details regarding calculations that may be used to estimate measurement uncertainty associated with laboratory results.

19.13.6 In the case where a well-recognized test method specifies limits to the values of major sources of uncertainty of measurement (e.g., 524.2, 525, etc.) and specifies the form of presentation of calculated results, no further discussion of uncertainty is required.

19.14) Sample Reanalysis Guidelines

Because there is a certain level of uncertainty with any analytical measurement, a sample re-preparation (where appropriate) and subsequent analysis (hereafter referred to as 'reanalysis') may result in either a higher or lower value from an initial sample analysis. There are also variables that may be present (e.g., sample homogeneity, analyte precipitation over time, etc.) that may affect the results of a reanalysis. Based on the above comments, the laboratory will reanalyze samples at a client's request with the following caveats. Client specific Contractual Terms & Conditions for reanalysis protocols may supersede the following items.

Homogenous samples: If a reanalysis agrees with the original result to within the RPD limits for MS/MSD or Duplicate analyses, or within + 1 reporting limit for samples < 5x the reporting limit, the original analysis will be reported. At the client's request, both results may be reported on the same report but not on two separate reports.

- If the reanalysis does not agree (as defined above) with the original result, then the laboratory will investigate the discrepancy and reanalyze the sample a third time for confirmation if sufficient sample is available.
- Any potential charges related to reanalysis are discussed in the contract terms and conditions or discussed at the time of the request. The client will typically be charged for reanalysis unless it is determined that the lab was in error.
- Due to the potential for increased variability, reanalysis may not be applicable to Non-homogenous, Encore, and Sodium Bisulfate preserved samples. See the Area Supervisor or Laboratory Director if unsure.

19.15) Control of Data

The laboratory has policies and procedures in place to ensure the authenticity, integrity, and accuracy of the analytical data generated by the laboratory, including but not limited to:

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- Software Change Management, SOP *NDSC-US-IT-SOP46228*
- Software Testing, Verification, and Validation, SOP *NDSC-US-IT-SOP46229*
- TALS Access and Security, SOP *NDSC-US-IT-SOP46231*

19.15.1) Computer and Electronic Data Related Requirements
The three basic objectives of our computer security procedures and policies are shown below. The laboratory is currently using the Eurofins Laboratory Information Management System (LIMS) called TALS, which has been highly customized to meet the needs of the laboratory.

19.15.1.1 Maintain the Database Integrity – Assurance that data is reliable and accurate from acquisition through data verification (review) procedures, password-protecting access, anti-virus protection, data change requirements, as well as an internal LIMS permissions procedure.

- LIMS Database Integrity is achieved through data input validation, internal user controls, documentation of system failures and corrective actions taken, and data change requirements.
- Spreadsheets and other software developed in-house must be verified with documentation through hand calculations prior to use. Cells containing calculations must be lock-protected and controlled.
- Instrument hardware and software adjustments are safeguarded through maintenance logs, audit trails, and controlled access.

19.15.1.2 Ensure Information Availability – Protection against loss of information or service is ensured through scheduled back-ups, stable file server network architecture, secure storage of media, line filter, Uninterruptible Power Supply (UPS), and maintaining older versions of software as revisions are implemented.

19.15.1.3 Maintain Confidentiality – Ensure data confidentiality through physical access controls such as password protection or website access approval when electronically transmitting data.

19.15.2) Data Reduction
The complexity of the data reduction depends on the analytical method and the number of discrete operations involved (e.g., extractions, dilutions, instrument readings and concentrations). The analyst calculates the final results from the raw data or uses appropriate computer programs to assist in the calculation of final reportable values.

For manual data entry, e.g., Wet Chemistry, the data is reduced by the analyst and then verified by the Department Manager or alternate analyst prior to updating the data in LIMS. The spreadsheets, or any other type of applicable documents, are signed by both the analyst and alternate reviewer to confirm the accuracy of the manual entry(s).

Manual integration of peaks will be documented and reviewed and the raw data will be flagged using NBLSC Document No. *NDSC-ETHC-SOP43862* - Manual Integrations.

Analytical results are reduced to appropriate concentration units specified by the analytical method, taking into account factors such as dilution, sample weight or volume, etc. Blank correction will be applied only when required by the method or per manufacturer's indication; otherwise, it should not be performed. Calculations are independently verified by appropriate laboratory staff. Calculations and data reduction steps for various methods are summarized in the respective analytical SOPs or program requirements.

19.15.2.1 All raw data must be retained in the worklist folder, computer file (if appropriate), and/or runlog. All criteria pertinent to the method must be recorded. The documentation is recorded at the time observations or calculations are made and must be signed or initialed/dated (month/day/year). It must be easily identifiable who performed which tasks if multiple people were involved.

19.15.2.2 In general, concentration results are reported in milligrams per liter (mg/l) or micrograms per liter (µg/l) for liquids and milligrams per kilogram (mg/kg) or micrograms per kilogram (µg/kg) for solids. For values greater than 10,000 mg/l, results can be reported in percent, i.e., 10,000 mg/l = 1%. Units are defined in each lab SOP.

19.15.2.3 In reporting, the analyst or the instrument output records the raw data result using values of known certainty plus one uncertain digit. If final calculations are performed external to LIMS, the results should be entered in LIMS with at least three significant figures. LIMS has a formatter for significant figure criterion for each analyte.

19.15.2.4 For those methods that do not have an instrument printout or an instrumental output compatible with the LIMS, the raw results and dilution factors are entered directly into LIMS by the analyst, and the software calculates the final result for the analytical report. LIMS has a formatter for significant figure criterion for each analyte.

19.15.2.5 The laboratory strives to import data directly from instruments or calculation spreadsheets to ensure that the reported data are free from transcription and calculation errors. For those analyses with an instrumental output compatible

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with the LIMS, the raw results and dilution factors are transferred into LIMS, electronically after reviewing the quantitation report, and removing unrequested or poor spectrally-matched compounds. The analyst prints a copy of what has been entered to check for errors. This printout and the instrument's printout of calibrations, concentrations, retention times, chromatograms, and mass spectra, if applicable, are retained with the data file. The data file is stored in a monthly folder on the instrument computer; periodically, this file is transferred to the server and, eventually, to a tape file.

19.15.3) Logbook / Worksheet Use Guidelines

Logbooks and worksheets are filled out 'real time' and have enough information on them to trace the events of the applicable analysis/task.

- Corrections are made following the procedures outlined in Section 14.5.
- Logbooks are controlled by the QA department. A record is maintained of all logbooks in the lab.
- Unused portions of pages must be "Z"'d out, signed and dated.
- Worksheets are created with the approval of the department manager/QA Manager at the facility. The QA Manager controls all worksheets following the laboratory's document control procedures in Section 8.

19.15.4) Review / Verification Procedures

Review procedures are outlined in several SOPs *e.g*. Sample Control, Data Review, Project Management to ensure that reported data are free from calculation and transcription errors, that QC parameters have been reviewed and evaluated before data is reported. The laboratory also has an SOP discussing Manual Integrations to ensure the authenticity of the data NBLSC Document No. *NDSC-ETHC-SOP43862* - Manual Integrations. The general review concepts are discussed below, more specific information can be found in the SOPs.

19.15.4.1 Log-In Review - The data review process starts at the sample receipt stage. Sample control personnel review chain-of-custody forms and project instructions from the project management group. This is the basis of the sample information and analytical instructions entered into the LIMS. The log-in instructions are reviewed by the personnel entering the information, and a second level review is conducted by the project management staff.

19.15.4.2 First Level Data Review - The next level of data review occurs with the analysts. As data are generated, analysts review their work to ensure that the results meet project and SOP requirements. First level reviews include inspection of all raw data (e.g., instrument output for continuous analyzers, chromatograms, spectra, and manual integrations), evaluation of calibration/calibration verification data in the day's analytical run, evaluation of QC data, and reliability of sample results. The analyst transfers data into LIMS, data qualifiers are added as needed. All first level reviews are documented.

19.15.4.3 Second Level Data Review – All analytical data are subject to review by a second qualified analyst or supervisor. Second level reviews include inspection of all raw data (e.g., instrument output, chromatograms, and spectra) including 100% of data associated with any changes made by the primary analyst, such as manual integrations or reassignment of peaks to different analytes, or elimination of false negative analytes. The second review also includes evaluation of initial calibration/calibration verification data in the day's analytical run, evaluation of QC data, reliability of sample results, qualifiers and NCM narratives. Manual calculations are checked in second level review. All second level reviews are documented. Issues that deem further review include the following:

- QC data are outside the specified control limits for accuracy and precision
- Reviewed sample data does not match with reported results
- Unusual detection limit changes are observed
- Samples having unusually high results
- Samples exceeding a known regulatory limit
- Raw data indicating some type of contamination or poor technique
- Inconsistent peak integration
- Transcription errors
- Results outside of calibration range

19.15.4.4 Unacceptable analytical results may require reanalysis of the samples. Any problems are brought to the attention of the Laboratory Director, Project Manager, Quality Director/Manager, Technical Manager, or Supervisor for further investigation. Corrective action is initiated whenever necessary.

19.15.4.5 The results are then entered or directly transferred into the computer database and a (.pdf) is printed for the client.

19.15.4.6 As a final review prior to the release of the report, the Project Manager reviews the results for appropriateness and completeness. This review and approval ensures that client requirements have been met and that the final report has been properly completed. The process includes, but is not limited to, verifying that the COC is followed, cover letters / narratives are present, flags are appropriate, and project specific requirements are met. The Project Manager may also evaluate the validity of results for different test methods given expected chemical relationships.

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19.15.4.7 Any project that requires a data package is subject to a tertiary data review for transcription errors and acceptable quality control requirements. The Project Manager then signs the final report. The accounting personnel also check the report for any clerical or invoicing errors. When complete, the report is sent out to the client.

19.15.4.8 A brief overview of sample flows and information through the laboratory, as well as data review and validation, is presented in Figure 19-1.

19.15.5) Manual Integrations

Computerized data systems provide the analyst with the ability to reintegrate raw instrument data in order to optimize the interpretation of the data. Though manual integration of data is an invaluable tool for resolving variations in instrument performance and some sample matrix problems, when used improperly, this technique would make unacceptable data appear to meet quality control acceptance limits. Improper reintegration may lead to legally indefensible data, a poor reputation, or possible laboratory decertification. Because guidelines for reintegration of data are not provided in the methods and most methods were written prior to widespread implementation of computerized data systems, the laboratory trains all analytical staff on proper manual integration techniques in accordance with *NBLSC Document No. NDSC-ETHC-SOP43862 - Manual Integrations*.

The analyst must adjust baseline or the area of a peak in some situations, for example when two compounds are not adequately resolved or when a peak shoulder needs to be separated from the peak of interest. The analyst must use professional judgment to determine when manual integrating is required. Analysts are encouraged to ask for assistance from a senior analyst or manager when in doubt.

19.15.5.1 Analysts shall not increase or decrease peak areas for the sole purpose of achieving acceptable QC recoveries that would have otherwise been unacceptable. The intentional recording or reporting of incorrect information (or the intentional omission of correct information) is against company principles and policy and is grounds for immediate termination.

19.15.5.2 Client samples, performance evaluation samples, and quality control samples are all treated equally when determining whether or not a peak area or baseline should be manually adjusted.

19.15.5.3 All manual integrations receive a second level review. Manual integrations must be indicated on an expanded scale "before" and "after" chromatograms such that the integration performed can be easily evaluated during data review. Expanded scale "before" chromatograms are also required for all manual integrations on QC parameters (calibrations, calibration verifications, laboratory control samples, internal standards, surrogates, etc.) unless the laboratory has another documented NDSC approved procedure in place that can demonstrate an active process for detection and deterrence of improper integration practices.

Figure 19-1. Example – Work Flow

Action	Personnel Involved
Bottle orders generated upon request - Bottles packed and shipped to the client under CoC	- Client Service Personnel / PM - Bottle Preparation Personnel
Samples received at laboratory - Unpacked and reconciled against client paperwork or CoC - Samples acceptance documented against completed (CoC)[1]	Sample Login Personnel
Samples are entered into LIMS - Job # assigned - Methods/Analytes linked from project - Sample labels generated - LIMS backlogs updated immediately	Sample Login Personnel
Sample Storage - Analysts are notified of short TATs and hold-time samples - Samples stored in assigned locations (refrigerated walk-in coolers, freezers, VOA refrigerators; etc.)	Sample Login Personnel
Sample Receipt Acknowledgement sent to client (when requested)	Sample Login Personnel
Sample Acquisition/Testing - Analysts collect samples from assigned storage. - Remaining sample returned to storage.	Analysts / Login Personnel

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Preparation and analysis is performed according to selected analytical method and applicable Project notes - Raw data recorded/reviewed[2] - Data imported to LIMS	Analysts
LIMS performs calculations: - Data reviewed by primary/secondary analyst - Data approved as final	Data Process (LIMS / Analyst)
Generation/review/release of reports (automated through LIMS) - Electronic copy saved in LIMS	Project Management Assistants / Reporting Group
Electronic Data Deliverables (EDDs) generated (as applicable)	PM Group
Hard copy and electronic batch raw data is archived according to data archiving procedures.	Analysts / IT

[1]Refer to Sec. 23.3.

[2]Analyses requiring the analyst's interpretation may involve manual data reduction before entry into LIMS.

20) Instruments, Equipment, and Calibration

20.1) Overview

The laboratory purchases the most technically advanced analytical instrumentation for sample analyses. Instrumentation is purchased on the basis of accuracy, dependability, efficiency and sensitivity. Each laboratory is furnished with all items of sampling, preparation, analytical testing and measurement equipment necessary to correctly perform the tests for which the laboratory has capabilities. Each piece of equipment is capable of achieving the required accuracy and complies with specifications relevant to the method being performed. Before being placed into use, the equipment (including sampling equipment) is calibrated and checked to establish that it meets its intended specification. The calibration routines for analytical instruments establish the range of quantitation. Calibration procedures are specified in laboratory SOPs. A list of available laboratory instrumentation is maintained on the local network.

Equipment is only operated by authorized and trained personnel. Manufacturer's instructions for equipment use are readily accessible to all appropriate laboratory personnel.

20.2) Instrument/Equipment Maintenance

The laboratory follows a well-defined maintenance program to ensure proper equipment operation and to prevent the failure of laboratory equipment or instrumentation during use. This program of preventive maintenance helps to avoid delays due to instrument failure.

Routine preventive maintenance procedures and frequency, such as cleaning and replacements, should be performed according to the procedures outlined in the manufacturer's manual. Qualified personnel must also perform maintenance when there is evidence of degradation of peak resolution, a shift in the calibration curve, loss of sensitivity, or failure to continually meet one of the quality control criteria.

Scheduled routine maintenance is defined in each method SOP. It is the responsibility of each Group Leader to ensure that instrument maintenance logs are kept for all equipment in his/her department. Preventative maintenance procedures are also outlined in analytical SOPs or instrument manuals. (Note: for some equipment, the log used to document maintenance is also used to monitor performance.)

Instrument maintenance logs are controlled and are used to document instrument problems, instrument repair and maintenance activities. Maintenance logs shall be kept for all major pieces of equipment. Instrument maintenance logs may also be used to specify instrument parameters.

- Documentation must include all major maintenance activities such as contracted preventive maintenance and service and in-house activities such as the replacement of electrical components, lamps, tubing, valves, columns, detectors, cleaning and adjustments.
- Each entry in the instrument log includes the analyst's initials, the date, a detailed description of the problem (or maintenance needed/scheduled), a detailed explanation of the solution or maintenance performed, and a verification that the equipment is functioning properly (state what was used to determine a return to control. e.g. CCV run on *'date'* was acceptable, or instrument recalibrated on 'date' with acceptable verification, etc.) must also be documented in the instrument records.

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- When maintenance or repair is performed by an outside agency, service receipts detailing the service performed are affixed into the maintenance logbook. The analyst signs across the entered item and the logbook page so that it is clear that the insert is missing if only half a signature is found in the logbook.
- In addition, the maintenance records contain:
  - The identification of the instrument/equipment (instrument's Serial Number and Model Number).
  - The date the instrument/equipment was put into use.
  - If available, the condition when the instrument was received (e.g., new, used, reconditioned).
- If an instrument requires repair (subjected to overloading or mishandling), gives suspect results, or otherwise has shown to be defective or outside of specified limits it shall be taken out of operation and tagged as out-of-service or otherwise isolated until such a time as the repairs have been made and the instrument can be demonstrated as operational by calibration and/or verification or other test to demonstrate acceptable performance. The laboratory shall examine the effect of this defect on previous analyses.

In the event of equipment malfunction that cannot be resolved, service shall be obtained from the instrument vendor manufacturer, or qualified service technician, if such a service can be tendered. If on-site service is unavailable, arrangements shall be made to have the instrument shipped back to the manufacturer for repair. Back up instruments, which have been approved, for the analysis shall perform the analysis normally carried out by the malfunctioning instrument. If the back-up is not available and the analysis cannot be carried out within the needed timeframe, the samples shall be subcontracted.

At a minimum, if an instrument is sent out for service or transferred to another facility, it must be recalibrated and the laboratory MDL verified (using an MDLV) prior to return to lab operations.

An inventory of critical spare parts is maintained to minimize delays in the completion of analyses. For most test methods, back-up instrumentation is also maintained to minimize delays.

20.3) Support Equipment

This section applies to all devices that may not be the actual test instrument, but are necessary to support laboratory operations. These include but are not limited to: balances, ovens, refrigerators, freezers, incubators, water baths, field sampling devices, temperature measuring devices, thermal/pressure sample preparation devices and volumetric dispensing devices if quantitative results are dependent on their accuracy, as in standard preparation and dispensing or dilution into a specified volume. All raw data records associated with the support equipment are retained to document instrument performance.

20.3.1) Weights and Balances

The accuracy of the balances used in the laboratory is checked every working day, before use. All balances are placed on stable counter tops.

Each balance is checked prior to initial serviceable use with at least two certified ASTM type 1 weights spanning its range of use (weights that have been calibrated to ASTM type 1 weights may also be used for daily verification). ASTM type 1 weights used only for calibration of other weights (and no other purpose) are inspected for corrosion, damage or nicks at least annually and if no damage is observed, they are calibrated at least every 5 years by an outside calibration laboratory. Any weights (including ASTM Type 1) used for daily balance checks or other purposes are recalibrated/recertified annually to NIST standards (this may be done internally if laboratory maintains "calibration only" ASTM type 1 weights).

All balances are serviced annually by a qualified service representative, who supplies the laboratory with a certificate that identifies traceability of the calibration to the NIST standards.

All of this information is recorded in logs, and the recalibration/recertification certificates are kept on file. Further details on balance calibration may be found in *QA-SOP69646*, Balance Calibration and Weight Verification.

20.3.2) pH, Conductivity, and Turbidity Meters

The pH meters used in the laboratory are accurate to + 0.1 pH units, and have a scale readability of at least 0.05 pH units. The meters automatically compensate for the temperature, and are calibrated with at least two working range buffer solutions on working day prior to use.

Conductivity meters used in the laboratory are capable or measuring conductivity with an error not exceeding 1% or one umhos/cm, whichever is greater. The meters are also verified on working day prior to use with a known standard.

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Turbidity meters are also calibrated on working day prior to use.

All of this information is documented in logbooks.

For further information consult pH SOP KNOX-WC-0007 and Routine Monitoring of Deionized Water SOP *KNOX-QA-0016* (*QA-SOP75860*).

20.3.3) Temperature Measuring Devices

All liquid in glass thermometers are calibrated on an annual basis with a NIST-traceable reference thermometer. IR thermometers and digital thermometers are calibrated quarterly.

- If the temperature measuring device is used over a range of 10°C or less, then a single point verification within the range of use is acceptable.
- If the temperature measuring device is used over a range of greater than 10°C, then the verification must bracket the range of use.

IR thermometers, digital probes and thermocouples are calibrated quarterly. IR Thermometers should be calibrated over the full range of use, including ambient, iced (4°C) and frozen (0°C to -5°C), per the Drinking Water Manual.

The NIST mercury reference thermometer(s) are recalibrated every five years (unless thermometer has been exposed to temperature extremes or apparent separation of internal liquid) by an approved outside service and the provided certificate of traceability is kept on file. NIST digital reference thermometers are recalibrated every two years. The NIST thermometer(s) have increments of 1ºC, and have a range applicable to all method and certification requirements. The NIST traceable thermometer is used for no other purpose than to calibrate other thermometers.

All of this information is documented in logbooks. Monitoring method-specific temperatures, including heating blocks, water baths, and ovens, is documented in method-specific logbooks. More information on this subject can be found in the method-specific SOPs.

Thermometer calibrations are documented as described in SOP *QA-SOP75206*, Temperature Monitoring and Thermometer Calibration.

20.3.4) Refrigerators, Freezer, Water baths, Ovens and Incubators

The temperatures of all refrigerator units and freezers used for sample and standard storage are monitored each working day. Monitoring is performed 7 days per week to ensure that samples remain within an acceptable range.

Ovens, water baths and incubators are monitored on days of use.

All of this equipment has a unique identification number, and is assigned a thermometer for monitoring.

Sample storage refrigerator temperatures are kept between > 0ºC and $\leq$ 6 ºC.

Specific temperature settings/ranges for other refrigerators, ovens, water baths, and incubators can be found in method specific SOPs.

The temperatures are documented in temperature logbooks or in the method-specific logbooks/benchsheets.

20.3.5) Autopipettors, Dilutors, and Syringes

Mechanical volumetric dispensing devices including burettes (except Class A Glassware and glass microliter syringes) are given unique identification numbers and the delivery volumes are verified gravimetrically, at a minimum, on a quarterly basis.

Any device not regularly verified cannot be used for any quantitative measurements.

Refer to SOP *QA-SOP71280*, Pipette and Volumetric Labware Calibration Verification.

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Micro-syringes are purchased from Hamilton Company. Each syringe is traceable to NIST. The laboratory keeps on file an "Accuracy and Precision Statement of Conformance" from Hamilton attesting established accuracy.

20.4) Instrument Calibration

Calibration of analytical instrumentation is essential to the production of quality data. Strict calibration procedures are followed for each method. These procedures are designed to determine and document the method detection limits, the working range of the analytical instrumentation and any fluctuations that may occur from day to day.

Sufficient raw data records are retained to allow an outside party to reconstruct all facets of the initial calibration. Records contain, but are not limited to, the following: calibration date, method, instrument, analyst(s) initials or signatures, analysis date, analytes, concentration, response, and type of calibration (Avg RF, curve, or other calculations that may be used to reduce instrument responses to concentration.)

Sample results must be quantitated from the initial calibration and may not be quantitated from any continuing instrument calibration verification unless otherwise required by regulation, method or program.

If the initial calibration results are outside of the acceptance criteria, corrective action is performed and any affected samples are reanalyzed if possible. If the reanalysis is not possible, any data associated with an unacceptable initial calibration will be reported with appropriate data qualifiers.

Note: Instruments are calibrated initially and as needed after that and at least annually (the annual requirement does not apply to Isotope dilution).

Refer to NBLSC SOP *NDSC-US-TS-QP44940*, Calibration Curves and the Selection of Calibration Points, for additional calibration criteria.

20.4.1) Calibration Standards

Calibration standards are prepared using the procedures indicated in the Reagents and Standards section of the determinative method SOP.

Standards for instrument calibration are obtained from a variety of sources. All standards are traceable to national or international standards of measurement, or to national or international standard reference materials.

The lowest concentration calibration standard that is analyzed during an initial calibration must be at or below the stated reporting limit for the method based on the final volume of extract (or sample).

The other concentrations define the working range of the instrument/method or correspond to the expected range of concentrations found in actual samples that are also within the working range of the instrument/method. Results of samples not bracketed by initial instrument calibration standards (within calibration range to at least the same number of significant figures used to report the data) must be reported as having less certainty, e.g., defined qualifiers or flags (additional information may be included in the case narrative). The exceptions to these rules. ICP and ICPMS methods which define the working range with periodic linear dynamic range studies, rather than through the range of concentrations of daily calibration standards.

All initial calibrations are verified with a standard obtained from a second source and traceable to a national standard, when available (or vendor certified different lot if a second source is not available). For unique situations, such as air analysis where no other source or lot is available, a standard made by a different analyst at a different time or a different preparation would be considered a second source. This verification occurs immediately after the calibration curve has been analyzed, and before the analysis of any samples.

20.4.1.1) Calibration Verification

The calibration relationship established during the initial calibration must be verified initially and at least daily as specified in the laboratory method SOPs in accordance with the referenced analytical methods and in the TNI Standard. The process of calibration verification applies to both external standard and internal standard calibration techniques, as well as to linear and non-linear calibration models. Initial calibration verification (ICV) is with a standard source secondary (second source standard) to the calibration standards, but continuing calibration verifications (CCV) may use the same source standards as the calibration curve.

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Note: The process of calibration verification referred to here is fundamentally different from the approach called "calibration" in some methods. As described in those methods, the calibration factors or response factors calculated during calibration are used to update the calibration factors or response factors used for sample quantitation. This approach, while employed in other EPA programs, amounts to a daily single-point calibration.

All target analytes and surrogates, including those reported as non-detects, must be included in periodic calibration verifications for purposes of retention time confirmation and to demonstrate that calibration verification criteria are being met, i.e., RPD, per 2009 and 2016 TNI Std. EL-V1M4 Sec. 1.7.2.

All samples must be bracketed by periodic analyses of standards that meet the QC acceptance criteria (e.g., calibration and retention time). The frequency is found in the determinative methods or SOPs.

Note: If an internal standard calibration is being used then bracketing calibration verification standards may not be required, only daily verifications are needed. The results from these verification standards must meet the calibration verification criteria and the retention time criteria (if applicable).

Generally, the calibrations must be verified by an ICV analyzed immediately following initial calibration and before sample analysis. The ICV may be used as the first bracketing CCV, if criteria for both are met.

A continuing instrument calibration verification (CCV) is generally analyzed at the beginning of each 12-hour analytical shift during which samples are analyzed. The 12-hour analytical shift begins with the injection of the calibration verification standard (or the MS tuning standard in MS methods). The shift ends after the completion of the analysis of the last sample, QC, or standard that can be injected within 12-hours of the beginning of the shift. For methods that have quantitation by external calibration models, a CCV is analyzed at the end of each analytical sequence. Some methods have more frequent CCV requirements. See method specific SOPs. Most inorganic methods require the CCV to be analyzed after ever 10 samples or injections, including matrix or batch QC samples.

Note: If an internal standard calibration is being used (e.g., GCMS) then bracketing standards are not required, only daily verifications are needed, except as specified by program or method requirements.

If the results of a CCV are outside the established acceptance criteria and analysis of a second consecutive (and immediate) CCV fails to produce results within acceptance criteria, corrective action shall be performed. Once corrective actions have been completed and documented, the laboratory shall demonstrate acceptable instrument / method performance by analyzing two consecutive CCVs, or a new initial instrument calibration shall be performed.

Sample analyses and reporting of data may not occur or continue until the analytical system is calibrated or calibration verified. However, data associated with an unacceptable calibration verification may be fully useable reported based upon discussion and approval of the client under the following special conditions:

a) when the acceptance criteria for the CCV are exceeded high (i.e., high bias) and the associated samples within the batch are non-detects, then those non-detects may be reported case narrative comment explaining the high bias. Otherwise the samples affected by the unacceptable CCV shall be re-analyzed after a new calibration curve has been established, evaluated and accepted; or

b) when the acceptance criteria for the CCV are exceeded low (i.e., low bias), those sample results may be reported if they exceed a maximum regulatory limit/decision level. Otherwise the samples affected by the unacceptable CCV shall be re-analyzed after a new calibration curve has been established, evaluated and accepted. Alternatively, a reporting limit standard may be analyzed to demonstrate that the laboratory can still support non-detects at their reporting limit.

Samples reported by the 2 conditions identified above will be appropriately flagged.

20.4.1.2) Verification of Linear and Non-Linear Calibrations

Calibration verification for calibrations involves the calculation of the percent drift or the percent difference of the instrument response between the initial calibration and each subsequent analysis of the verification standard. Equations are available in NBLSC SOP *NDSC-US-TS-QP44940*. Verification standards are evaluated based on the % Difference from the average CF or RF of the initial calibration or based on % Drift or % Recovery if a linear or quadratic curve is used.

Regardless of whether a linear or non-linear calibration model is used, if initial verification criterion is not met, then no sample analyses may take place until the calibration has been verified or a new initial calibration is performed that meets the specifications listed in the method SOPs. If the calibration cannot be verified after the analysis of a single verification standard, then adjust the instrument operating conditions and/or perform instrument maintenance, and analyze another aliquot of the verification standard. If the calibration cannot be verified with the second standard, then a new initial calibration is performed.

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- When the acceptance criteria for the calibration verification are exceeded high, i.e., high bias, and there are associated samples that are non-detects, then those non-detects may be reported. Otherwise, the samples affected by the unacceptable calibration verification shall be reanalyzed after a new calibration curve has been established, evaluated and accepted.

- When the acceptance criteria for the calibration verification are exceeded low, i.e., low bias, those sample results may be reported if they exceed a maximum regulatory limit/decision level. Otherwise, the samples affected by the unacceptable verification shall be reanalyzed after a new calibration curve has been established, evaluated and accepted. Alternatively, a reporting limit standard may be analyzed to demonstrate that the laboratory can still support non-detects at their reporting limit.

20.5) Tentatively Identified Compounds (TICs) – GC/MS Analysis

For samples containing components not associated with the calibration standards, a library search may be made for the purpose of tentative identification. The necessity to perform this type of identification will be determined by the purpose of the analyses being conducted. For example, the RCRA permit or waste delisting requirements may require the reporting of non-target analytes. Only after visual comparison of sample spectra with the nearest library searches may the analyst assign a tentative identification. Data system library search routines should not use normalization routines that would misrepresent the library or unknown spectra when compared to each other. Additional details are provided in SOP *12-GCMS-SOP71618*, Tentatively Identified Compounds (TICs), and *NDSC-US-TS-QP71638*, Policy on Tentatively Identified Compounds (TICs).

Note: If the TIC compound is not part of the client target analyte list but is calibrated by the laboratory and is both qualitatively and/or quantitatively identifiable, it should not be reported as a TIC. If the compound is reported on the same form as true TICs, it should be qualified and/or narrated that the reported compound is qualitatively and quantitatively (if verification in control) reported compared to a known standard that is in control (where applicable). Eurofins Knoxville will provide this service upon client request.

20.6) GC/MS Tuning

Prior to any GC/MS analytical sequence, including calibration, the instrument parameters for the tune and subsequent sample analyses within that sequence must be set.

Prior to tuning/auto-tuning the mass spectrometer, the parameters may be adjusted within the specifications set by the manufacturer or the analytical method. These generally do not need any adjustment but it may be required based on the current instrument performance. If the tune verification does not pass it may be necessary to clean the source or perform additional maintenance. Any maintenance is documented in the maintenance log or run log.

For additional tuning guidance refer to NBLSC SOP *NDSC-US-TS-QP44987*, Policy on GC/MS Tuning for Full Scan Volatile and Semi-Volatile Methods.

21) Measurement Traceability

21.1) Overview

Traceability of measurements shall be assured using a system of documentation, calibration, and analysis of reference standards. Laboratory equipment that are peripheral to analysis and whose calibration is not necessarily documented in a test method analysis or by analysis of a reference standard shall be subject to ongoing certifications of accuracy. At a minimum, these must include procedures for checking specifications of ancillary equipment. Wherever possible, subsidiary or peripheral equipment is checked against standard equipment or standards that are traceable to national or international standards.

With the exception of Class A Glassware and glass microliter syringes, quarterly accuracy checks are performed for mechanical volumetric devices used to measure critical volumes. Class A Glassware and glass microliter syringes should be routinely inspected for chips, acid etching or deformity (e.g., bent needle). If the Class A glassware or syringe is suspect, the accuracy of the glassware will be assessed prior to use.

21.2) Reference Weights and Thermometers

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Reference standards of measurement shall be used for calibration only and for no other purpose, unless it can be shown that their performance as reference standards would not be invalidated.

For NIST-traceable weights and thermometers, the laboratory requires that all calibrations be conducted by a calibration laboratory accredited by A2LA, NVLAP (National Voluntary Laboratory Accreditation Program), or another accreditation organization that is a signatory to a MRA (Mutual Recognition Arrangement) of one or more of the following cooperation's – ILAC (International Laboratory Accreditation Cooperation) or APLAC (Asia–Pacific Laboratory Accreditation Cooperation). A calibration certificate and scope of accreditation is kept on file at the laboratory.

An external certified service engineer services laboratory balances on an annual basis. This service is documented on each balance with a signed and dated certification sticker. Balance calibrations are checked each day of use. All mercury thermometers are calibrated annually against a traceable reference thermometer. Temperature readings of ovens, refrigerators, and incubators are checked on each day of use.

21.3) Reference Standards, Materials, and Reagents

Reference standards/materials/reagents, where commercially available, are traceable to certified reference materials. Commercially prepared reference standards, to the extent available, are purchased from vendors that are accredited under ISO 17034. All reference standards from commercial vendors shall be accompanied with a certificate that includes at least the following information:

- Manufacturer
- Analytes or parameters calibrated
- Identification or lot number
- Calibration method
- Concentration with associated uncertainties
- Purity

If a standard cannot be purchased from a vendor that supplies a Certificate of Analysis, the purity of the standard is documented by analysis. The receipt of all reference standards must be documented. Reference standards are labeled with a unique identification number and expiration date. All documentation received with the reference standard is retained as a QC record and references the identification number.

All reference, primary and working standards/materials, whether commercially purchased or laboratory prepared, must be checked regularly to ensure that the variability of the standard or material from the true value does not exceed method requirements. The accuracy of calibration standards is checked by comparison with a standard from a second source. In cases where a second standard manufacturer is not available, a vendor certified different lot is acceptable for use as a second source. For unique situations, such as air analysis where no other source or lot is available, a standard made by a different analyst would be considered a second source. The appropriate Quality Control (QC) criteria for specific standards are defined in laboratory SOPs.

All standards and materials must be stored and handled according to method or manufacturer's requirements in order to prevent contamination or deterioration. For safety requirements, please refer to method SOPs and the NBLSC Environmental Health and Safety (HSE) Manual, *NDSC-US-EHS-QP46060*.

Standards and reference materials shall not be used after their expiration dates unless their reliability is verified by the laboratory and their continued use through the extended expiration period is approved by the QA Manager. The laboratory must have documented contingency procedures for re-verifying expired standards.

21.4) Documentation and Labeling of Standards, Reagents, and Reference Materials

Reagents must be at a minimum the purity required in the test method. The date of reagent receipt and the expiration date are documented. The lots for most of the common solvents and acids are tested for acceptability prior to company-wide purchase. Refer to Document No. *NDSC-US-PUR-SOP46704*, Solvent and Acid Lot Testing and Approval.

All manufacturer or vendor supplied Certificate of Analysis or Purity must be retained, stored appropriately, and readily available for use and inspection. These records are maintained in the analytical laboratory. Records must be kept of the date of receipt and date of expiration of standards, reagents and reference materials. In addition, records of preparation of laboratory standards, reagents, and reference materials must be retained, stored appropriately, and be readily available for use and inspection. For detailed information on documentation and labeling, please refer to SOP *KNOX-QA-0001* (*QA-SOP75858*), Standard/Reagent Labeling and Documentation.

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Commercial materials purchased for preparation of calibration solutions, spike solutions, etc.., are usually accompanied with an assay certificate or the purity is noted on the label. If the assay purity is 96% or better, the weight provided by the vendor may be used without correction. If the assay purity is less than 96% a correction will be made to concentrations applied to solutions prepared from the stock commercial material (For 1613B dioxin/furan analyses the purity must be 98% or corrections must be made). Blended gas standard cylinders use a nominal concentration if the certified value is within +/-15%, otherwise the certified values is used for the canister concentration

21.4.1 All standards, reagents, and reference materials must be labeled in an unambiguous manner. Standards are logged into the laboratory's TALS system, and are assigned a unique identification number. The following information is typically recorded in the electronic database within the TALS.

- Standard ID
- Description of Standard
- Department
- Preparer's name
- Final volume and number of vials prepared
- Solvent type and lot number
- Preparation Date
- Expiration Date
- Standard source type (stock or daughter)
- Standard type (spike, surrogate, other)
- Parent standard ID (if applicable)
- Parent Standard Analyte Concentration (if applicable)
- Parent Standard Amount used (if applicable)
- Component Analytes
- Final concentration of each analyte
- Comment box (text field)

Note: All solvents and acids are stored at ambient temperature unless otherwise specified in the SOPs.

Records are maintained electronically for standard and reference material preparation. These records show the traceability to purchased stocks or neat compounds. These records also include method of preparation, date of preparation, expiration date and preparer's name or initials. Preparation procedures are provided in the Method SOPs.

21.4.2 All standards, reagents, and reference materials must be clearly labeled with a minimum of the following information:

- Expiration Date (include prep date for reagents)
- Standard ID
- Special Health/Safety warnings if applicable (Refer to the Health and Safety Manual *NDSC-US-EHS-QP46060*)

Note: Refer to SOP *KNOX-QA-0001* (*QA-SOP75858*) for more details.

21.4.3 In addition, the following information may be helpful:

- Date opened (for multi-use containers, if applicable)
- Description of standard (if different from manufacturer's label or if standard was prepared in the laboratory)
- Recommended Storage Conditions
- Concentration (if applicable)
- Initials of analyst preparing standard or opening container

All containers of prepared reagents must include an expiration date and an ID number to trace back to preparation.

Procedures for preparation of reagents can be found in the Method SOPs. Standard ID numbers must be traceable through associated logbooks, worksheets and preparation/analytical batch records.

All reagents and standards must be stored in accordance to the following priority: 1) with the manufacturer's recommendations; 2) with requirements in the specific analytical methods as specified in the laboratory SOP.

22) Sampling

22.1) Overview

The laboratory does not provide sampling services. The laboratory's responsibility in the sample collection process lies in supplying the sampler with the necessary coolers, reagent water, sample containers, preservatives, sample labels, custody seals, COC forms, ice, and packing materials required to properly preserve, pack, and ship samples to the laboratory.

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22.2) Sampling Containers

The laboratory offers clean sampling containers for use by clients. These containers are obtained from reputable container manufacturers and meet EPA specifications as required. Certificates of cleanliness for bottles and preservatives are provided by the supplier and are maintained at the laboratory. Alternatively, the certificates may be maintained by the supplier and available to the laboratory on-line.

22.2.1) Preservatives

Upon request, preservatives are provided to the client in pre-cleaned sampling containers. In some cases containers may be purchased pre-preserved from the container supplier. Whether prepared by the laboratory or bought pre-preserved, the grades of the preservatives are at a minimum:

- Hydrochloric Acid – Reagent ACS (Certified VOA Free) or equivalent
- Methanol – Purge and Trap grade
- Nitric Acid – Instra-Analyzed or equivalent
- Sodium Bisulfate – ACS Grade or equivalent
- Sodium Hydroxide – Instra-Analyzed or equivalent
- Sulfuric Acid – Instra-Analyzed or equivalent
- Sodium Thiosulfate – ACS Grade or equivalent

22.3) Definition of Holding Time

The date and time of sampling documented on the COC form establishes the day and time zero. As a general rule, when the maximum allowable holding time is expressed in days (e.g., 14 days, 28 days), the holding time is based on calendar day measured. Holding times expressed in hours (e.g., 6 hours, 24 hours, etc.) are measured from date and time zero. The first day of holding time ends twenty-four hours after sampling. Holding times for analysis include any necessary reanalysis. However, there are some programs that determine holding time compliance based on the date and specific time of analysis compared to the time of sampling regardless of how long the holding time is.

22.3.1 Semi-Volatile - Holding times for sample preparation for semi-volatile organics are measured from the sampling date until the day solvent contacts the sample. Holding times for analysis are measured from the date of initiation of extraction to the date of injection into the gas chromatograph.

22.3.2 Volatiles - Holding times for volatile organics are measured from the date (and time where applicable) of sampling to the date of injection into the gas chromatograph. Holding times for Encore preservation of volatiles samples is measured from the date and time of sampling to the date and time of sample preservation.

22.3.3 Inorganics - For inorganic and metals analysis, the preparation/digestion/distillation must be started within the maximum holding time as measured from the sampling date (and time where applicable). Eurofins Knoxville measures the holding time for inorganics from sampling date (and time where applicable) to analysis date (and time where applicable).

22.4) Sampling Containers, Preservation Requirements, Holding Times

The preservation and holding time criteria specified in the laboratory SOPs are derived from the source documents for the methods. If method required holding times or preservation requirements are not met, the reports will be qualified using a flag, footnote or case narrative. As soon as possible or "ASAP" is an EPA designation for tests for which rapid analysis is advised, but for which neither EPA nor the laboratory have a basis for a holding time.

22.5) Sample Aliquots / Subsampling

Taking a representative sub-sample from a container is necessary to ensure that the analytical results are representative of the sample collected in the field. The size of the sample container, the quantity of sample fitted within the container, and the homogeneity of the sample need consideration when sub-sampling for sample preparation. It is the laboratory's responsibility to take a representative subsample or aliquot of the sample provided for analysis.

Analysts should handle each sample as if it is potentially dangerous. At a minimum, safety glasses, gloves, and lab coats must be worn when preparing aliquots for analysis.

Refer to SOP *KNOX-QA-0006* (*QA-SOP75861*), Subsampling, for details on the procedures to obtain representative subsamples for analysis from the samples submitted by the client.

Tables 22-1 to 22-6 detail holding times, preservation and container requirements, and sample volumes for SDWA and NPDES methods. The sample volumes are intended to be a minimal amount to perform the method, the containers that are used may be of larger size. Please Note: the holding times are program specific and different programs may have different holding times for equivalent methods (e.g., there are differences in Holding times for many Organic analytes between SDWA and NPDES. RCRA methods may also be different).

Table 22-1.
Holding Times, Preservation and Container Requirements: Drinking Water (SDWA)

Parameter	Container	Preservation[1,2] Temp. [6]	Chemical	Holding Time[3]	Sample Volume
Nitrate	Plastic/Glass	4ºC	None	48 hours[4]	250 mL
Dioxin	Glass[5]	4ºC	$Na_2S_2O_3$	1 year	1 L

Key to Table

1. Sample preservation should be performed immediately upon sample collection. For composite chemical samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at 4ºC until compositing and sample splitting is completed.
2. When any sample is to be shipped by common carrier or sent through the United States mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For the preservation requirements of Table 6-8, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid, (HCl) in water, solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).
3. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid. Holding Times are determined from time of collection to time of analysis.
4. If the sample is chlorinated, the holding time for an un-acidified sample kept at 4ºC is extended to 14 days.
5. With Teflon lined septum.
6. For samples with a temperature requirement of 4ºC, a sample temperature of just above the water freezing temperature to ≤ 6ºC is acceptable.

Table 22-2
Holding Times, Preservation and Container Requirements: NPDES - Inorganic

PARAMETER	CONTAINER [1]	PRESERVATION[2,3] Temp[10].	Chemical	HOLDING TIME[4]	SAMPLE VOLUME
Boron	Plastic[5]	None	HNO_3 to pH<2	6 months	200 mL
Bromide	Plastic/Glass	None	None	28 days	100 mL
Chloride	Plastic/Glass	None	None	28 days	50 mL
Fluoride	Plastic	None	None	28 days	300 mL
Hardness	Plastic/Glass	None	HNO_3 to pH<2[7]	6 months	100 mL
Hydrogen Ion (pH)	Plastic/Glass	None	None	15 min.[6]	200 mL
Mercury	Plastic/Glass	None	HNO_3 to pH<2	28 days	200 mL
Metals[8,9]	Plastic/Glass	None	HNO_3 to pH<2[11]	6 months	200 mL
Nitrate	Plastic/Glass	≤ 6ºC	None	48 hours	100 mL
Nitrate-Nitrite	Plastic/Glass	≤ 6ºC	H_2SO_4 to pH <2	28 days	100 mL
Nitrite	Plastic/Glass	≤ 6ºC	None	48 hours	100 mL
Orthophosphate	Plastic/Glass	≤ 6ºC	Filter within 15 min.	48 hours	250 mL
Sulfate	Plastic/Glass	≤ 6ºC	None	28 days	250 mL

Key to Table

1. Plastic should be Polyethylene.

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Key to Table

2. Sample preservation should be performed immediately upon sample collection. For composite chemical samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at ≤6ºC until compositing and sample splitting is completed.
3. When any sample is to be shipped by common carrier or sent through the United States mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For the preservation requirements of Table 6-8, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid, (HCl) in water, solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).
4. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid. Holding Times are determined from time of collection to time of analysis.
5. May also be collected in quartz or PFTE Plastic.
6. For compliance testing, the analysis must be performed in the field at the time of sample collection. If transported to the laboratory for analysis, the analysis will be performed as soon as practical and reported qualified.
7. H_2SO_4 to a pH <2 is also acceptable.
8. Except Mercury and Hexavalent Chromium.
9. For dissolved metals, samples must be filtered on site before adding HNO_3 preservative (or before shipping to laboratory).
10. Aqueous samples must be preserved at ≤6 °C unless otherwise indicated, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. Also, for purposes of NPDES monitoring, the specification of "≤ °C" is used in place of the "4 °C" and "<4 °C" sample temperature requirements listed in some methods.

11 Acid preservation may be omitted for shipping and laboratory will acidify at least 24 hours prior to analysis.

Table 22-3
Holding Times, Preservation and Container Requirements: NPDES - Organic

PARAMETER	CONTAINER	PRESERVATION[1,2] Temp.[7]	Chemical	HOLDING TIME[3]	SAMPLE VOLUME
CDD/CDFs[6] – Aqueous: Field/Lab Preservation	Glass	≤ 6ºC	pH <9, 0.008 % $Na_2S_2O_3$[5]	1 year	1 L
CDD/CDFs[6] – Solids/Mixed Phase/ - Field Preservation	Glass	≤ 6ºC	None	7 days[8]	10 grams/1 L
CDD/CDFs[6] – Tissue – Field Preservation	Glass	≤ 6ºC	None	24 hours[8]	10 grams
CDD/CDFs[6] – Solids/Mixed Phase/Tissue - Lab Preservation	Glass	< -10ºC	None	1 year	10 grams/1 L
Polychlorinated Biphenyls (PCB Congeners): Aqueous: Field/Lab Preservation[9]	Glass	≤ 6ºC	0.008 % $Na_2S_2O_3$[5]	1 year	1 L
Polychlorinated Biphenyls (PCB Congeners): Solid/Mixed Phase– Field Preservation[9]	Glass	≤ 6ºC	None	1 year	10 grams/1 L

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Polychlorinated Biphenyls (PCB Congeners): Tissue-Field Preservation[9]	Glass	≤ 6ºC	None	24 hours[8]	10 grams
Polychlorinated Biphenyls (PCB Congeners): Solid/Mixed Phase/Tissue – Lab Preservation[9]	Glass	< -10ºC	None	1 year	10 grams/1 L

Key to Table

1. Sample preservation should be performed immediately upon sample collection. For composite chemical samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at ≤ 6ºC until compositing and sample splitting is completed.
2. When any sample is to be shipped by common carrier or sent through the United States mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For the preservation requirements of Table 6-8, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid, (HCl) in water, solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).
3. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid. Holding Times are determined from time of collection to time of analysis (See also Footnote 8).
4. With Teflon lined septum.
5. Should only be used in the presence of residual chlorine. Ascorbic may be used instead.
6. When the extractable analytes of concern fall within a single chemical category, the specified preservative and maximum holding times should be observed for optimum safeguard of sample integrity. When the analytes of concern fall within two or more categories, the sample may be preserved by cooling to ≤ 6ºC reducing residual chlorine with 0.0008 % sodium thiosulfate, storing in the dark, and adjusting the pH to 6-9. Samples preserved in this manner may be held for 7 days before extraction and for 40 days after extraction. Exceptions to this optional preservation and holding time procedure are noted in footnote 5 (re the requirement for thiosulfate reduction of residual chlorine) and footnotes 10 and 11(re the analysis of Benzidine).
7. Aqueous samples must be preserved at ≤6 °C unless otherwise indicated, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. Also, for purposes of NPDES monitoring, the specification of "≤ °C" is used in place of the "4 °C" and "<4 °C" sample temperature requirements listed in some methods.

8 Holding time from sampling field preservation at <6ºC to time of preservation at <-10ºC.

9 Polychlorinated biphenyls (PCB congeners) are in the proposed 40CFR Part 136 Rule September 23, 2010.

Table 22-4.
Holding Times, Preservation and Container Requirements: RCRA - Aqueous

PARAMETER	CONTAINER [1]	PRESERVATION[2,3] Temp.[9]	Chemical	HOLDING TIME[4]	SAMPLE VOLUME
Chloride	Plastic/Glass	4ºC	None	28 days	100 mL
Hydrogen Ion (pH)	Plastic/Glass	4ºC	None	24 hours[8]	100 mL
Nitrate	Plastic/Glass	4ºC	None	48 hours	28 days
Sulfate	Plastic/Glass	4ºC	None	28 days	400 mL

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PARAMETER	CONTAINER [1]	PRESERVATION[2,3] Temp.[9]	PRESERVATION[2,3] Chemical	HOLDING TIME[4]	SAMPLE VOLUME
Mercury	Plastic/Glass	None	HNO_3 to pH<2	28 days	250 mL
Other Metals	Plastic/Glass	None	HNO_3 to pH<2	6 months	250 mL
Acrolein and Acrylonitrile	Glass[7]	4ºC	0.0008 % Na2S2O3[5] Adjust pH to 4-5[10]	14 days	1 L
Benzidines	Glass[7]	4ºC	0.0008 % $Na_2S_2O_3$[5]	7 days[6]	1 L
Chlorinated Hydrocarbons	Glass[7]	4ºC	0.0008 % $Na_2S_2O_3$[5]	7 days[6]	1 L
Dioxins and Furans	Glass[7]	4ºC	0.0008 % $Na_2S_2O_3$[5]	30 days[6]	1 L
Haloethers	Glass[7]	4ºC	0.0008 % $Na_2S_2O_3$[5]	7 days[6]	1 L
Nitroaromatics and cyclic ketones	Glass[7]	4ºC	0.0008 % $Na_2S_2O_3$[5], store in dark	7 days[6]	1 L
Nitrosamines	Glass[7]	4ºC	0.0008 % $Na_2S_2O_3$[5], store in dark	7 days[6]	1 L
PCBs	Glass[7]	4ºC	None	1 year[6]	1 L
Pesticides (1699)	Glass[7]	4ºC	None	7 days[6]	1 L
Phenols	Glass[7]	4ºC	0.0008 % $Na_2S_2O_3$[5]	7 days[6]	1 L
Phthalate Esters	Glass[7]	4ºC	None	7 days[6]	1 L
Polynuclear Aromatic Hydrocarbons	Glass[7]	4ºC	0.0008 % $Na_2S_2O_3$[5], store in dark	7 days[6]	1 L
Purgeable Hydrocarbons	Glass[7]	4ºC	0.0008 % $Na_2S_2O_3$[5] Adjust pH <2[2]	14 days	40 mL
Purgeable Halocarbons	Glass[7]	4ºC	0.0008 % $Na_2S_2O_3$[5]	14 days	40 mL

Key to Table

1. Plastic should be Polyethylene.
2. Sample preservation should be performed immediately upon sample collection. For composite chemical samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at 4ºC until compositing and sample splitting is completed.

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Key to Table

3. When any sample is to be shipped by common carrier or sent through the United States mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For the preservation requirements of Table 6-8, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid, (HCl) in water, solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).
4. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid. Holding Times are determined from time of collection to time of preparation (or to time of analysis if there is no separate preparation step).
5. Free Chlorine must be removed by the appropriate addition of $Na_2S_2O_3$.
6. 7 days to extraction. 40 days from extraction to analysis. For Dioxins/Furans: 30 days to extraction 45 days from extraction to analysis. For PCBs, no holding time is specified in SW-846 Chapter 4.
7. With Teflon lined septum.
8. Holding Time is listed as "As Soon as Possible" in SW 846. Per EPA MICE, the recommended maximum holding time for pH in water is 24 hours and pH in soil is 7 days. There are no mandated regulatory requirements.
9. For samples with a temperature requirement of 4°C, a sample temperature of just above the water freezing temperature to $\leq$ 6°C is acceptable.
10. Based on guidance from EPA MICE, if samples are received without pH adjustment, the holding time is 7 days.

Table 22-5.
Holding Times, Preservation and Container Requirements: RCRA – Non-Aqueous

PARAMETER	CONTAINER [1]	PRESERVATION Temp.[7]	Chemical	HOLDING TIME[2]	SAMPLE WEIGHT
Chloride	Glass	4°C	None	28 days	50 g
Hydrogen Ion (pH)	Glass	4°C	None	7 days[6]	50 g
Nitrate	Glass	4°C	None	N/A	50 g
Mercury	Plastic/Glass	4°C	None	28 days	50 g
Other Metals	Plastic/Glass	None	None	6 months	50 g
Acrolein and Acrylonitrile	Glass[4]	4°C	None	14 days	50 g
Benzidines	Glass[4]	4°C	None	14 days[3]	50 g
Chlorinated Hydrocarbons	Glass[4]	4°C	None	14 days[3]	50 g
Dioxins and Furans	Glass[4]	4°C	None	30 days[3]	50 g
Haloethers	Glass[4]	4°C	None	14 days[3]	50 g
Nitroaromatics and cyclic ketones	Glass[4]	4°C	None	14 days[3]	50 g
Nitrosamines	Glass[4]	4°C	None	14 days[3]	50 g
PCBs	Glass[4]	4°C	None	1 year[3]	50 g
Pesticides (1699)	Glass[4]	4°C	None	1 year[3]	50 g
Phenols	Glass[4]	4°C	None	14 days[3]	50 g
Phthalate Esters	Glass[4]	4°C	None	14 days[3]	50 g
Polynuclear Aromatic Hydrocarbons	Glass[4]	4°C	None	14 days[3]	50 g
Purgeable Hydrocarbons	Glass[4]	4°C	None	14 days[5]	50 g
Purgeable Halocarbons	Glass[4]	4°C	None	14 days[5]	50 g

Key to Table

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1. Plastic should be Polyethylene.
2. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.
3. 14 days to extraction. 40 days from extraction to analysis. For Dioxins/Furans (Method 8290) in Matrices other than tissue: 30 days to extraction 45 days from extraction to analysis. For Dioxins/Furans (Method 8290) in Tissue: 30 days to extraction 45 days from collection to analysis. Holding Times are determined from time of collection to time of preparation (or to time of analysis if there is no separate preparation step). For PCBs, no holding time is specified in SW-846 Chapter 4.
4. With Teflon Lined Septum
5. See Volatile SOP for more detailed preservation requirements.
6. Holding Time is listed as "As Soon as Possible" in SW 846. Per EPA MICE, the recommended maximum holding time for pH in water is 24 hours and pH in soil is 7 days. There are no mandated regulatory requirements.
7. For samples with a temperature requirement of 4°C, a sample temperature of just above the water freezing temperature to ≤ 6°C is acceptable.

Table 22-6 .
Holding Times, Preservation and Container Requirements: Air Samples[1]

PARAMETER	CONTAINER	PRESERVATION Temp.	Chemical	HOLDING TIME[2]	SAMPLE WEIGHT
Volatile Organics (TO-15, TO-14A)	Summa Canister	None	None	30 days	6L or 1L
Volatile Organics (TO-15, TO-14A)	Tedlar Bag	None	None	72 hrs[3,4]	1 L
Polynuclear Aromatic Hydrocarbons (TO-13A)	PUF/XAD	4°C[5]	None	7 days[6]	N/A
Organochlorine Pesticides/PCBs (TO-4A)	PUF/XAD	4°C[5]	None	7 days[6]	N/A
Dioxins/Furans (TO-9A)	PUF/XAD	4°C[5]	None	7 days[6]	N/A

Key to Table

1. For details on Source Air Emission Holding Times, Containers, and Preservation please contact the laboratory for method specific information.
2. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid. Holding Times are determined from time of collection to time of preparation (or to time of analysis if there is no separate preparation step).
3. Holding Time is based on SW 846 Method 0040 "SAMPLING OF PRINCIPAL ORGANIC HAZARDOUS CONSTITUENTS FROM COMBUSTION SOURCES USING TEDLAR® BAGS". Some states specifically enforce this holding time (e.g. Florida, New Jersey) and others have not specified this information in their regulatory requirements.
4. The holding time is 72 hours unless the laboratory has a documented validation study that indicates a longer HT is acceptable for the analytes of interest. Alternatively, the sample may be transferred into a Summa Canister within 72 hours.
5. For samples with a temperature requirement of 4°C, a sample temperature of just above the water freezing temperature to ≤ 6°C is acceptable.
6. 7 days from collection to extraction, 40 days from extraction to analysis.

23) Sample Handling

It is the responsibility of the client to send us representative and/or homogeneous and properly preserved samples of the system from which they are drawn. The laboratory assumes that all multiple sample containers with the same designator/description and bottle type contain a homogeneous, representative sample.

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The laboratory provides the appropriate sample containers, required preservative, chain-of-custody (COC) forms, shipping containers, labels, and custody seals. The laboratory also provides trip blanks and analyte-free water for field blanks. Preparation of methanol containers for field preservation of volatile soil samples is available.

Sample management procedures at the laboratory ensure that sample integrity and custody are maintained and documented from sampling/receipt through disposal.

23.1) Chain of Custody (COC)

The COC form is the documented history of any sample and is initiated when bottles are sent to the field, or at the time of sampling. This form is completed by the sampling personnel and accompanies the samples to the laboratory where it is received and stored under the laboratory's custody. The purpose of the COC form is to provide a legal record of the handling of samples from the time of collection until they are received at the laboratory. It also serves as the primary documented request for analyses from the client to the laboratory. The COC form may serve as the purchase order specifying the requested analytical services when no other contractual agreement is in effect.

23.1.1) Field Documentation

The information the sampler needs to provide at the time of sampling on the container label includes:

- Sample identification
- Date and time of collection
- Preservative

During the sampling process, the COC form is completed and must be legible. This form includes information such as:

- Client name, address, phone number and fax number (if available)
- Project name and/or number
- The sample identification
- Date, time and location of sampling
- Sample collector's name
- The matrix description
- The container description
- The total number of each type of container
- Preservatives used
- Analysis requested
- Requested turnaround time (TAT)
- Any special instructions
- Purchase Order number or billing information (e.g. quote number) if available
- The date and time that each person received or relinquished the sample(s), including their signed name.

When the sampling personnel deliver the samples directly to the laboratory personnel, the samples are stored in a cooler with ice, as applicable, and remain solely in the possession of the client's field technician until the samples are delivered to the laboratory personnel. The sample collector must assure that each container is in his/her physical possession or in his/her view at all times, or stored in such a place and manner to preclude tampering. The field technician relinquishes the samples in writing on the COC form to the sample control personnel at the laboratory or to a laboratory courier. When sampling personnel deliver the samples through a common carrier (Fed-Ex, UPS), the CoC relinquished date/time is completed by the field personnel and samples are released to the carrier. Signing of the COC by laboratory personnel does not immediately signify that the contents of the shipping container(s) were verified, but that the shipping containers(s) with content inside was received by an employee. The shipping container(s) are then stored in the secured laboratory facility, until sample receiving staff processes the samples, thus taking official custody of the samples. Samples are only considered to be received by the laboratory when personnel at the fixed laboratory facility have physical contact with the samples.

Note: Independent couriers are not required to sign the COC form, as the COC is usually kept in the sealed sample cooler.

23.1.2) Legal / Evidentiary Chain-of-Custody

If samples are identified for legal/evidentiary purposes on the COC, login will complete the custody seal, retain the shipping record with the COC, and initiate an internal COC for laboratory use by analysts and a sample disposal record.

23.2) Sample Receipt

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Per State and/or Federal Regulation, the client is responsible to ensure that samples are shipped in accordance with DOT/IATA requirements, and that radioactive materials may only be delivered to licensed facilities. Any samples containing (or suspected to contain) Source, Byproduct, or Special Nuclear Material as defined by 10 CFR should be delivered directly to facilities licensed to handle such radioactive material. Natural material or ores containing naturally occurring radionuclides may be delivered to any Eurofins facility or courier as long as the activity concentration of the material does not exceed 270 pCi/g alpha or 2700 pCi/g beta (49 CFR Part 173).

Samples are received at the laboratory by designated sample receiving personnel and a unique laboratory project identification number is assigned. Each sample container shall be assigned a unique sample identification number that is cross-referenced to the client identification number such that traceability of test samples is unambiguous and documented. Each sample container is affixed with a durable sample identification label. Sample acceptance, receipt, tracking and storage procedures summarized in the following sections.

23.2.1) Laboratory Receipt

When samples arrive at the laboratory, sample receiving personnel inspect the coolers and samples. The integrity of each sample must be determined by comparing sample labels or tags with the COC and by visual checks of the container for possible damage. Any non-conformance, irregularity, or compromised sample receipt must be documented on a Condition Upon Receipt Form (See Example form in Figure 23-2) and brought to the immediate attention of the client. The COC, shipping documents, documentation of any non-conformance, irregularity, or compromised sample receipt, record of client contact, and resulting instructions become part of the project record. Details on the receipt of samples are found in SOP *SC-SOP75255*, Sample Receipt and Log in.

Note: North Carolina requires that they be notified when samples are processed that do not meet sample acceptance criteria.

23.3) Sample Acceptance Policy

The laboratory has a written sample acceptance policy (Figure 23-1) that clearly outlines the circumstances under which samples shall be accepted or rejected. These include:

- a COC filled out completely;
- samples must be properly labeled;
- proper sample containers with adequate volume for the analysis (Sampling Guide) and necessary QC;
- samples must be preserved according to the requirements of the requested analytical method (Sampling Guide);
- sample holding times must be adhered to (Sampling Guide);
- the project manager will be notified if any sample is received in damaged condition.

Data from samples which do not meet these criteria are flagged and the nature of the variation from policy is defined.

23.3.1 After inspecting the samples, the sample receiving personnel sign and date the COC form, make any necessary notes of the samples' conditions and store them in appropriate refrigerators or storage locations.

23.3.2 Any deviations from these checks that question the suitability of the sample for analysis, or incomplete documentation as to the tests required will be resolved by consultation with the client. If the sample acceptance policy criteria are not met, the laboratory shall either:

- Retain all correspondence and/or records of communications with the client regarding the disposition of rejected samples, or
- Fully document any decision to proceed with sample analysis that does not meet sample acceptance criteria.

Note: North Carolina requires that they be notified when samples are processed that do not meet sample acceptance criteria.

Once sample acceptance is verified, the samples are logged into LIMS.

23.4) Sample Storage

In order to avoid deterioration, contamination or damage to a sample during storage and handling, from the time of receipt until all analyses are complete, samples are stored in refrigerators, freezers or protected locations suitable for the sample matrix. Samples for methods that do not require refrigeration (e.g., aqueous samples for ICP metals analysis) are stored on shelves at ambient temperature. In addition, samples to be analyzed for volatile organic parameters are stored in separate refrigerators designated for volatile organic parameters only. Samples are never to be stored with reagents, standards or materials that may create contamination.

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To ensure the integrity of the samples during storage, refrigerator blanks are maintained in the volatile sample refrigerators and analyzed every two weeks.

Laboratory Analysts retrieve the sample container(s) allocated to their analysis from the designated storage location, analyze the sample, and return the remaining sample to the storage location from which it originally came. Residual samples are maintained in the designated storage location until disposal at least thirty days after the report is issued. (Exception: TO-14A or TO-15 canister samples are subject to disposal two days after the report is issued.) Special arrangements are made to store samples for longer periods of time.

Access to the laboratory is controlled such that sample storage need not be locked at all times unless a project specifically demands it. Samples are accessible to laboratory personnel only. Visitors to the laboratory are prohibited from entering the refrigerator and laboratory areas unless accompanied by an employee of Eurofins Knoxville.

23.5) Hazardous Samples and Foreign Soils

All samples are assumed to be hazardous. All samples are either returned to the client or disposed of appropriately through a hazardous waste disposal firm. All soil samples are sent out for incineration by a USDA-approved waste disposal facility.

Reference the Procedure for Acceptance and Handling of USDA Regulated Domestic and Foreign Soil *HS-SOP73160* Handling of Soils Regulated by USDA.

23.6) Sample Shipping

In the event that the laboratory needs to ship samples, the samples are placed in a cooler with enough ice to ensure the samples remain just above freezing and at or below 6.0°C during transit. The samples are carefully surrounded by packing material to avoid breakage (yet maintain appropriate temperature). A trip blank is enclosed for those samples requiring water/solid volatile organic analyses. The chain-of-custody form is signed by the sample control technician and attached to the shipping paperwork. Samples are generally shipped overnight express or hand-delivered by a Eurofins courier to maintain sample integrity. All personnel involved with shipping and receiving samples must be trained to maintain the proper chain-of-custody documentation and to keep the samples intact and on ice. The NBLSC Environmental Health and Safety Manual, *NDSC-US EHS-QP46060*, contains additional shipping requirements.

Note: If a client does not request trip blank analysis on the COC or other paperwork, the laboratory will not analyze the trip blanks that were supplied. However, in the interest of good client service, the laboratory will advise the client at the time of sample receipt that it was noted that they did not request analysis of the trip blank; and that the laboratory is providing the notification to verify that they are not inadvertently omitting a key part of regulatory compliance testing.

23.7) Sample Disposal

Samples should be retained for a minimum of 30 days after the project report is sent, however, provisions may be made for earlier disposal of samples once the holding time is exceeded. Some samples are required to be held for longer periods based on regulatory or client requirements (e.g., 60 days after project report is sent). The laboratory must follow the longer sample retention requirements where required by regulation or client agreement.

Several possibilities for sample disposal exist: the sample may be consumed completely during analysis, the sample may be returned to the customer or location of sampling for disposal, or the sample may be disposed of in accordance with the laboratory's waste disposal procedures (SOP: KNOX-SC-0005, Sample Disposal Return and Archive). All procedures in the laboratory's Environmental Health and Safety Manual, *NDSC-US EHS-QP46060*, are followed during disposal. Unused portions of samples found or suspected to be hazardous according to state or federal guidelines may be returned to the client upon completion of the analytical work or disposed of in the relevant hazardous waste stream.

If a sample is part of a known litigation, the affected legal authority, sample data user, and/or submitter of the sample must participate in the decision about the sample's disposal. All documentation and correspondence concerning the disposal decision process must be kept on file. Pertinent information includes the date of disposal, nature of disposal (such as sample depletion, hazardous waste facility disposal, return to client), names of individuals who conducted the arrangements and physically completed the task. The laboratory will remove or deface sample labels prior to disposal unless this is accomplished through the disposal method (e.g., samples are incinerated).

23.8) Figure 23-1 Example: Sample Acceptance Policy

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Figure 23-1. Example: Sample Acceptance Policy

NELAC specifies requirements under which any NELAC accredited laboratory will accept or reject samples. Eurofins Knoxville will review your sample shipment against those requirements listed below, and will communicate any discrepancies to you. Your project manager will assist you in the appropriate resolution of any issues related to sample receipt. Please contact your project manager with any questions.

When completing the chain of custody form, please do not forget to sign your name in the "relinquished by" box.

NELAC requirements are as follows:

- Proper, full and complete documentation, which includes sample identification, the location, date and time of collection, the collector's name, the preservation type, the sample matrix type, the requested testing method, and any special remarks concerning the samples shall be provided. (Chain of Custody filled out properly)
- Each sample shall be labeled with unique, durable and indelible identification, (See note below regarding SUMMA canisters and VOST tubes).
- The samples shall be collected in the appropriate sample containers.
- The samples shall arrive at the laboratory within the specified holding time for the analyses requested.
- Sufficient sample volume must be available to perform the requested analyses and associated quality control.
- All samples submitted for water/solid Volatile Organic analyses must have a Trip Blank submitted at the same time
- The laboratory will notify the client upon sample receipt if the samples exhibit obvious signs of damage, contamination or inadequate preservation. Also, if there is a breach in the chain-of-custody associated with the sample(s), the client will be notified to determine the disposition of the samples.
- Samples shall be rejected if they are received in broken containers or if they exceed the laboratory radiological license limits. The client will be notified to determine the disposition of the samples.

NOTE: Never affix a label directly on a SUMMA canister. A special tag is attached to each canister for this purpose. Never place a label on a VOST tube; use the external container for labeling.

NOTE: Canisters and flow controllers must be returned even if they were not used. Sampling equipment that is lost or not returned will be invoiced to the client at the replacement costs.

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23.9) Figure 23-2. Example: Condition Upon Receipt Form

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EUROFINS KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST Log In Number:

Review Items	Yes	No	NA	If No, what was the problem?	Comments/Actions Taken
1. Are the shipping containers intact?				☐ Containers, Broken	
2. Were ambient air containers received intact?				☐ Checked in lab	
3. The coolers/containers custody seal if present, is it intact?				☐ Yes ☐ NA	
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID :_____ Correction factor: _____				☐ Cooler Out of Temp, Client Contacted, Proceed/Cancel ☐ Cooler Out of Temp, Same Day Receipt	
5. Were all of the sample containers received intact?				☐ Containers, Broken	
6. Were samples received in appropriate containers?				☐ Containers, Improper; Client Contacted; Proceed/Cancel	
7. Do sample container labels match COC? (IDs, Dates, Times)				☐ COC & Samples Do Not Match ☐ COC Incorrect/Incomplete ☐ COC Not Received	
8. Were all of the samples listed on the COC received?				☐ Sample Received, Not on COC ☐ Sample on COC, Not Received	
9. Is the date/time of sample collection noted?				☐ COC; No Date/Time; Client Contacted	
10. Was the sampler identified on the COC?				☐ Sampler Not Listed on COC	Labeling Verified by: Date:
11. Is the client and project name/# identified?				☐ COC Incorrect/Incomplete	
12. Are tests/parameters listed for each sample?				☐ COC No tests on COC	pH test strip lot number:
13. Is the matrix of the samples noted?				☐ COC Incorrect/Incomplete	
14. Was COC relinquished? (Signed/Dated/Timed)				☐ COC Incorrect/Incomplete	
15. Were samples received within holding time?				☐ Holding Time - Receipt	
16. Were samples received with correct chemical preservative (excluding Encore)?				☐ pH Adjusted, pH Included (See box 16A) ☐ Incorrect Preservative	
17. Were VOA samples received without headspace?				☐ Headspace (VOA only)	
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:_____				☐ Residual Chlorine	
19. For 1613B water samples is pH<9?				☐ If no, notify lab to adjust	
20. For rad samples was sample activity info. Provided?				☐ Project missing info	

	Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Project #: _____ PM Instructions: _____

Sample Receiving Associate: _____ Date: _____ QA026R33.doc, 11/10/23

24) Assuring the Quality of Test Results

24.1) Overview

In order to assure our clients of the validity of their data, the laboratory continuously evaluates the quality of the analytical process. The analytical process is controlled not only by instrument calibration, but also by routine process quality control measurements. These quality control checks are performed as required by the method and/or regulations to assess precision and accuracy. Quality control samples are to be treated in the exact same manner as the associated field samples being tested (e.g. filtering of samples requires the QC to also be filtered). In addition to the routine process quality control samples, Proficiency Testing (PT) Samples (concentrations unknown to laboratory) are analyzed to help ensure laboratory performance.

24.2) Controls

Sample preparation or pre-treatment is commonly required before analysis. Typical preparation steps include homogenization, grinding, solvent extraction, sonication, acid digestion, distillation, reflux, evaporation, drying and ashing. During these pre-treatment steps, samples are arranged into discreet manageable groups referred to as preparation (prep) batches. Prep batches provide a means to control variability in sample treatment. Control samples are added to each prep batch to monitor method performance and are processed through the entire analytical procedure with investigative/field samples.

24.3) Negative Controls

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Table 24-1 Example – Negative Controls

Control Type	Details
Method Blank (MB)	To assess preparation and analysis for possible contamination during the preparation and processing steps.
	The specific frequency of use for method blanks during the analytical sequence is defined in the specific standard operating procedure for each analysis. Generally it is 1 for each batch of samples; not to exceed 20 environmental samples.
	The method blank is prepared from a clean matrix similar to that of the associated samples that is free from target analytes (e.g., Reagent water, Ottawa sand, glass beads, etc.) and is processed along with and under the same conditions as the associated samples. The method blank goes through all of the steps of the process (including as necessary: filtration, clean-ups, etc.).
	Reanalyze or qualify associated sample results when the concentration of a targeted analyte in the blank is at or above the reporting limit as established by the method or by regulation, AND is greater than 1/10 of the amount measured in the sample.
Calibration Blanks	Prepared and analyzed along with calibration standards where applicable or injected at specified frequencies throughout an analytical sequence. They are prepared using the same reagents that are used to prepare the standards. In some analyses the calibration blank may be included in the calibration curve. These blanks are termed Initial Calibration Blanks (ICB) or Continuing Calibration Blanks (CCB)
Instrument Blanks	Blank reagents or reagent water that may be processed during an analytical sequence in order to assess contamination in the analytical system. In general, instrument blanks are used to differentiate between contamination caused by the analytical system and that caused by the sample handling or sample prep process. Instrument blanks may also be inserted throughout the analytical sequence to minimize the effect of carryover from samples with high analyte content.
Trip Blank (TB) [1]	TBs are required to be submitted by the client with each shipment of samples requiring aqueous and solid volatiles analyses (or as specified in the client's project plan). Additionally, trip blanks may be prepared and analyzed for volatile analysis of air samples, when required by the client. A trip blank may be purchased (certified clean) or is prepared by the laboratory by filling a clean container with pure deionized water that has been purged to remove any volatile compounds. Appropriate preservatives are also added to the container. The trip blank is sent with the bottle order and is intended to reflect the environment that the containers are subjected to throughout shipping and handling and help identify possible sources if contamination is found. The field sampler returns the trip blank in the cooler with the field samples.
Field Blanks (FB) [1]	FBs are sometimes used for specific projects by the field samplers. A field blank prepared in the field by filling a clean container with pure reagent water and appropriate preservative, if any, for the specific sampling activity being undertaken. (EPA OSWER)
Equipment Blanks (EB) [1]	EBs are also sometimes created in the field for specific projects. An equipment blank is a sample of analyte-free media which has been used to rinse common sampling equipment to check effectiveness of decontamination procedures. (TNI)
Holding Blanks	Also referred to as refrigerator, storage, or freezer blanks, are used to monitor the sample storage units for volatile organic compounds during the storage of VOA samples in the laboratory

[1] When known, these field QC samples should not be selected for matrix QC as it does not provide information on the behavior of the target compounds in the field samples. Usually, the client sample ID will provide information to identify the field blanks with labels such as "FB", "EB", or "TB."

Evaluation criteria and corrective action for these controls are defined in the specific standard operating procedure for each analysis.

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24.4) Positive Controls

Control samples (e.g., QC indicators) are analyzed with each batch of samples to evaluate data based upon (1) Method Performance (Laboratory Control Sample (LCS) or Blank Spike (BS)), which entails both the preparation and measurement steps; and (2) Matrix Effects (Matrix Spike (MS) (Matrix spikes are not applicable to air) or Sample Duplicate (MD, DUP), which evaluates field sampling accuracy, precision, representativeness, interferences, and the effect of the matrix on the method performed. Each regulatory program and each method within those programs specify the control samples that are prepared and/or analyzed with a specific batch.

Note that frequency of control samples vary with specific regulatory, methodology and project specific criteria. Complete details on method control samples are as listed in each analytical SOP.

24.4.1) Method Performance Control - Laboratory Control Sample (LCS)

The LCS measures the accuracy of the method in a blank matrix and assesses method performance independent of potential field sample matrix affects in a laboratory batch.

The LCS is prepared from a clean matrix similar to that of the associated samples that is free from target analytes (for example: Reagent water, Ottawa sand, glass beads, etc.) and is processed along with and under the same conditions as the associated samples. The LCS is spiked with verified known amounts of analytes or is made of a material containing known and verified amounts of analytes, taken through all preparation and analysis steps along with the field samples. Where there is no preparation taken for an analysis (such as in aqueous volatiles), or when all samples and standards undergo the same preparation and analysis process, a calibration verification standard is reported as the LCS. In some instances where there is no practical clean solid matrix available, aqueous LCS's may be processed for solid matrices; final results may be calculated as mg/kg or ug/kg, assuming 100% solids.

The specific frequency of use for LCS during the analytical sequence is defined in the specific standard operating procedure for each analysis. It is generally 1 for each batch of samples; not to exceed 20 environmental samples.

If the mandated or requested test method, or project requirements, do not specify the spiking components, the laboratory shall spike all reportable components to be reported in the Laboratory Control Sample (and Matrix Spike) where applicable (e.g. no spike of pH). However, in cases where the components interfere with accurate assessment (such as simultaneously spiking chlordane, Toxaphene and PCBs in Method 608), the test method has an extremely long list of components or components are incompatible, at a minimum, a representative number of the listed components (see below) shall be used to control the test method. The selected components of each spiking mix shall represent all chemistries, elution patterns and masses, permit specified analytes and other client requested components. However, the laboratory shall ensure that all reported components are used in the spike mixture within a two-year time period.

- For methods that have 1-10 target analytes, spike all components.
- For methods that include 11-20 target analytes, spike at least 10 or 80%, whichever is greater.
- For methods with more than 20 target analytes, spike at least 16 components.
- Exception: Due to analyte incompatibility in pesticides, Toxaphene and Chlordane are only spiked at client request based on specific project needs.
- Exception: Due to analyte incompatibility between the various PCB aroclors, aroclors 1016 and 1260 are used for spiking as they cover the range of all of the aroclors. Specific aroclors may be used by request on a project specific basis.

24.5) Sample Matrix Controls

Table 24-2. Sample Matrix Control

Control Type	Details	
Matrix Spikes (MS)	Use	Used to assess the effect sample matrix of the spiked sample has on the precision and accuracy of the results generated by the method used;

Table 24-2. Sample Matrix Control

Control Type	Details	
	Typical Frequency [1]	At a minimum, with each matrix-specific batch of samples processed, an MS is carried through the complete analytical procedure. Unless specified by the client, samples used for spiking are randomly selected and rotated between different client projects. If the mandated or requested test method does not specify the spiking components, the laboratory shall spike all reportable components to be reported in the Laboratory Control Sample and Matrix Spike. Note: Matrix spikes are not applicable to air. Refer to the method SOP for complete details
	Description	Essentially a sample fortified with a known amount of the test analyte(s).
Surrogate	Use	Measures method performance to sample matrix (organics only).
	Typical Frequency [1]	Are added to all samples, standards, and blanks, for all organic chromatography methods except when the matrix precludes its use or when a surrogate is not available. The recovery of the surrogates is compared to the acceptance limits for the specific method. Poor surrogate recovery may indicate a problem with sample composition and shall be reported, with data qualifiers, to the client whose sample produced poor recovery.
	Description	Are similar to matrix spikes except the analytes are compounds with properties that mimic the analyte of interest and are unlikely to be found in environment samples.
Duplicates[2]	Use	For a measure of analytical precision, with each matrix-specific batch of samples processed, a matrix duplicate (MD or DUP) sample, matrix spike duplicate (MSD), or LCS duplicate (LCSD) is carried through the complete analytical procedure.
	Typical Frequency [1]	Duplicate samples are usually analyzed with methods that do not require matrix spike analysis.
	Description	Performed by analyzing two aliquots of the same field sample independently or an additional LCS.
Internal Standards	Use	Are spiked into all environmental and quality control samples (including the initial calibration standards) to monitor the qualitative aspect of organic and some inorganic analytical measurements.
	Typical Frequency [1]	All organic and ICP methods as required by the analytical method.
	Description	Used to correct for matrix effects and to help troubleshoot variability in analytical response and are assessed after data acquisition. Possible sources of poor internal standard response are sample matrix, poor analytical technique or instrument performance.

[1] See the specific analytical SOP for type and frequency of sample matrix control samples.

[2] LCSD's are normally not performed except when regulatory agencies or client specifications require them. The recoveries for the spiked duplicate samples must meet the same laboratory established recovery limits as the accuracy QC samples. If an LCSD is analyzed both the LCS and LCSD must meet the same recovery criteria and be included in the final report. The precision measurement is reported as "Relative Percent Difference" RPD). Poor precision between duplicates (except LCS/LCSD) may indicate non-homogeneous matrix or sampling.

24.6) Acceptance Criteria (Quality Control Limits)

As mandated by the test method, each individual analyte in the LCS, MS, or Surrogate Spike is evaluated against the control limits published in the test method. Where there are no established acceptance criteria, the laboratory calculates in-house control limits with the use of control charts or, in some cases, utilizes client project specific control limits. When this occurs, the regulatory or project limits will supersede the laboratory's in-house limits.

Note: For methods, analytes and matrices with very limited data (e.g., unusual matrices not analyzed often), interim limits are established using available data or by analogy to similar methods or matrices.

Once control limits have been established, they are verified, reviewed, and updated if necessary on an annual basis unless the method requires more frequent updating. Control limits are established per method (as opposed to per instrument) regardless

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of the number of instruments utilized.

- Laboratory generated % Recovery acceptance (control) limits are generally established by taking + 3 Standard Deviations (99% confidence level) from the average recovery of a minimum of 20-30 data points (more points are preferred).
- Regardless of the calculated limit, the limit should be no tighter than the Calibration Verification (ICV/CCV). (Unless the analytical method specifies a tighter limit).
- In-house limits cannot be any wider than those mandated in a regulated analytical method. (e.g., SDWA Dioxin Method 1613B 2,3,7,8-TCDD on-going precision and recovery limits of 73% to 146% recovery). Client or contract required control limits are evaluated against the laboratory's statistically derived control limits to determine if the data quality objectives (DQOs) can be achieved. If laboratory control limits are not consistent with DQOs, then alternatives must be considered, such as method improvements or use of an alternate analytical method.
- The lowest acceptable recovery limit will be 10% (the analyte must be detectable and identifiable). Exception: The lowest acceptable recovery limit for Benzidine will be 5% and the analyte must be detectable and identifiable.

24.6.1 The lab must be able to generate a current listing of their control limits and track when the updates are performed. In addition, the laboratory must be able to recreate historical control limits.

24.6.2 Refer to SOP KNOX-QA-0004 (*QA-SOP75853*), Control Limits and Control Charting for details on the generation of control limits and the use of control charts at Eurofins Knoxville.

24.6.3 A LCS that is within the acceptance criteria establishes that the analytical system is in control and is used to validate the process. Samples that are analyzed with an LCS with recoveries outside of the acceptance limits may be determined as out of control and should be reanalyzed if possible. If reanalysis is not possible, then the results for all affected analytes for samples within the same batch must be qualified when reported. The internal corrective action process (see Section 12) is also initiated if an LCS exceeds the acceptance limits. Sample results may be qualified and reported without reanalysis if:

- The analyte results are below the reporting limit and the LCS is above the upper control limit.
- If the analytical results are above the relevant regulatory limit and the LCS is below the lower control limit.
- For Department of Defense (DOD) and Department of Energy (DOE) work, there are an allowable number of Marginal Exceedances (ME). The use of allowable marginal exceedances may also be used for evaluation of LCS recoveries for TNI accredited methods.

<11 analytes	0 marginal exceedances are allowed.
11 – 30 Analytes	1 marginal exceedance is allowed
31-50 Analytes	2 marginal exceedances are allowed
51-70 Analytes	3 marginal exceedances are allowed
71-90 Analytes	4 marginal exceedances are allowed
> 90 Analytes	5 marginal exceedances are allowed

- Marginal exceedances are recovery exceedances between 3 SD and 4 SD from the mean recovery limit (TNI). (Note: The DOD/DOE QSM has defined limits for marginal exceedances. Refer to the DOD QSM SOP *KNOX-QA-0021* (*QA-SOP75862*), DOD/DOE QSM Program Requirements.)
- Marginal exceedances must be random. If the same analyte exceeds the LCS control limit repeatedly, it is an indication of a systematic problem. The source of the error must be located and corrective action taken. The laboratory has a system to monitor marginal exceedances to ensure that they are random. . Refer to the DOD/DOE QSM SOP *KNOX-QA-0021* (*QA-SOP75862*), DOD/DOE QSM Program Requirements for details on how the laboratory ensures that the marginal exceedances are random.
- Though marginal exceedances may be allowed, the data must still be qualified to indicate it is outside of the normal limits.

24.6.4 If the MS/MSDs do not meet acceptance limits, the MS/MSD and the associated spiked sample is reported with a qualifier for those analytes that do not meet limits. If obvious preparation errors are suspected, or if requested by the client, unacceptable MS/MSDs are reprocessed and reanalyzed to prove matrix interference. A more detailed discussion of acceptance criteria and corrective action can be found in analytical SOPs and in Section 12.

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24.6.5 If a surrogate standard falls outside the acceptance limits, and if there is not obvious chromatographic matrix interference, reanalyze the sample to confirm a possible matrix effect. If the recoveries confirm or there was obvious chromatographic interference, results are reported from the original analysis and a qualifier is added. If the reanalysis meets surrogate recovery criteria, the second run is reported (or both are reported if requested by the client). Under certain circumstances, where all of the samples are from the same location and share similar chromatography, the reanalysis may be performed on a single sample rather than all of the samples and if the surrogate meets the recovery criteria in the reanalysis, all of the affected samples would require reanalysis.

24.7) Additional Procedures to Assure Quality Control

The laboratory has written and approved method SOPs to assure the accuracy of the test method including calibration (see Section 20), use of certified reference materials (see Section 21) and use of PT samples (see Section 17).

A discussion regarding MDLs, Limit of Detection (LOD) and Limit of Quantitation (LOQ) can be found in Section 19.

- Use of formulae to reduce data is discussed in the method SOPs and in Section 20.
- Selection of appropriate reagents and standards is included in Section 11 and 21.
- A discussion on selectivity of the test is included in Section 7.
- Constant and consistent test conditions are discussed in Section 6.
- The laboratories sample acceptance policy is included in Section 23.

25) Reporting Results

25.1) Overview

The results of each test are reported accurately, clearly, unambiguously, and objectively in accordance with State and Federal regulations as well as client requirements. Analytical results are issued in a format that is intended to satisfy customer and laboratory accreditation requirements as well as provide the end user with the information needed to properly evaluate the results. Where there is conflict between client requests and laboratory ethics or regulatory requirements, the laboratory's ethical and legal requirements are paramount, and the laboratory will work with the client during project set up to develop an acceptable solution.

A variety of report formats are available to meet specific needs.

In cases where a client asks for simplified reports, there must be a written request from the client. There still must be enough information that would show any analyses that were out of conformance (QC out of limits) and there should be a reference to a full report that is made available to the client.

Review of reported data is included in Section 19.

25.2) Test Reports

Analytical results are reported in a format that is satisfactory to the client and meets all requirements of applicable accrediting authorities and agencies. A variety of report formats are available to meet specific needs. The report is printed on laboratory letterhead, reviewed, and signed by the appropriate project manager. At a minimum, the standard laboratory report shall contain the following information:

25.2.1 A report title (e.g., Analytical Report) on the cover page with a "Result" column header on the sample results page.

25.2.2 The cover page shall include the laboratory name, address and telephone number.

25.2.3 A unique identification of the report (e.g., Job ID #) and on each page an identification in order to ensure the page is recognized as part of the report and a clear identification of the end.

Note: Page numbers of reports are represented on the upper right hand corner of each page. A table of contents precedes the cover page on each report which includes the page number of each section as well as the total number of pages.

25.2.4 A copy of the chain of custody (COC).

- Any COCs involved with Subcontracting are included.

25.2.5 The name and address of client and a project name/number, if applicable.

25.2.6 Client project manager or other contact.

25.2.7 Description and unambiguous identification of the tested sample(s) including the client identification code.

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25.2.8 Date of receipt of sample, date and time of collection, and date(s) of test preparation and performance, and time of preparation or analysis if the required holding time for either activity is less than or equal to 72 hours. Both date and time of preparation and analysis are required to be included in the data report for work done in support of the DoD QSM; see SOP *KNOX-QA-0021* (*QA-SOP75862*), "Department of Defense Quality Systems Manual Program Requirements."

25.2.9 Date reported or date of revision, if applicable.

25.2.10 Method of analysis including method code (EPA, Standard Methods, etc.).

25.2.11 Reporting limit or Minimum Level.

25.2.12 Method detection limits or Estimated Detection Limits (if requested)

25.2.13 Definition of Data qualifiers and reporting acronyms (e.g. ND).

25.2.14 Sample results.

25.2.15 QC data consisting of method blank, surrogate, LCS, and MS/MSD recoveries and control limits.

25.2.16 Condition of samples at receipt including temperature. This may be accomplished in a narrative or by attaching sample login sheets. This is discussed in the narrative and a copy of the condition upon receipt form is included with the chain of custody.

25.2.17 A statement to the effect that the results relate only to the items tested and the sample as received by the laboratory, except when information is provided by the client. When data is provided by the client there shall be a clear identification of it, and a disclaimer shall be put in the report when the client supplied data can affect the validity of the test.

25.2.18 A statement that the report shall not be reproduced except in full, without prior express written approval by the laboratory coordinator.

25.2.19 A signature and title of the person(s) accepting responsibility for the content of the report and date of issue. Authorized signatories are qualified Project Managers appointed by the Manager of Project Managers.

25.2.20 When TNI accreditation is required, the lab shall certify that the test results meet all requirements of TNI or provide reasons and/or justification if they do not.

25.2.21 Where applicable, a narrative to the report that explains the issue(s) and corrective action(s) taken in the event that a specific accreditation or certification requirement was not met.

25.2.22 When soil samples are analyzed, a specific identification as to whether soils are reported on a "wet weight" or "dry weight" basis.

25.2.23 Appropriate laboratory certification number for the state of origin of the sample, if applicable.

25.2.24 If only part of the report is provided to the client (client requests some results before all of it is complete), it must be clearly indicated on the report (e.g., preliminary report), and that a complete report will follow once all of the work has been completed. A complete report must be sent once all of the work has been completed.

25.2.25 Any non Eurofins subcontracted analysis results are provided as a separate report on the official letterhead of the subcontractor. All Eurofins subcontracting is clearly identified on the report as to which laboratory performed a specific analysis.

25.2.26 A Certification Summary Report, where required, will document that, unless otherwise noted, all analytes tested and reported by the laboratory were covered by the noted certifications.

25.3) Reporting Level or Report Type

The type and format of the Analysis Report is designed to accommodate each type of environmental test carried out and to minimize the possibility of misunderstanding or misuse of the data. The laboratory offers four levels of quality control reporting. Each level, in addition to its own specific requirements, contains all the information provided in the preceding level.

The packages provide the following information:

· Level I is a report with all of the elements outlined in the section above but excluding QC results.

· Level II is a Level I report plus summary information, including results for the method blank reported to the laboratory MDL, percent recovery for laboratory control samples and matrix spike samples, and the RPD values for all MSD and sample duplicate analyses.

· Level III contains all the information supplied in Level 2, but presented on the CLP-like summary forms, and relevant calibration information. A Level II report is not included, unless specifically requested. No raw data is provided.

· Level IV is the same as Level 3 with the addition of all raw supporting data.

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In addition to the various levels of QC packaging, the laboratory also provides reports in EDD (see below). Initial reports may be provided to clients by facsimile. Procedures used to ensure client confidentiality are outlined in Section 25.7.

25.4) Electronic Data Deliverable (EDD)

EDDs are routinely offered as part of Eurofins services in addition to the test report. When NELAP accreditation is required and both a test report and EDD are provided to the client, the official version of the test report will be the combined information of the report and the EDD. Eurofins Knoxville offers a variety of EDD formats including industry standard and client specific electronic deliverables.

EDDs shall be subject to a review to ensure their accuracy and completeness. If EDD generation is automated, review may be reduced to periodic screening if the laboratory can demonstrate that it can routinely generate that EDD without errors. Any revisions to the EDD format must be reviewed until it is demonstrated that it can routinely be generated without errors. If the EDD can be reproduced accurately and if all subsequent EDDs can be produced error-free, each EDD does not necessarily require a review.

25.5) Supplemental Information

The lab identifies any unacceptable QC analyses or any other unusual circumstances or observations such as environmental conditions and any non-standard conditions that may have affected the quality of a result. This is typically in the form of a footnote or a qualifier and/or a narrative explaining the discrepancy in the front of the report. See Appendix 7 for example data qualifiers.

Numeric results with values outside of the calibration range, either high or low are qualified as estimated.

Where quality system requirements are not met, a statement of compliance/non-compliance with requirements and/or specifications is required, including identification of test results derived from any sample that did not meet TNI sample acceptance requirements such as improper container, holding time, or temperature.

Where applicable, a statement on the estimated uncertainty of measurements; information on uncertainty is needed when a client's instructions so require.

When, as requested by the client and agreed to by Eurofins Knoxville the report includes a statement of conformity to specification or standard, (see Special Services, Section 7.4), the report shall clearly identify:

- to which results the statement applies;
- which specifications, standard or parts thereof are met or not; and
- the decision rule that was applied (unless the decision rule is inherent in the requested specification or standard, taking into account the level of risk (such as false accept and false reject and statistical assumptions) associated with the decision rule.

Opinions and Interpretations - The test report contains objective information, and generally does not contain subjective information such as opinions and interpretations. If such information is required by the client, the Laboratory Director will determine if a response can be prepared. If so, the Laboratory Director will designate the appropriate member of the management team to prepare a response. The response will be fully documented, and reviewed by the Laboratory Director, before release to the client. There may be additional fees charged to the client at this time, as this is a non-routine function of the laboratory.

Note: Review of data deliverable packages for submittal to regulatory authorities requires responses to non-conforming data concerning potential impact on data quality. This necessitates a limited scope of interpretation, and this work is performed by the QA Department. This is the only form of "interpretation" of data that is routinely performed by the laboratory.

When opinions or interpretations are included in the report, the laboratory provides an explanation as to the basis upon which the opinions and interpretations have been made. Opinions and interpretations are clearly noted as such and where applicable, a comment should be added suggesting that the client verify the opinion or interpretation with their regulator.

25.6) Environmental Testing Obtained From Subcontractors

If the laboratory is not able to provide the client the requested analysis, the samples would be subcontracted following the procedures outlined in the Document No. *NDSC-US-SUB-SOP44936*, Subcontracting.

Data reported from analyses performed by a subcontractor laboratory are clearly identified as such on the analytical report provided to the client. Results from a subcontract laboratory outside of Eurofins Knoxville are reported to the client on the subcontract laboratory's original report stationary and the report includes any accompanying documentation.

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25.7) Client Confidentiality
Eurofins Knoxville is responsible for maintaining in confidence all client information obtained or created. In situations involving the transmission of environmental test results by telephone, facsimile or other electronic means, client confidentiality must be maintained.

The laboratory will not intentionally divulge to any person (other than the client or any other person designated by the client in writing) any information regarding the services provided by the laboratory or any information disclosed to the laboratory by the client. Furthermore, information known to be potentially endangering to national security or an entity's proprietary rights will not be released.

Information about the client obtained from sources other than the client (e.g., complainant, regulators) shall be confidential between client and the laboratory. The source of this information shall be confidential to the laboratory and shall not be shared with the client, unless agreed by the source.

Note: This shall not apply to the extent that the information is required to be disclosed by the laboratory under the compulsion of legal process. The laboratory will, to the extent feasible, provide reasonable notice to the client before disclosing the information.
Note: Authorized representatives of an accrediting authority are permitted to make copies of any analyses or records relevant to the accreditation process, and copies may be removed from the laboratory for purposes of assessment.

25.7.1 Report deliverable formats are discussed with each new client. If a client requests that reports be mailed, the reports are to meet all requirements of this document.

25.8) Format of Reports
The format of reports is designed to accommodate each type of environmental test carried out and to minimize the possibility of misunderstanding or misuse.

25.9) Amendments to Test Reports

Corrections, additions, or deletions to reports are only made when justification arises through supplemental documentation. Justification is documented using the laboratory's corrective action system (refer to Section 12).

The revised report is retained on the Archive data server, as is the original report. The revised report is stored in the Archive data server under the job number followed by "rev" The revised report will have the word "revised" on the cover page.

When the report is re-issued, a notation of "Reissued Report" is placed on the cover/signature page of the report or at the top of the narrative page with a brief explanation of reason for the re-issue.

25.10) Policies on Client Requests for Amendments

25.10.1) Policy on Data Omissions or Reporting Limit Increases

Eurofins policy is simply to not omit previously reported results (including data qualifiers) or to not raise reporting limits and report sample results as ND.

This policy has the following exceptions:
- Laboratory error
- Sample identification is unclear (discrepancy between COC and sample labels)
- An incorrect analysis (not analyte) was requested (e.g., COC lists 8315 but client wanted 8310); documented request for the change is required
- Incorrect limits reported based on regulatory requirements
- The requested change has absolutely *no possible* impact on the interpretation of the analytical results and there is *no possibility* of the change being interpreted as misrepresentation by anyone inside or outside of our company.

25.10.2) Multiple Reports

The laboratory does not issue multiple reports for the same work order where there is different information on each report (this does not refer to copies of the same report) unless required to meet regulatory needs and approved by QA.

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26) Appendices

26.1) Appendix 1 - List of Governing Documents applicable to the QA Manual

Appendix 1. List of Governing Documents applicable to the QA Manual
(NDSC and Laboratory SOPs and Policies)

NDSC Doc. No.	Previous Doc. No.	Title
NDSC-US-IT-QP46227	NA	Electronic Reporting and Signature Policy
NDSC-US-TS-QP71638	NA	Guidance on Tentatively Identified Compounds (TICs) – GC/MS Analysis
NDSC-US-PUR-SOP46704	CA-Q-S-001	Acid and Solvent Lot Testing and Approval Program
NDSC-ETHC-SOP43862	CA-Q-S-002	Manual Integrations
NDSC-US-TS-SOP42091	CA-Q-S-006	Detection and Quantitation Limits
NDSC-CAR-SOP43847	CA-Q-S-009	Root Cause Analysis
NDSC-US-EHS-QP46060	CW-E-M-001	Environmental Health & Safety Manual
NDSC-US-LEG-QP54927	CW-L-P-001	Records Retention Policy
NDSC-ETHC-QP5252	CW-L-P-004	Ethics Policy
NDSC-ETHC-SOP38228	CW-L-S-002	Internal Investigation
NDSC-US-SUB-SOP44936	CW-L-S-004	Subcontracting
NDSC-IA-SOP5260	CW-Q-S-003	Internal Auditing
IA-QP38702	CW-Q-S-004	Management Systems Review
NDSC-CAR-SOP38229	CW-Q-S-005	Data Recall Process
NDSC-US-LEG-FRM58366	CW-Q-S-004	Document Control and Archiving
Local Laboratory Document No.	**Previous Doc No.**	**Title**
QA-SOP75858	*KNOX-QA-0001*	Standard/Reagent Labeling and Documentation
QA-SOP75853	KNOX-QA-0004	Control Limits and Control Charting
QA-SOP69646	KNOX-QA-0005	Balance Calibration and Weight Verification
QA-SOP75861	*KNOX-QA-0006*	Subsampling
QA-SOP71051	KNOX-QA-0008	Nonconformance and Corrective Action
QA-SOP75852	KNOX-QA-0009	Personnel Orientation and Training
QA-SOP75206	KNOX-QA-0010	Temperature Monitoring and Thermometer Calibration
QA-SOP75849	*KNOX-QA-0011*	Document Control & Distribution
QA-SOP71280	KNOX-QA-0012	Pipette and Volumetric Labware Calibration Verification
QA-SOP75854	KNOX-QA-0018	Preparation and Management of Standard Operating Procedures
QA-SOP75859	*KNOX-QA-0019*	Estimation of Measurement Uncertainty
QA-SOP75862	*KNOX-QA-0021*	Department of Defense Quality Systems Manual Program Requirements
KNOX-AD-0003	NA	Documenting Project Requirements
12-GCMS-SOP71618	KNOX-MS-0014	Tentatively Identified Compounds (TICS)
SC-SOP75255	KNOX-SC-0003	Sample Receipt and Login
KNOX-SC-0005	NA	Sample Disposal, Return and Archive

26.2) Appendix 2 - Certification List

The laboratory maintains accreditations, certifications, and approvals with numerous state and national entities. Programs vary but may include on-site audits, reciprocal agreements with another entity, performance testing evaluations, review of the QA Manual, Standard Operating Procedures, Method Detection Limits, training records, etc. At the time of this QA Manual revision, the laboratory has accreditation/ certification/licensing with the following organizations:

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Certification List

Laboratory	Program	Authority	Identification	Expiration Date
Knoxville	Dept. of Defense ELAP	ANAB	L2311	02/13/2025
Knoxville	Dept. of Energy	ANAB	L2311.01	02/13/2025
Knoxville	ISO/IEC 17025	ANAB	L2311	02/13/2025
Knoxville	NELAP	Florida	E87177	06/30/2025
Knoxville	NELAP	Kansas	E-10349	10/31/2024
Knoxville	NELAP	Louisiana (All)	53979	06/30/2025
Knoxville	NELAP	New Hampshire	2966	01/17/2025
Knoxville	NELAP	New Jersey	TN001	06/30/2025
Knoxville	NELAP	New York	10781	03/31/2025
Knoxville	NELAP	Oregon	TNI0189	01/01/2025
Knoxville	NELAP	Pennsylvania	68-00578	12/31/2024
Knoxville	NELAP	Texas	T104704380	08/31/2025
Knoxville	NELAP	Utah	TN00009	07/31/2025
Knoxville	NELAP	Virginia	460176	09/14/2025
Knoxville	State	Arkansas DEQ	88-0688	06/17/2025
Knoxville	State	Colorado	TN00009	02/28/2025
Knoxville	State	Connecticut	PH-0223	10/01/2026
Knoxville	State	Georgia (DW)	905	07/27/2025
Knoxville	State	Hawaii	NA	07/27/2025
Knoxville	State	Kentucky (DW)	90101	12/31/2024
Knoxville	State	Louisiana (DW)	LA015	12/31/2024
Knoxville	State	Maryland	277	03/31/2025
Knoxville	State	Michigan	9933	07/27/2025
Knoxville	State	Nevada	TN00009	07/31/2025
Knoxville	State	North Carolina (DW)	21705	07/31/2025
Knoxville	State	North Carolina (WW/SW)	64	12/31/2024
Knoxville	State	Oklahoma	9415	12/31/2024
Knoxville	State	Tennessee	02014	07/27/2025
Knoxville	State	Washington	C593	01/19/2025
Knoxville	State	West Virginia (DW)	9955C	12/31/2024
Knoxville	State	West Virginia DEP	345	04/30/2025
Knoxville	State	Wisconsin	998044300	08/31/2025

8/2024

* Certification Valid - Laboratory is Pending Renewal with the Program Authority

For more information, or to contact a local Eurofins representative nearest you, please visit our website at:

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26.3) Appendix 3 - References

The QAM has been prepared to be consistent with the requirements of the following documents:

- ANSI/ASQC, E4-1994, "Specifications and Guidelines for Quality Management Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995, or most recent version)
- "EPA Requirements for Quality Management Programs" (QA/R-2) (EPA/240/B-01/002, May 31, 2006).
- EPA 600/4-88/039, *Methods for the Determination of Organic Compounds in Drinking Water,* EPA, Revised July 1991.
- EPA 600/R-95/131, *Methods for the Determination of Organic Compounds in Drinking Water,* Supplement III, EPA, August 1995.
- EPA 600/4-79-019, *Handbook for Analytical Quality Control in Water and Wastewater Laboratories,* EPA, March 1979.
- *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW846), current editions*
- *U.S. Department of Defense (DoD)/Department of Energy (DOE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, current version*
- Federal Register, 40 CFR Parts 136, 141, 172, 173, 178, 179 and 261.
- *Manual for the Certification of Laboratories Analyzing Drinking Water (EPA 815-R-05-004, January 2005) (DW labs only)*
- *Statement of Work for Inorganics & Organics Analysis, SOM and ISM, current versions, USEPA Contract Laboratory Program Multi-media, Multi-concentration.*
- APHA, *Standard Methods for* the Examination of Water and Wastewater, current edition.
- Nuclear Regulatory Commission (NRC) Quality Assurance Requirements.
- Toxic Substances Control Act (TSCA).

26.4) Appendix 4 - QA Manual Crosswalk with TNI and ISO/IEC 17025 Standards

Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
-	QUALITY ASSURANCE MANUAL COVER PAGE	V1M2 Sec. 4.2.8.3		

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Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
-	Table of Contents	V1M2 Sec. 4.2.8.3		8.1.2., 8.2.1
1.0	Title Page			
2.0	Revision Log	V1M2 Sec. 4.2.8.5		
3.0	Introduction, Scope and Applicability	V1M2 Sec. 4.2.8.4		
3.1	Introduction and Compliance References	V1M2 Secs. 1.1; 1.2; 2.0; 3.2; 4.1.2; 4.2.4	4.1.2; 4.2.4	5.3; 5.4; 8.2.4; 8.3.1
3.2	Terms and Definitions	V1M2 Secs. 3.0; 4.2.4	4.2.4	
3.3	Scope /Field of Testing	V1M2 Secs. 1.2; 4.2.4	4.1.2; 4.2.4	5.3; 5.4; 8.2.1; 8.2.4
3.4	Quality Manual Review Process	V1M2 Secs. 4.2.1; 4.2.7; 4.3.3.2; 4.3.3.3	4.2.1; 4.2.7; 4.3.3.2; 4.3.3.3	5.3
4.0	Management and Responsibilities	V1M2 Sec. 4		8.2.4; 8.2.5
4.1	Overview	V1M2 Secs. 4.1.1, 4.1.3; 4.1.5	4.1.1; 4.1.3; 4.1.5; 4.2.6	5.1; 5.2; 5.5; 5.6 ; 6.2.1; 6.2.4
4.2	Roles and Responsibilities	V1M2 Secs. 4.1.4; 4.1.5; 4.1.6; 4.2.1; 4.2.6; 5.2.4	4.1.3; 4.1.5; 4.1.6; 4.2.1; 4.2.6; 5.2.4	4.1.1 to 4.1.3; 4.1.5; 5.5; 5.6; 6.2.1; 6.2.4; 6.2.6 8.2.2;
4.3	Business Continuity and Contingency Plan	V1M2 Secs. 4.1.5; 4.1.7.2; 4.2.7	4.1.5; 4.2.7	
5.0	Personnel	V1M2 Secs. 5.2; 5.2.1	5.2.1	6.1; 6.2.3
5.1	Overview	V1M2 Secs. 5.2.2; 5.2.3; 5.2.5	5.2.2; 5.2.3; 5.2.5	6.2.2
5.2	Education and Experience Requirements for Technical Staff	V1M2 Secs. 5.2.1; 5.2.3; 5.2.4	5.2.1; 5.2.3; 5.2.4	6.2.2 to 6.2.4
5.3	Training	V1M2 Sec. 5.2.5	5.2.5	4.2.1; 6.2.2; 6.2.4; 6.2.5
5.4	Ethics and Data Integrity Training	V1M2 Sec. 4.2.8.1; 5.2.7		4.1.1
6.0	Accommodations and Environmental Conditions	V1M2 Sec. 5.3		6.1; 6.3.1
6.1	Overview	V1M2 Secs. 5.3.1; 5.3.3; 5.3.4; 5.3.5	5.3.1; 5.3.3; 5.3.4; 5.3.5	6.3.1
6.2	Environment	V1M2 Secs. 5.3.1; 5.3.2; 5.3.3; 5.3.4; 5.3.5	5.3.1; 5.3.2; 5.3.3; 5.3.4; 5.3.5	6.3.1 to 6.3.5
6.3	Work Area	V1M2 Secs. 5.3.3; 5.3.4; 5.3.5	5.3.3; 5.3.4; 5.3.5	6.3.1
6.4	Responding to Emergencies			
6.5	Building Security	V1M2 Sec. 5.3.4	5.3.4	6.3.4
7.0	Quality System			6.1; 8.2.4
7.1	Quality Policy	V1M2 Secs. 4.1.5; 4.2.2; 4.2.3; 4.2.8.3	4.1.5; 4.2.2; 4.2.3	8.2.3; 8.6.1
7.2	Ethics and Data Integrity	V1M2 Secs. 4.1.5; 4.16; 4.2.2; 4.2.8.1; 5.2.7	4.1.5; 4.2.2	4.1.1 to 4.1.3; 4.2.1; 6.2.1; 8.2.2; 8.2.3
7.3	Quality System Documentation	V1M2 Secs. 4.1.5; 4.2.2; 4.2.5	4.2.2; 4.2.5	8.2.4
7.4	QA/QC Objectives for the Measurement of Data	V1M2 Sec. 4.2.2	4.1.5; 4.2.2	6.2.4
7.5	Criteria for Quality Indicators			
7.6	Statistical Quality Control			
7.7	Quality System Metrics			
7.8	Management of Change			
8.0	Document Control	V1M2 Secs. 4.2.7; 4.3.1; 4.3.2.2 ; 4.3.3.3; 4.3.3.4	4.2.7; 4.3.1; 4.3.2.2; 4.3.3.3; 4.3.3.4	8.2.4; 8.3.1
8.1	Overview			8.2.5; 8.3.1; 8.3.2

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Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
8.2	Document Approval and Issue	V1M2 Secs. 4.3.2; 4.3.2.1-4.3.2.3; 4.3.3.1	4.3.2.1; 4.3.2.2; 4.3.2.3; 4.3.3.1	8.2.5; 8.3.2
8.3	Procedures for Document Control	V1M2 Secs. 4.3.2.1–4.3.2.2; 4.3.3.1	4.3.2.1; 4.3.2.2; 4.3.3.1	8.2.5; 8.3.2
8.4	Obsolete Documents	V1M2 Secs. 4.3.2.1–4.3.2.2	4.3.2.1; 4.3.2.2	8.2.5; 8.3.2
9.0	Service to the Client	V1M2 Secs. 4.4.1 - 4.4.4	4.4.1; 4.4.2; 4.4.3; 4.4.4	7.1.1; 7.1.1.4; 7.1.1.5; 7.1.1.8; 7.1.2.1
9.1	Overview	V1M2 Secs. 4.4.5; 4.5.5; 5.7.1	4.4.5; 5.7.1	
9.2	Project Review	V1M2 Sec. 4.4.5	4.4.5	7.1.1.6
9.3	Balancing Laboratory Work Load and Capacity			
9.4	Project Contracts/Records	V1M2 Sec. 5.7.1	5.7.1	
9.5	Special Services	V1M2 Secs. 4.7.1-4.7.2	4.7.1; 4.7.2	7.1.1.3; 7.1.1.7
9.6	Client Communication	V1M2 Secs. 4.7.1-4.7.2	4.7.1; 4.7.2	7.1.1.7
9.7	Reporting	V1M2 Secs. 4.7.1-4.7.2	4.7.1; 4.7.2	7.1.1.7
9.8	Client Feedback and Surveys	V1M2 Secs. 4.7.1-4.7.2	4.7.1; 4.7.2	7.1.1.7; 8.6.2
9.9	Client Confidentiality	V1M2 Secs. 4.1.5; 5.10.7	4.1.5; 5.10.7	4.2.1 to 4.2.4
10.0	Subcontracting	V1M2 Secs. 4.4.3; 4.5.4	4.4.3; 4.5.4	
10.1	Overview	V1M2 Secs. 4.5.1 - 4.5.3; 4.5.5; 5.3.1	4.5.1; 4.5.2; 4.5.3; 5.3.1	6.6.1; 7.1.2.1; 7.1.2.2
10.2	Qualifying and Monitoring Subcontractors	V1M2 Secs. 4.5.1; 4.5.2; 4.5.3; 4.5.5	4.5.1; 4.5.2; 4.5.3	6.6.1; 7.1.2.1; 7.1.2.2
10.3	Oversight and Reporting	V1M2 Sec. 4.5.5		
10.4	Contingency Planning			
11.0	Purchasing Services and Supplies	V1M2 Sec. 4.6.1	4.6.1	
11.1	Overview	V1M2 Secs. 4.6.2; 4.6.3; 4.6.4	4.6.2; 4.6.3; 4.6.4	6.6.1; 6.6.2
11.2	Glassware	V1M2 Sec. 5.5.13.1		
11.3	Reagents, Standards & Supplies	V1M2 Secs. 4.6.2; 4.6.3; 4.6.4 2016 V1M4 1.7.2.5	4.6.2; 4.6.3; 4.6.4	6.6.1 to 6.6.3
11.4	Purchase of Equipment / Instruments / Software			
11.5	Services			
11.6	Suppliers			
12.0	Complaints	V1M2 Sec. 4.8	4.8	8.6.1; 8.6.2
12.1	Overview			7.9.1 to 7.9.3 8.6.1; 8.6.2;
12.2	Complaint Processing			7.9.2 to 7.9.7 8.6.1; 8.6.2;
13.0	Control of Nonconforming Work	V1M2 Secs. 4.9.1; 5.10.5	4.9.1; 5.10.5	7.10.1
13.1	Overview	V1M2 Secs. 4.9.1; 4.11.3; 4.11.5	4.9.1; 4.11.3; 4.11.5	7.10.1
13.2	Responsibilities and Authorities	V1M2 Secs. 4.9.1; 4.11.3; 4.11.5; 5.2.7	4.9.1; 4.11.3; 4.11.5	7.10.1
13.3	Evaluation of Significance and Action Taken	V1M2 Secs. 4.9.1; 4.11.3; 4.11.5	4.9.1; 4.11.3; 4.11.5	4.1.5; 7.10.1; 7.10.2; 8.5.3
13.4	Method Suspension / Restriction (Stop Work Procedures)	V1M2 Secs. 4.9.1; 4.9.2; 4.11.5	4.9.1; 4.9.2; 4.11.5	7.10.1; 7.10.2
14.0	Corrective Action	V1M2 Sec. 4.11		4.1.4; 4.1.5
14.1	Overview	V1M2 Secs. 4.9.2; 4.11.1; 4.11.2	4.9.2; 4.11.1; 4.11.2; 8.7.1; 8.7.3	7.10.2 8.7.1; 8.7.3;
14.2	General Processes	V1M2 Sec. 4.11.2; 4.11.3	4.11.2; 4.11.3	7.7.2; 8.5.3; 8.7.1;

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Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
14.3	Correction Action Process Steps	V1M2 Sec. 4.11.2; 4.11.3; 4.11.4; 4.11.6; 4.11.7; 4.12.2	4.11.2; 4.11.3; 4.11.4; 4.12.2	8.5.3; 8.6.1; 8.7.2
14.4	Technical Data Corrective Actions	V1M2 Sec. 4.11.6		8.7.1
14.5	Corrections to Data/Records	V1M2 Secs. 4.11.1; 4.13.2.3	4.11.1; 4.13.2.3	7.5.2; 8.7.1
15.0	Preventive Action / Improvement	V1M2 Secs. 4.10; 4.12.1; 4.12.2; 4.15.1; 4.15.2	4.10; 4.12.1; 4.12.2; 4.15.1; 4.15.2	4.1.4; 8.6.2
16.0	Control of Records	V1M2 Secs. 4.2.7; 4.13.1.1; 4.13.3	4.2.7; 4.13.1.1	8.4.2
16.1	Overview	V1M2 Secs. 4.13.1.1 - 4.13.1.4; 4.13.2.1-4.13.2.3; 4.13.3	4.13.1.1 - 4.13.1.4; 4.13.2.1-4.13.2.3	8.4.1; 8.4.2
16.2	Programs with Longer Retention Requirements			
16.3	Technical and Analytical Records	V1M2 Sec. 4.13.2.2 - 4.13.2.3	4.13.2.2; 4.13.2.3	7.5.1; 8.4.2
16.4	Laboratory Support Activities			7.5.2; 8.4.2
16.5	Administrative Records			8.4.2
16.6	Records Management, Storage and Disposal	V1M2 Sec. 4.13.3		4.2.1; 8.4.2
17.0	Audits			
17.1	Internal Audits	V1M2 Sec. 4.2.8.1; 4.14; 4.14.1; 4.14.2 ; 4.14.3; 4.14.5; 5.9.1; 5.9.2	4.14.1; 4.14.2; 4.14.3; 5.9.1; 5.9.2	8.6.1; 8.8.1; 8.8.2
17.2	External Audits	V1M2 Secs.4.14.2; 4.14.3	4.14.2; 4.14.3; 4.14.4	4.2.1; 8.6.1
17.3	Audit Findings	V1M2 Secs. 4.14.2; 4.14.3; 4.14.5		8.6.1
18.0	Management Reviews	V1M2 Sec. 4.1.6; 4.15; 4.15.1; 4.15.2	4.1.6; 4.15.1; 4.15.2	4.1.4; 8.5.1; 8.6.1; 8.9.1; 8.9.2
18.1	Quality Metrics Report			8.5.1
18.2	Annual Management Review	V1M2 Sec. 4.2.2; 4.15.3	4.2.2	4.1.1, 4.1.4; 4.2.1; 7.1.1.3; 8.2.2; 8.5.1 to 8.5.3; 8.6.1; 8.9.3
19.0	Test Methods and Method Validation	V1M2 Sec. 5.4.1	5.4.1	7.2.1.1; 8.2.5
19.1	Overview	V1M2 Sec. 5.4.1	5.4.1; 5.4.5.1	6.2.3; 7.2.1.1 to 7.2.1.3
19.2	Standard Operating Procedures (SOPs)	V1M2 Secs. 4.2.8.5; 4.3.3.1; 5.4.2	4.3.3.1; 5.4.2	7.2.1.4
19.3	Laboratory Methods Manual	V1M2 Sec. 4.2.8.5 (2019 5.4.4.2)		6.2.3
19.4	Selection of Methods	V1M2 Secs. 4.13.3; 5.4.1; 5.4.2; 5.4.3. (2019 5.4.4) V1M4 Secs. 1.4; 1.5.1; 1.6.1; 1.6.2; 1.6.2.1; 1.6.2.2	5.4.1; 5.4.2; 5.4.3; 5.4.4; 5.4.5.1; 5.4.5.2; 5.4.5.3	7.1.1.2; 7.2; 7.2.1.2; 7.2.1.3; 7.1.2.4 to 7.2.1.7; 7.2.2.1 to 7.2.1.7; 7.2.2.1
19.5	Methods Detection Limits (MDLs) / Limit of Detection (LOD)	V1M2 Sec. 5.9.3. V1M4 Secs. 1.5.2; 1.5.2.1; 1.5.2.2	5.4.5.3	7.2.2.3
19.6	Instrument Detection Limits (IDLs)	V1M2 Sec. 5.9.3. V1M4 Sec. 1.5.2.1		
19.7	Limit of Quantitation	V1M2 Sec. 5.9.3		

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Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
19.8	Retention Windows	V1M2 Sec. 5.9.3. V1M4 Sec. 1.5.4; (2009 1.7.3.6) (2016 1.7.2.6)		
19.9	Evaluation of Selectivity	V1M2 Sec. 5.9.3. V1M4 Sec. 1.5.4; (2009 1.7.3.6) (2016 1.7.2.6)		
19.10	Estimation of Uncertainty of Measurement	V1M2 Sec. 5.1.1; 5.1.2; 5.4.6	5.1.1; 5.1.2; 5.4.6.1; 5.4.6.2; 5.4.6.3	7.6.1; 7.6.2; 7.6.3
19.11	Sample Reanalysis Guidelines	V1M2 Sec 5.9.1	5.9.1	
19.12	Control of Data	V1M2 Secs. 5.4.7.1; 5.4.7.2; 5.9.1	5.4.7.1; 5.4.7.2; 5.9.1	7.11.1 to 7.11.6
20.0	Instruments, Equipment, and Calibration	V1M2 Secs. 5.5.4; 5.5.5; 5.5.6	5.5.4; 5.5.5; 5.5.6; 5.6.1	6.1; 6.4.3; 6.4.6; 6.4.9
20.1	Overview	V1M2 Secs. 5.5.1; 5.5.2; 5.5.3; 5.5.5; 5.5.10	5.5.1; 5.5.2; 5.5.3; 5.5.5; 5.5.10; 5.6.1	6.4.1; 6.4.4 to 6.4.6; 6.4.9; 6.4.11
20.2	Instrument and Equipment Maintenance	V1M2 Secs. 5.5.1; 5.5.3; 5.5.7; 5.5.9	5.5.1; 5.5.3; 5.5.7; 5.5.9; 5.6.1	6.4.1 to 6.4.3; 6.4.6; 6.4.10
20.3	Support Equipment	V1M2 Secs. 5.5.10; 5.5.11; 5.5.13.1	5.5.10; 5.5.11; 5.6.2.1.2; 5.6.2.2.1; 5.6.2.2.2	6.4.11; 6.4.12; 6.5.1; 6.5.2; 6.5.3
20.4	Instrument Calibrations	V1M2 Secs. 5.5.8; 5.5.10; 5.6.3.1. V1M4 Sec. 1.7.1.1; (2009 1.7.2) (2016 1.7.1.2)	5.5.8; 5.5.9; 5.5.10; 5.6.1; 5.6.2; 5.6.3.1	6.4.2; 6.4.3; 6.4.6 to 6.4.8; 6.4.11; 6.4.13; 6.4.14; 6.5.1; 6.5.2
21.0	Measurement Traceability			
21.1	Overview	V1M2 Sec. 5.6.3.1	5.6.2.1.2; 5.6.2.2.2; 5.6.3.1	6.4.14; 6.5.1; 6.5.2; 6.5.3
21.2	Reference Weights and Thermometers	V1M2 Secs. 5.5.13.1; 5.6.3.1; 5.6.3.2	5.6.3.1; 5.6.3.2	6.4.14
21.3	Reference Standards, Materials, and Reagents	V1M2 Secs. 5.6.3.1; 5.6.3.2; 5.6.3.3; 5.6.3.4; 5.6.4.1; 5.6.4.2; 5.9.1; 5.9.3	5.6.3.1; 5.6.3.2; 5.6.3.3; 5.6.3.4; 5.9.1	6.4.14
22.0	Sampling			
22.1	Overview	V1M2 Secs. 5.7.1; 5.7.3	5.7.1; 5.7.3	7.3.1; 7.3.2; 7.3.3
22.2	Sample Containers			
23.0	Sample Handling	V1M2 Sec. 5.8.1	5.8.1	7.4.1
23.1	Chain of Custody (CoC)	V1M2 Secs. 5.7.2; 5.7.4; 5.8.4; 5.8.7.5; 5.8.8; 5.9.1	5.7.2; 5.8.4; 5.9.1	7.1.1.6; 7.4.1
23.2	Sampling Containers, Preservation Requirements, Holding Times			
23.3	Sample Receipt	V1M2 Secs. 5.8.1; 5.8.2; 5.8.3; 5.8.5; 5.8.7.3; 5.8.7.4; 5.8.7.5	5.8.2; 5.8.3	7.4.3
23.4	Sample Acceptance Policy	V1M2 Secs. 5.8.6; 5.8.7.2		
23.5	Sample Storage	V1M2 Secs. 5.7.4; 5.8.4	5.8.4	7.4.1; 7.4.4
23.6	Hazardous Samples and Foreign Soils			
23.7	Sample Shipping	V1M2 Sec. 5.8.2	5.8.2	7.4.2
23.8	Sample Aliquots / Subsampling	V1M2 Sec. 5.7.1	5.7.1	7.3.1; 7.3.2
23.9	Sample Disposal			
24.0	Assuring the Quality of Test Results			
24.1	Overview	V1M2 Secs. 5.9.2; 5.9.3	5.9.2	7.7.2 to 7.7.3
24.2	Controls	V1M2 Secs. 5.9.2; 5.9.3	5.9.2	7.7.1; 7.7.3

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Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
24.3	Negative Controls	V1M2 Secs. 5.9.2; 5.9.3 V1M4 Secs. (2019 1.7.3; 1.7.3.1; 1.7.4.1) (2016 1.7.2, 1.7.2.1, 1.7.3.1)	5.9.2	7.7.1; 7.7.3
24.4	Positive Controls	V1M2 Secs 5.9.2; 5.9.3. V1M4 Secs.(2009 1.7.3; 1.7.3.2; 1.7.3.2.1; 1.7.3.2.2; 1.7.3.2.3) (2016 1.7.2, 1.7.2.2, 1.7.3.2)	5.9.2	7.7.1; 7.7.3
24.5	Acceptance Criteria (Control Limits)	V1M2 Sec. 5.9.3. V1M4 Secs. 1.7.4.2; 1.7.4.3		7.7.1; 7.7.3
24.6	Marginal Exceedance	V1M4 Sec. 1.7.3.2		
25.0	Reporting Results			
25.1	Overview	V1M2 Secs. 5.10.1; 5.10.2; 5.10.8	5.10.1; 5.10.2; 5.10.8	7.8.1 to 7.8.2
25.2	Test Reports	V1M2 Secs. 5.10.1; 5.10.2; 5.10.3.1; 5.10.3.2; 5.10.5; 5.10.6; 5.10.7; 5.10.8; 5.10.10; 5.10.11	5.10.1; 5.10.2; 5.10.3.1; 5.10.3.2; 5.10.5; 5.10.6; 5.10.7; 5.10.8	7.8.2.1; 7.8.2.2; 7.8.3; 7.8.5
25.3	Reporting Level or Report Type	V1M2 Secs. 5.10.1; 5.10.7; 5.10.8	5.10.1; 5.10.7; 5.10.8	
25.4	Electronic Data Deliverables (EDDs)			
25.5	Supplemental Information for Test	V1M2 Secs. 5.10.1; 5.10.3.1; 5.10.5	5.10.1; 5.10.3.1; 5.10.5	7.1.1.3; 7.8.6.1; 7.8.6.2; 7.8.7.1 to 7.8.7.3
25.6	Amendments to Test Reports	V1M2 Sec. 5.10.9	5.10.1; 5.10.9	7.8.8.1 to 7.8.8.3

26.5) Appendix 5 - Terms/Glossary and Acronyms (EL-V1M2 Sec. 3.1)
Appendix 5. Terms/Glossary and Acronyms (EL-V1M2 Sec. 3.1)

Terms/Glossary:
Acceptance Criteria: Specified limits placed on characteristics of an item, process, or service defined in requirement documents. (ASQC)
Accreditation: The process by which an agency or organization evaluates and recognizes a laboratory as meeting certain predetermined qualifications or standards, thereby accrediting the laboratory.
Accuracy: The degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations; a data quality indicator. (QAMS)
Analyst: The designated individual who performs the "hands-on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.
Analytical Uncertainty: A subset of Measurement Uncertainty that includes all laboratory activities performed as part of the analysis. (TNI)
Anomaly: A condition or event, other than a deficiency, that may affect the quality of the data, whether in the laboratory's control or not.
Assessment: The evaluation process used to measure or establish the performance, effectiveness, and conformance of an organization and/or its systems to defined criteria (to the standards and requirements of laboratory accreditation). (TNI)
Audit: A systematic and independent examination of facilities, equipment, personnel, training, procedures, record-keeping, data validation, data management, and reporting aspects of a system to determine whether QA/QC and technical activities are being conducted as planned and whether these activities will effectively achieve quality objectives. (TNI)
Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A **preparation batch** is composed of one (1) to twenty (20) environmental samples of the same quality systems matrix, meeting the above mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be twenty-four (24) hours. An **analytical batch** is composed of prepared environmental

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samples (extracts, digestates or concentrates) which are analyzed together as a group. An analytical batch can include prepared samples originating from various quality system matrices and can exceed twenty (20) samples. (TNI)
Bias: The systematic or persistent distortion of a measurement process, which causes errors in one direction (i.e., the expected sample measurement is different from the sample's true value). (TNI)
Blank: A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results. (ASQC)
Calibration: A set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or measuring system, or values represented by a material measure or a reference material, and the corresponding values realized by standards. (TNI)

1) In calibration of support equipment the values realized by standards are established through the use of reference standards that are traceable to the International System of Units (SI).
2) In calibration according to methods, the values realized by standards are typically established through the use of Reference Materials that are either purchased by the laboratory with a certificate of analysis or purity, or prepared by the laboratory using support equipment that has been calibrated or verified to meet specifications.
Calibration Curve: The mathematical relationship between the known values, such as concentrations, of a series of calibration standards and their instrument response. (TNI)
Calibration Standard: A substance or reference material used to calibrate an instrument (QAMS)
Certified Reference Material (CRM): A reference material accompanied by a certificate, having a value, measurement uncertainty, and stated metrological traceability chain to a national metrology institute. (TNI)
Chain of Custody (COC) Form: Record that documents the possession of the samples from the time of collection to receipt in the laboratory. This record generally includes: the number and types of containers; the mode of collection; the collector; time of collection; preservation; and requested analyses. (TNI)
Compromised Samples: Those samples which are improperly sampled, insufficiently documented (chain of custody and other sample records and/or labels), improperly preserved, collected in improper containers, or exceeding holding times when delivered to a laboratory. Under normal conditions, compromised samples are not analyzed. If emergency situation require analysis, the results must be appropriately qualified.
Confidential Business Information (CBI): Information that an organization designates as having the potential of providing a competitor with inappropriate insight into its management, operation or products. TNI and its representatives agree to safeguard identified CBI and to maintain all information identified as such in full confidentiality.
Confirmation: Verification of the identity of a component through the use of an approach with a different scientific principle from the original method. These may include, but are not limited to Second Column Confirmation; Alternate wavelength; Derivatization; Mass spectral interpretation; Alternative detectors or Additional Cleanup procedures. (TNI)
Conformance: An affirmative indication or judgment that a product or service has met the requirements of the relevant specifications, contract, or regulation; also the state of meeting the requirements. (ANSI/ASQC E4-1994)
Correction: Actions necessary to correct or repair analysis specific non-conformances. The acceptance criteria for method specific QC and protocols as well as the associated corrective actions. The analyst will most frequently be the one to identify the need for this action as a result of calibration checks and QC sample analysis**.** No significant action is taken to change behavior, process or procedure.
Corrective Action: The action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence. (ISO 8402)
Data Integrity: The condition that exists when data are sound, correct, and complete, and accurately reflect activities and requirements. (TNI)
Data Audit: A qualitative and quantitative evaluation of the documentation and procedures associated with environmental measurements to verify that the resulting data re of acceptable quality (i.e., that they meet specified acceptance criteria).
Data Reduction: The process of transforming the number of data items by arithmetic or statistical calculations, standard curves, and concentration factors, and collation into a more useable form. (TNI)
Deficiency: An unauthorized deviation from acceptable procedures or practices, or a defect in an item (ASQC), whether in the laboratory's control or not.
Demonstration of Capability: A procedure to establish the ability of the analyst to generate analytical results of acceptable accuracy and precision. (TNI)
Document Control: The act of ensuring that documents (and revisions thereto) are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly, and controlled to ensure use of the correct version at the location where the prescribed activity if performed. (ASQC)
Duplicate Analyses: The analyses or measurements of the variable of interest performed identically on two subsamples of the same sample. The results from duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory. (EPA-QAD)
Equipment Blank: Sample of analyte-free media which has been used to rinse common sampling equipment to check effectiveness of decontamination procedures.
External Standard Calibration: Calibrations for methods that do not utilize internal standards to compensate for changes in instrument conditions.
Field Blank: Blank prepared in the field by filing a clean container with pure de-ionized water and appropriate preservative, if any, for the specific sampling activity being undertaken (EPA OSWER)

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Field of Accreditation: Those matrix, technology/method, and analyte combinations for which the accreditation body offers accreditation.
Holding Blank: A blank matrix stored with field samples of a similar matrix (Volatiles only) that measures storage contribution to any source of contamination.
Holding Times: The maximum time that samples may be held prior to analyses and still be considered valid or not compromised. (40 CFR Part 136)
Internal Standard: A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical test method. (TNI)
Internal Standard Calibration: Calibrations for methods that utilize internal standards to compensate for changes in instrument conditions.
Instrument Blank: A clean sample (e.g., distilled water) processed through the instrumental steps of the measurement process; used to determine instrument contamination. (EPA-QAD)
Instrument Detection Limit (IDL): The minimum amount of a substance that can be measured with a specified degree of confidence that the amount is greater than zero using a specific instrument. The IDL is associated with the instrumental portion of a specific method only, and sample preparation steps are not considered in its derivation. The IDL is a statistical estimation at a specified confidence interval of the concentration at which the relative uncertainty is ± 100%. The IDL represents a range where qualitative detection occurs on a specific instrument. Quantitative results are not produced in this range.
Laboratory Control Sample (however named, such as laboratory fortified blank, spiked blank, or QC check sample): A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes, taken through all preparation and analysis steps of the procedure unless otherwise noted in a reference method. It is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.
An LCS shall be prepared at a minimum of 1 per batch of 20 or less samples per matrix type per sample extraction or preparation method except for analytes for which spiking solutions are not available such as total suspended solids, total dissolved solids, total volatile solids, total solids, pH, color, odor, temperature, dissolved oxygen or turbidity. The results of these samples shall be used to determine batch acceptance.
Least Squares Regression (1st Order Curve): The least squares regression is a mathematical calculation of a straight line over two axes. The y axis represents the instrument response (or Response ratio) of a standard or sample and the x axis represents the concentration. The regression calculation will generate a correlation coefficient (r) that is a measure of the "goodness of fit" of the regression line to the data. A value of 1.00 indicates a perfect fit. In order to be used for quantitative purposes, r must be greater than or equal to 0.99 for organics and 0.995 for inorganics.
Limit(s) of Detection (LOD) [a.k.a., Method Detection Limit (MDL)]: The MDL is the minimum measured quantity of a substance that can be reported with 99% confidence that the concentration is distinguishable from method blank results, consistent with 40CFR Part 136 Appendix B, August, 2017.
Limit(s) of Quantitation (LOQ) [a.k.a., Reporting Limit]: The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence.
(QS) Matrix: The component or substrate that contains the analyte of interest. For purposes of batch and QC requirement determinations, the following matrix distinctions shall be used:
Aqueous: Any aqueous sample excluded from the definition of Drinking Water or Saline/Estuarine. Includes surface water, groundwater effluents, and TCLP or other extracts.
Drinking Water: Any aqueous sample that has been designated as a potable or potential potable water source.
Saline/Estuarine: Any aqueous sample from an ocean or estuary, or other salt water source such as the Great Salt Lake.
Non-Aqueous Liquid: Any organic liquid with <15% settleable solids.
Biological Tissue: Any sample of a biological origin such as fish tissue, shellfish, or plant material. Such samples shall be grouped according to origin.
Solids: Includes soils, sediments, sludges, and other matrices with >15% settleable solids.
Chemical Waste: A product or by-product of an industrial process that results in a matrix not previously defined.
Air & Emissions: Whole gas or vapor samples including those contained in flexible or rigid wall containers and the extracted concentrated analytes of interest from a gas or vapor that are collected with a sorbant tube, impinger solution, filter, or other device. (TNI)
Matrix Spike (spiked sample or fortified sample): A sample prepared, taken through all sample preparation and analytical steps of the procedure unless otherwise noted in a referenced method, by adding a known amount of target analyte to a specified amount of sample for which an independent test result of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.
Matrix Spike Duplicate (spiked sample or fortified sample duplicate): A replicate matrix spike prepared and analyzed to obtain a measure of the precision of the recovery for each analyte.
Method Blank: A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.
Method Detection Limit: See Limit of Detection (LOD)
Negative Control: Measures taken to ensure that a test, its components, or the environment do not cause undesired effects, or produce incorrect test results.

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Non-conformance: An indication, judgment, or state of not having met the requirements of the relevant specifications, contract, or regulation.
Observation: A record of phenomena that (1) may assist in evaluation of the sample data; (2) may be of importance to the project manager and/or the client, and yet not at the time of the observation have any known effect on quality.
Performance Audit: The routine comparison of independently obtained qualitative and quantitative measurement system data with routinely obtained data in order to evaluate the proficiency of an analyst or laboratory.
Positive Control: Measures taken to ensure that a test and/or its components are working properly and producing correct or expected results from positive test subjects.
Precision: The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms. (TNI)
Preservation: Any conditions under which a sample must be kept in order to maintain chemical and/or biological integrity prior to analysis. (TNI)
Proficiency Testing: A means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an external source. (TNI)
Proficiency Testing Program: The aggregate of providing rigorously controlled and standardized environmental samples to a laboratory for analysis, reporting of results, statistical evaluation of the results and the collective demographics and results summary of all participating laboratories. (TNI)
Proficiency Test Sample (PT): A sample, the composition of which is unknown to the laboratory and is provided to test whether the laboratory can produce analytical results within specified acceptance criteria. (TNI)
Quality Assurance: An integrated system of management activities involving planning, implementation, assessment, reporting and quality improvement to ensure that a process, item or service is of the type of quality needed and expected by the client. (TNI)
Quality Assurance [Project] Plan (QAPP): A formal document describing the detailed quality control procedures by which the quality requirements defined for the data and decisions pertaining to a specific project are to be achieved. (EAP-QAD)
Quality Control: The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer; operational techniques and activities that are used to fulfill requirements for quality; also the system of activities and checks used to ensure that measurement systems are maintained within prescribed limits, providing protection against "out of control" conditions and ensuring that the results are of acceptable quality. (TNI)
Quality Control Sample: A sample used to assess the performance of all or a portion of the measurement system. One of any number of samples, such as Certified Reference Materials, a quality system matrix fortified by spiking, or actual samples fortified by spiking, intended to demonstrate that a measurement system or activity is in control. (TNI)
Quality Manual: A document stating the management policies, objectives, principles, organizational structure and authority, responsibilities, accountability, and implementation of an agency, organization, or laboratory, to ensure the quality of its product and the utility of its product to its users. (TNI)
Quality System: A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required QA and QC activities. (TNI)
Raw Data: The documentation generated during sampling and analysis. This documentation includes, but is not limited to, field notes, electronic data, magnetic tapes, untabulated sample results, QC sample results, print outs of chromatograms, instrument outputs, and handwritten records. (TNI)
Record Retention: The systematic collection, indexing and storing of documented information under secure conditions.
Reference Material: Material or substance one or more properties of which are sufficiently homogeneous and well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials. (TNI)
Reference Standard: Standard used for the calibration of working measurement standards in a given organization or a given location. (TNI)
Sampling: Activity related to obtaining a representative sample of the object of conformity assessment, according to a procedure.
Second Order Polynomial Curve (Quadratic): The 2nd order curves are a mathematical calculation of a slightly curved line over two axis. The y axis represents the instrument response (or Response ratio) of a standard or sample and the x axis represents the concentration. The 2nd order regression will generate a coefficient of determination (COD or r^2) that is a measure of the "goodness of fit" of the quadratic curvature the data. A value of 1.00 indicates a perfect fit. In order to be used for quantitative purposes, r^2 must be greater than or equal to 0.99.
Selectivity: The ability to analyze, distinguish, and determine a specific analyte or parameter from another component that may be a potential interferent or that may behave similarly to the target analyte or parameter within the measurement system. (TNI)
Sensitivity: The capability of a method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest. (TNI)
Spike: A known mass of target analyte added to a blank, sample or sub-sample; used to determine recovery efficiency or for other quality control purposes.
Standard: The document describing the elements of laboratory accreditation that has been developed and established within the consensus principles of standard setting and meets the approval requirements of standard adoption organizations

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procedures and policies. (TNI)
Standard Operating Procedures (SOPs): A written document which details the method for an operation, analysis, or action, with thoroughly prescribed techniques and steps. SOPs are officially approved as the methods for performing certain routine or repetitive tasks. (TNI)
Storage Blank: A blank matrix stored with field samples of a similar matrix (volatiles only) that measures storage contribution to any source of contamination.
Surrogate: A substance with properties that mimic the analyte of interest. It is unlikely to be found in environment samples and is added to them for quality control purposes.
Surrogate compounds must be added to all samples, standards, and blanks, for all organic chromatography methods except when the matrix precludes its use or when a surrogate is not available. Poor surrogate recovery may indicate a problem with sample composition and shall be reported to the client whose sample produced poor recovery. (QAMS)
Systems Audit (also Technical Systems Audit): A thorough, systematic, qualitative on-site assessment of the facilities, equipment, personnel, training, procedures, record keeping, data validation, data management, and reporting aspects of a total measurement system. (EPA-QAD)
Technical Manager: A member of the staff of an environmental laboratory who exercises actual day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results
Technology: A specific arrangement of analytical instruments, detection systems, and/or preparation techniques.
Traceability: The ability to trace the history, application, or location of an entity by means of recorded identifications. In a calibration sense, traceability relates measuring equipment to national or international standards, primary standards, basic physical constants or properties, or reference materials. In a data collection sense, it relates calculations and data generated throughout the project back to the requirements for the quality of the project. (TNI)
Trip Blank: A blank matrix placed in a sealed container at the laboratory that is shipped, held unopened in the field, and returned to the laboratory in the shipping container with the field samples.
Uncertainty: A parameter associated with the result of a measurement that characterizes the dispersion of the value that could reasonably be attributed to the measured value.

Acronyms:
CAR – Corrective Action Report
CCV – Continuing Calibration Verification
CF – Calibration Factor
CFR – Code of Federal Regulations
COC – Chain of Custody
DOC – Demonstration of Capability
DQO – Data Quality Objectives
DUP - Duplicate
EHS – Environment, Health and Safety
EPA – Environmental Protection Agency
GC - Gas Chromatography
GC/MS - Gas Chromatography/Mass Spectrometry
HPLC - High Performance Liquid Chromatography
ICP - Inductively Coupled Plasma Atomic Emission Spectroscopy
ICP/MS – ICP/Mass Spectrometry
ICV – Initial Calibration Verification
IDL – Instrument Detection Limit
IH – Industrial Hygiene
IS – Internal Standard
LCS – Laboratory Control Sample
LCSD – Laboratory Control Sample Duplicate
LIMS – Laboratory Information Management System
LOD – Limit of Detection
LOQ – Limit of Quantitation
MDL – Method Detection Limit
MDLCK – MDL Check Standard
MDLV – MDL Verification Check Standard
MRL – Method Reporting Limit Check Standard
MS – Matrix Spike
MSD – Matrix Spike Duplicate
SDS - Safety Data Sheet
NELAP - National Environmental Laboratory Accreditation Program
PT – Performance Testing
TNI – The NELAC Institute
QAM – Quality Assurance Manual
QA/QC – Quality Assurance / Quality Control
QAPP – Quality Assurance Project Plan
RF – Response Factor

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RPD – Relative Percent Difference
RSD – Relative Standard Deviation
SD – Standard Deviation
SOP – Standard Operating Procedure
TAT – Turn-Around-Time
VOA – Volatiles
VOC – Volatile Organic Compound

26.6) Appendix 6 - Analytical Methods and Matrices

Analytical Parameters	Fields of Testing[1]				
	Drinking Water (SDWA)	**Non-Potable Water (CWA/RCRA)**	**Solid and Chemical Materials (RCRA-SW846)**	**Air and Emissions (CAA)**	**Biological Tissue**
Anions (Br^-, Cl^-, F^-, NO_2, NO_3, o-PO_4, SO_4	**EPA 300.0**	**EPA 300.0 (CWA) EPA 9056 (RCRA)**	**EPA 9056**	Mod Method 26A/0050 (9057 Mod)	---
Ash	---	---	**ASTM D482**	---	---
Density	---	---	ASTM D1963, D854	---	---
Halogens	---	---	EPA 5050/9056 (KNOX-WC-0016)	---	---
Heat of Combustion (Btu)	---	---	**ASTM D5865, D240**	---	---
Hexavalent Chromium	---	---	---	Method 0061/7199	---
pH	---	EPA 9040C (RCRA) SM4500 H+B (CWA)	EPA 9040C EPA 9045D	---	---
Hardness	---	**SM 2340B (CWA)**	---	---	---
Particulates	---	---	---	PM-10, **0050/5, 5B, 5J**, 201A, **202**, **TCEQ-23**, OTM-27, OTM-28	---
Mercury	---	**EPA 7470A (RCRA)**	**EPA 7471A&B**	**EPA 29/0060/7470A** ASTM D6784-02/7470A EPA IO-3.1/7470A	**EPA3051/3052/ 7470A**
Metals	---	**EPA 200.7 (CWA) EPA 3005A/ 6010B&C EPA 3010A/ 6010B&C (RCRA)**	**EPA 3050B/ 6010B&C EPA 3051/3052/6010B&C**	**EPA 29/ 0060/6010B&C EPA IO-3.1/6010B&C 40CFR60-12 (Pb)**	**EPA 3051/3052/ 6010B&C**
Sulfur	---	---	ASTM D3177, ASTM D129	---	---
Viscosity	---	---	**ASTM D445**	---	---
Volatiles by GC/MS	---	**EPA 5030B EPA 8260B, &D (RCRA)**	**EPA 5035 EPA 8260B, & D**	**TO-14A, TO-15 EPA 0031/5041A (VOST)**	---

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Volatiles by GC	---	---	---	EPA 0040 Condensates **ASTM D1946** M308	---
Semivolatiles by GC/MS	---	**EPA 3520C EPA 8270C,D,&E (RCRA)**	**EPA3550B&C EPA 3640A EPA 8270C,D&E**	**EPA 3542/8270C&D TO-13A**	---
Semivolatiles by GC	---	**EPA 3520C PCBs EPA 8082A (RCRA)**	**EPA 3550B&C EPA 3640A EPA 8082A**	**EPA 3542**/8082A **EPA 3542**/8081A **TO-4A, TO-10A** TCO/Grav	**EPA 3550B&C EPA 3640A** PCBs EPA 8082A
Dioxins/Furans by HRGC/HRMS	**EPA 1613B**	**EPA 1613B (CWA) EPA 8290 EPA 8290A (RCRA)**	**EPA 3640A EPA 8290 EPA 8290A**	**TO-9A, Method 23/8290/8290A EPA 0023A/8290/8290A**	**EPA 3640A EPA 8290 EPA 8290A EPA 1613B**
Lipids	---	---	---	---	EPA 8290, Micro-Lipids (KNOX-OP-0019)
Pesticides by HRGC/HRMS	_	**EPA 1699**	**EPA 1699**	_	**EPA 1699**
PCBs by HRGC/HRMS	---	**EPA 1668A&B&C CWA**	**EPA3640A EPA 1668A&B&C**	**EPA 1668A&B&C**	**EPA 3640A EPA 1668A&B&C**
PFAS by LC/MS/MS	—	—	—	**OTM-45**	—
Polycyclic Aromatic Hydrocarbons (PAH)	---	**EPA 3520C EPA 8270C&D** ID0016	**EPA 3550B&C/3640A/ 8270C&D EPA 3540C/3640A/ ID0016**	**EPA 3542/8270C&D EPA 3542/ID0016**	**EPA 3550B&C/ 3640A/** 8270C&D EPA **3540C/3640A/ ID0016**

(1) NELAC accredited analytical methods and accepted prep methods are highlighted in bold font

26.7) Appendix 7- Example Data Qualifiers (Standard Flagging Suite)1

Qualifier	Footnote
!	Laboratory is not accredited for this parameter.
*	RPD of the LCS and LCSD exceeds the control limits
*	LCS or LCSD is outside acceptance limits
>	The analyte exceeded the indicated concentration
^	Instrument related QC is outside acceptance limits
4	MS,MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore control limits are not applicable
AP	Altered Pattern
B	Compound was found in the blank and sample
B7	Target analyte detected in the method blank at or above method reporting limit. Concentration found in sample was at 10X the concentration found in the blank
c	Compound falls outside routine control limits, but is within acceptable client specific calibration criteria
cn	Refer to Case Narrative for further detail
D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples
D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D

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D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
DW	Result has been dry weight corrected
E	Result exceeded calibration range.
F1	MS and/or MSD Recovery is outside acceptance limits.
F2	MS/MSD RPD exceeds control limits
F3	Duplicate RPD exceeds the control limit
F4	MS/MSD RPD exceeds control limits due to sample size difference.
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL. The data are considered valid because the absolute difference is less than the RL.
H	Sample was prepped or analyzed beyond the specified holding time
h	Alternate peak selection upon analytical review.
I	Indicates the presence of an interference, recovery is not calculated.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
NC	Not Confirmed
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
P	The %RPD between the primary and confirmation column/detector is >40%. The higher value has been reported
Q	Result was qualitatively confirmed, but not quantitated.
q	The reported result is the estimated maximum possible concentration of this analyte, quantitated using the theoretical ion ratio. The measured ion ratio does not meet qualitative identification criteria and indicates a possible interference.
S	Ion suppression
U	Indicates the analyte was analyzed for but not detected.
V	Serial Dilution exceeds the control limits
W	PS: Post-digestion spike was outside control limits
X	Surrogate is outside control limits

1 – This is a standard list of qualifiers commonly used. Other qualifiers are available in LIMS.

HS-SOP73160 Handling of Soils Regulated by USDA
QA-LI75849 Glossary of Acronyms, Definitions, and Terms
QA-QP75850 Instrument Records and Logbooks
QA-QP75858 Standard & Reagent Labeling and Documentation
QA-SOP69646 Balance Calibration and Weight Verification
QA-SOP71051 Nonconformance and Corrective Action
QA-SOP71280 Pipette and Volumetric Labware Calibration Verification
QA-SOP75206 Temperature Monitoring and Thermometer Calibration
QA-SOP75860 Routine Monitoring Of Deionized Water
QA-SOP75861 Subsampling
QA-SOP75862 DOD QSM Program Requirements
QA-WI75859 Estimation of Measurement Uncertainty
SC-SOP75255 Sample Receipt and Log In
US-PUR-SOP62924 Guidance for Procurement of Environmental Laboratory Supplies
0-QA-WI75765 Change Plan to Document Control
12-GCMS-SOP71618 Tentatively Identified Compounds (TICs)
NDSC-CAR-QP5341 Investigation and Corrective Action Process Policy
NDSC-CAR-SOP38229 Nonconforming Work
NDSC-CAR-SOP43847 Management of Root Cause Analysis
NDSC-ETHC-QP5252 Ethics and Data Integrity Policy
NDSC-ETHC-SOP38228 Internal Ethics and Data Integrity Investigations
NDSC-ETHC-SOP43862 Manual Integrations
NDSC-IA-FRM43453 Annual Management Systems Review Checklists
NDSC-IA-QP38702 Management Systems Review
NDSC-IA-SOP5260 Internal Auditing
NDSC-QA-FRM68791 Common Terms, Definitions, and Acronyms
NDSC-US-EHS-QP46060 Environmental Health and Safety (HSE) Manual
NDSC-US-IT-QP46227 Electronic Signature Policy
NDSC-US-IT-SOP46228 Software Change Management
NDSC-US-IT-SOP46229 Software Testing, Verification and Validation

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NDSC-US-IT-SOP46231 TALS Security and User Access
NDSC-US-LEG-FRM58366 Records Retention / Storage Schedule
NDSC-US-LEG-QP54927 Records Retention Policy
NDSC-US-MCC-QP5339 Change Control
NDSC-US-PUR-SOP46704 Acid and Solvent Testing and Approval Program
NDSC-US-SUB-SOP44936 Subcontracting
NDSC-US-TS-QP44940 Calibration Curves and the Selection of Calibration Points
NDSC-US-TS-QP44987 Policy on GC/MS Tuning for Full Scan Volatile and Semi-Volatile Methods
NDSC-US-TS-QP71638 Policy on Tentatively Identified Compounds (TICs) – GC/MS Analysis
NDSC-US-TS-SOP42091 Detection and Quantitation Limits
NDSC-US-TS-WI72946 DoD/DOE Specific Process Requirements for Detection and Quantitation Limits (LOD, LOQ)

End of document

Version history

Version	Approval	Revision information	
7	06.NOV.2024		

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ATTACHMENT 2

EXAMPLE DATA COLLECTION FORMS

Method 1 Data

Location _____

Source _____

Project No. _____

Date: _____

Stack Parameters

Duct Orientation: _____

Duct Design: _____

Distance from Far Wall to Outside of Port: _____ **in**

Nipple Length: _____ **in**

Depth of Duct: _____ **in**

Width of Duct: _____ **in**

Cross Sectional Area of Duct: _____ **ft^2**

Equivalent Diameter: _____ **in**

No. of Test Ports: _____

Distance A: _____ **ft**

Distance A Duct Diameters: _____ **(must be > 0.5)**

Distance B: _____ **ft**

Distance B Duct Diameters: _____ **(must be > 2)**

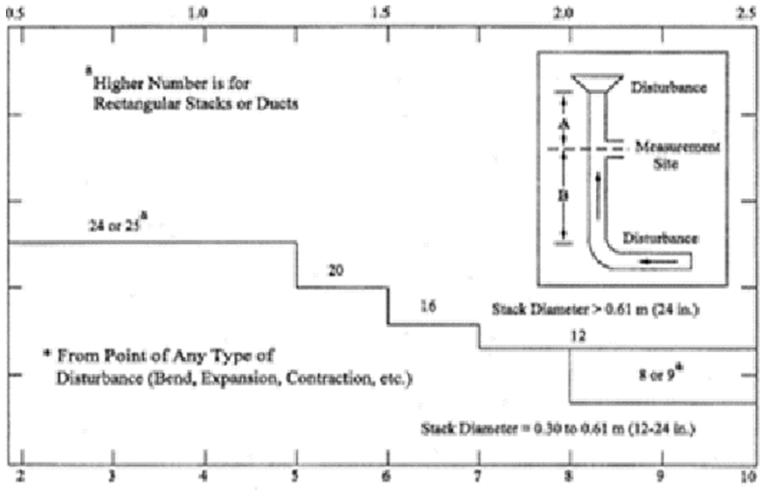
Minimum Number of Traverse Points: _____

Actual Number of Traverse Points: _____

Number of Readings per Point: _____

Measurer (Initial and Date): _____

Reviewer (Initial and Date): _____



DUCT

LOCATION OF TRAVERSE POINTS

Number of traverse points on a diameter

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3	--	83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	31.8	20.8
4	--	--	87.5	70.0	58.3	50.0	43.8	38.9	35.0	22.7	29.2
5	--	--	--	90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6	--	--	--	--	91.7	78.6	68.8	61.1	55.0	50.0	45.8
7	--	--	--	--	--	92.9	81.3	72.2	65.0	59.1	54.2
8	--	--	--	--	--	--	93.8	83.3	75.0	68.2	62.5
9	--	--	--	--	--	--	--	94.4	85.0	77.3	70.8
10	--	--	--	--	--	--	--	--	95.0	86.4	79.2
11	--	--	--	--	--	--	--	--	--	95.5	87.5
12	--	--	--	--	--	--	--	--	--	--	95.8

**Percent of stack diameter from inside wall to traverse point.*

Traverse Point	% of Diameter	Distance from inside wall	Distance from outside of port
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

Cyclonic Flow Check

Location _____
Source _____
Project No. _____
Date _____

Sample Point	Angle (ΔP=0)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
Average	--

Alliance

Isokinetic Field Data

Page ____ of ____

Client/Location: _____ Start Time: _____ Source: _____

Date: _____ Run Number _____ End Time: _____ Project No.: _____ Parameter:

STACK DATA (EST)	EQUIPMENT	IMPINGER #	INITIAL	FINAL	NET	Run Notes
Moisture: ____ % est.	Meter Box ID:	1				Filter ID
Target Rate: ____ scfm	Y:	2				Ambient Temp, °F
	ΔH @ (in.WC):	3				Ambient Moisture, %
STACK DATA (FINAL)	Probe ID:	4				Nomograph Index
Pb: ____ in. Hg	Liner Material:	H2O Gain				
Pg: ____ in. WC	Pitot ID:	LEAK CHECKS	Pre	Mid 1	Mid 2	Mid 3	Post
O_2: ____ %	Pitot Cp/Type:	Leak Rate (cfm):					
CO_2: ____ %	Nozzle ID/Type:	Vacuum (in Hg):					
	Nozzle Dn (in.):	Pitot Tube:					

Check Pt.	Initial	Final	Corr.
Mid 1 (cf)			
Mid 2 (cf)			
Mid 3 (cf)			
Mid-Point Leak Check Vol (cf):			

Sample Pt.	Sample Time (minutes) Begin	Sample Time (minutes) End	Dry Gas Meter Reading (ft^3)	Pitot Tube ΔP (in WC)	Gas Temperatures (°F) DGM Average Amb.	Gas Temperatures (°F) Stack Amb.	Orifice Press. ΔH (in. WC) Actual	Pump Vac (in. Hg)	Gas Temperatures (°F) Probe Amb.	Gas Temperatures (°F) Filter Amb.	Gas Temperatures (°F) Imp Exit Amb.	Gas Temperatures (°F) Aux Amb.
Average												

Alliance SOURCE TESTING

Location _____
Source _____
Project No. _____
Parameter _____

Date	Nozzle ID	Nozzle Diameter (in.) #1	#2	#3	Dn (Average)	Difference	Criteria	Material
							≤ 0.004 in.	

Date	Pitot ID	Evidence of damage?	Evidence of mis-alignment?	Calibration or Repair required?

Date	Probe or Thermocouple ID	Reference Temp. (°F)	Indicated Temp. (°F)	Difference	Criteria	Probe Length
	--			--	± 1.5 % (absolute)	--

Field Balance Check						
Date						
Balance ID:						
Test Weight ID:						
Certified Weight (g):						
Measured Weight (g):						
Weight Difference (g):						

Date	Barometric Pressure	Evidence of damage?	Reading Verified	Calibration or Repair required?	Barometer ID

Date	Meter Box ID	Positive Pressure Leak Check

Reagent	Lot#	Field Prep performed	Field Lot	Date	By

Posttest Purge					
Run 1		**Run 2**		**Run 3**	
Flow Rate (lpm):		Flow Rate (lpm):		Flow Rate (lpm):	
Clock Time	Temperature	Clock Time	Temperature	Clock Time	Temperature

Alliance TECHNICAL GROUP

Low-Flow DGM Data

Location _____
Source _____
Project No. _____
Parameter _____

Run Number: _____ Meter ID: _____
Rotometer ID: _____ Meter Correction Factor (Y): _____

Trap Set No.	R1A					R1B					R1C					R1D				
Trap 1 ID																				
Trap 2 ID																				
Trap 3 ID																				
Date																				
Start Time																				
End Time																				
Run Time (θ), min																				
Pre Leak Check, L (at > 10 in WC)																				
Post Leak Check, L (at max vac.)																				
Run Time	Meter Volume, L			Meter Pressure	Vacuum, in. Hg	Meter Volume, L			Meter Pressure	Vacuum, in. Hg	Meter Volume, L			Meter Pressure	Vacuum, in. Hg	Meter Volume, L			Meter Pressure	Vacuum, in. Hg
0																				
5																				
10																				
15																				
20																				
25																				
30																				
35																				
40																				
Total Meter Volume (Vm), L																				
Run Time	Temperatures, °F				Roto. Reading, L/min	Temperatures, °F				Roto. Reading, L/min	Temperatures, °F				Roto. Reading, L/min	Temperatures, °F				Roto. Reading, L/min
	DGM	Probe	Tenax	Tenax Char.		DGM	Probe	Tenax	Tenax Char.		DGM	Probe	Tenax	Tenax Char.		DGM	Probe	Tenax	Tenax Char.	
0																				
5																				
10																				
15																				
20																				
25																				
30																				
35																				
40																				
Average Meter Temperature, °F																				
Average Meter Temperature, °R																				
Barometric Pressure (Pb), in. Hg																				
Average Meter Pressure (ΔH), in. WC																				
Average Meter Pressure (Pm), in. Hg																				
Standard Meter Volume (Vmstd), dsL																				
Collected Condensate + Rinse, ml																				
Average Rotometer Reading, L/min						--					--					--				

Alliance Source Testing, LLC
Instrument QA Checklist

Client _____ **Project** _____

Site _____ **Date** _____

Source _____

Constituent										
Instrument										
Make										
Model										
ID/Serial Number										
Range										
Cylinder #										
High, Cylinder 1										
Expiraton Date										
Mid, Cylinder 2										
Expiraton Date										
Zero, Cylinder 3										
Cylinder Gas Value										
High, Cylinder 1										
Mid, Cylinder 2										
Zero, Cylinder 3										
Linearity	Observed	% Diff	Observed	% Diff	Observed	% Diff	Observed	% Diff	Observed	% Diff
High, ppm or %										
Mid, ppm or %										
Zero, ppm or %										

Were all Calibration Gases in cert? _____

What was the leak check reading? _____

When was the leak check performed? _____

Was the Gas Divider used and proved? _____

Aeros Gas Divider Number _____

Was a NO_x : NO Conversion Check performed? _____

Did all Instruments pass Linearities (+\- 2% of Span)? _____

Did all Instruments pass a System Bias (+\- 5% of Span)? _____

High Cal Gas Value _____

High Cal Gas Cylinder # _____

Mid Cal Gas Value _____

Mid Cal Gas Cylinder # _____

NO_x Cal Gas Value _____

NO_x Cal Gas Cylinder # _____

NO_2 Audit Gas Value _____

NO_2 Audit Gas Cylinder # _____

Alliance Source Testing, LLC
Calibration Log

Client _____ **Project** _____

Site _____ **Date** _____

Source _____

Run	Time	Instrument	Internal			External		Comments
			Zero	Mid	High	Zero	Cal	
		O_2						
		CO						
		NO_x						Temp
								Volts
		O_2						
		CO						
		NO_x						Temp
								Volts
		O_2						
		CO						
		NO_x						Temp
								Volts
		O_2						
		CO						
		NO_x						Temp
								Volts
		O_2						
		CO						
		NO_x						Temp
								Volts
		O_2						
		CO						
		NO_x						Temp
								Volts
		O_2						
		CO						
		NO_x						Temp
								Volts
		O_2						
		CO						
		NO_x						Temp
								Volts

APPENDIX II

STACK DETECTION LIMIT AND FEEDRATE CALCULATIONS

POHC Detection Limit Calculations

Parameter	Units	Diphenylamine
Method Detection Limit	ng/dscf	375
Stack Gas Flowrate	dscfm	9,300
Minimum Detectable Emission Rate	lb/hr	4.61E-04
Removal Efficiency Required	%	99.99
Minimum Feedrate Required for Detection	lb/hr	4.61E+00
Minimum Feedrate Required for Detection [x 10]	lb/hr	4.61E+01
Target Feedrate [a]	lb/hr	46.0
Is the Target Feedrate Above the Minimum Feedrate Required for Detection?		YES
How Much Above the Minimum Feedrate Required for Detection?		10.0

Metals Stack Detection Limit Calculations

Parameter	Units	Chromium	Lead
Method Detection Limit	µg/sample	0.71	0.95
Sample Volume	dscm	1.25	1.25
Estimated In-Stack Detection Limit	µg/dscm	0.568	0.760
Stack Gas Flowrate	dscmm	2,835	2,835
Minimum Detectable Emission Rate	lb/hr	2.13E-04	2.85E-04
Removal Efficiency	%	99.99	99.99
Minimum Feedrate Required for Detection	lb/hr	2.13E+00	2.85E+00
Minimum Feedrate Required for Detection [x 2]	lb/hr	4.26E+00	5.70E+00
Target Feedrate	lb/hr	4.26	5.05
Is the Target Feedrate Above the Minimum Feedrate Required for Detection?		YES	YES
How Much Above the Minimum Feedrate Required for Detection?		2.0	1.8
Emissions Concentration Calculated Based on Expected Removal Efficiency [a]	µg/dscm @ 7% O_2 [a]	1	1
Emission Limit	µg/dscm @ 7% O_2	23	10
Emissions as Percentage of Emission Limit	%	4%	12%

Notes:

[a] Assuming an average oxygen content of 5.2%.

APPENDIX III

CONTINUOUS MONITORING SYSTEM

PERFORMANCE EVALUTION TEST PLAN (PETP)

AND INFORMATION ON THE

CONTINUOUS EMISSIONS MONITORING SYSTEM

CONTINUOUS MONITORING SYSTEM

PERFORMANCE EVALUTION TEST PLAN (PETP)

CONTINUOUS MONITORING SYSTEM
PERFORMANCE EVALUATION TEST PLAN
FOR THE
TRIAL BURN TEST
OF THE
ENVIROSAFE DEMIL, LLC
HYBRID BURN CHAMBER

DECEMBER 2025

Revision 0

TABLE OF CONTENTS

1.0 INTRODUCTION 2
2.0 PERFORMANCE EVALUATION PROGRAM OBJECTIVES 3
3.0 PERFORMANCE EVALUATION PROGRAM SUMMARY 3
4.0 DATA QUALITY OBJECTIVES 4
5.0 QUALITY ASSURANCE 4
6.0 PERFORMANCE EVALUATION TEST SCHEDULE 4
7.0 REPORT 4

1.0 INTRODUCTION

EnviroSafe Demil, LLC (ESD) is installing a Hybrid Burn Chamber (HBC) at its facility in Hooks, Texas. The HBC is not an incinerator and there is no controlled flame combustion. The HBC operation most closely resembles open burning/open detonation but is more environmentally responsible. As opposed to open burning/open detonation, the HBC has the advantage of containing and cleaning the exhaust gases.

The HBC is subject to 40 CFR Part 264 Subpart X (40 CFR §264.600-§264.603) – Miscellaneous Units. 40 CFR §264.601 requires that Subpart X permit terms and provisions include those requirements of 40 CFR Part 264 Subparts I through O and Subparts AA through CC, 40 CFR Part 270, 40 CFR Part 63 Subpart EEE, and 40 CFR Part 146 that are appropriate for the miscellaneous unit being permitted. Even though the HBC is not an incinerator, the Texas Commission on Environmental Quality (TCEQ) recommends that the emission limits and relevant operating parameter limits (OPLs) described in the National Emissions Standards for Hazardous Air Pollutants (NESHAP) from Hazardous Waste Combustors (HWC) found at 40 CFR Part 63 Subpart EEE would be most appropriate for the HBC and its air pollution control system (APCS). This standard is commonly referred to as the HWC Maximum Achievable Control Technology (MACT) standard.

ESD will conduct a Trial Burn test to show compliance with the Hazardous Waste Combustor Maximum Achievable Control Technology emission standards for new hazardous waste incinerators specified in 40 CFR §63.1219. The HBC system and its air pollution control system (APCS) is equipped with continuous monitoring systems (CMS) to demonstrate continuous compliance with emission standards and operating parameters. The CMS includes instrumentation such as thermocouples, pressure transmitters, and flowmeters, as well as a continuous emission monitoring system (CEMS).

The HWC MACT standard requires all operating parameter instruments be installed in locations that provide representative measurements of emissions or process parameters. All CMS operating parameter measurement devices associated with the HBC are installed at points that measure representative process parameter or process emissions. Instrument locations are shown in Figure 3-1 of the Trial Burn Plan.

The HWC MACT standard places significant emphasis on continuous system monitoring for proof of ongoing compliance with emission standards and operating parameter limits. As a result, incineration facilities are required to perform a CMS Performance Evaluation Test prior to the

performance testing to verify that all instrumentation is properly calibrated and collecting valid data.

The purpose of this document is to outline the procedures and activities associated with the CMS Performance Evaluation Test for the HBC.

2.0 PERFORMANCE EVALUATION PROGRAM OBJECTIVES

Pursuant to 40 CFR §63.1207(e) of the HWC MACT standard, ESD is submitting a CMS Performance Evaluation Test in conjunction with the Trial Burn Plan for the HBC. The primary objective of the CMS Performance Evaluation Test is to ensure that all operating parameter data recorded during the test is valid. To comply with regulatory requirements, ESD must verify the accuracy of all instruments that continuously monitor and record data measurements of the HBC operating parameters.

3.0 PERFORMANCE EVALUATION PROGRAM SUMMARY

The results of the CMS Performance Evaluation Test will be used to verify that the instrumentation and controls associated with the HBC CMS are operational, properly calibrated, and collecting valid data. The performance evaluation will consist of the following:

- Instrument calibrations
- CEMS calibrations

Instruments will be verified by using the manufacturer's written specifications or recommendations for installation, operation, and calibration of the system.

As specified in the Appendix to Subpart EEE of Part 63 – "*Quality Assurance Procedures for Continuous Emissions Monitors Used for Hazardous Waste Combustors*," ESD will conduct a Relative Accuracy Test Audit (RATA) as part of the CMS Performance Evaluation Test. The RATA will be conducted as described in the Relative Accuracy (RA) test procedure of Performance Specification 4B for CO and O_2 CEMS found in 40 CFR Part 60, Appendix B.

Nine sets of reference method (RM) tests will be conducted. The RM tests will be conducted in such a way that they will yield results representative of the emissions from the source and can be correlated to the CEMS data. The RA of the CEMS for O_2 must be no greater than 20% of the mean value of the RM test data or 1.0% O_2 by volume, whichever is greater. The RA of the CEMS for CO must be no greater than 10% of the mean value of the RM test data in terms of the applicable units of the emission standard or 5 ppmv CO, whichever is greater.

4.0 DATA QUALITY OBJECTIVES

Once calibrated, all CMS measurement devices will meet or exceed the appropriate levels of accuracy and/or precision as per the manufacturer's standard calibration procedures. Data completeness of 100% is expected for this test. ESD will ensure that all CMS instruments are properly calibrated prior to the test, consistent with this CMS Performance Evaluation Test Plan.

5.0 QUALITY ASSURANCE

Implementation of internal quality control procedures will assure ongoing quality of data generated by the CMS. The internal QA program shall include the following routine procedures:

- Quality assurance testing of instruments that comprise the CMS and CEMS utilizing this document and the manufacturer's calibration procedures
- Daily review of the CMS components and operating parameters – Any malfunctions or abnormal operating conditions will be corrected as necessary
- Daily calibration drift checks on the CEMS – The monitoring instruments shall be adjusted for drift as needed

The external QA program will include at a minimum, system audits of instrument calibration, data validation, sample logging, and documentation of quality control data and field maintenance activities.

6.0 PERFORMANCE EVALUATION TEST SCHEDULE

The CMS Performance Evaluation Test will be completed prior to initiation of the Trial Burn. The CMS Performance Evaluation Test is expected to be completed within four weeks prior to the Trial Burn. ESD will submit a 60 day notice prior to the date that the performance test is scheduled to begin.

7.0 REPORT

The results of the CMS Performance Evaluation Test will be submitted with the Trial Burn Report and Notification of Compliance (NOC) after all testing is complete and the results have been prepared in a report format. The report will include the following information:

- CMS System Calibration Records
- Data sheets, if needed
- Calculations, if needed
- Other records as needed

INFORMATION ON THE

CONTINUOUS EMISSIONS MONITORING SYSTEM

Continuous Emissions Monitoring System

Precision Partners has a partnership with CEMTEK Environmental, a technology leader in Continuous Emissions Monitoring Systems (CEMS), which after consulting, recommended and will provide a Fourier Transform Infrared Spectroscopy (FTIR) based Continuous Emissions Monitoring System. The Continuous Emissions Monitoring System was designed & engineered to meet the unique conditions encountered when monitoring emissions meeting RCRA 40 CFR Part 264 Subpart X, 40 CFR §63.1219(b)(5), and 40 CFR §63.1219(b)(5)(ii).

The CEMS FTIR technology package includes an analyzer to measure CO, & HCl, NH_3 (FTIR) and EPA compliant data acquisition software, all housed in an environmentally controlled shelter. O_2 will be measured using a zirconia oxide module in the FTIR analyzer, since O2 does not absorb light. This is a mechanical module integrated into the FTIR system. Gas is extracted into the FTIR analyzer, and after passing through it, the gas flows through the zirconia oxide module to provide a continuous O_2 reading in accordance with Performance Specification 4B. The system measures NH_3 and NH_3 slip using the FTIR analyzer, complemented by a triboelectric broken filter detector at the outlet of each filter housing. Together, these components provide dual leak detection capability.

The FTIR measurement technique incorporates several components, including a heated gas cell, electronics, a detector box, pressure measurement instrumentation, and a heated gas inlet. FTIR collects all infrared spectral data simultaneously by sending a broadband infrared light through an interferometer (modulator), which modulates all wavelengths at once. The modulated light passes through a gas cell where molecules in the sample absorb specific wavelengths. This signal is then demodulated using the Fourier Transform process, converting mirror position into a frequency response that directly correlates with the molecules present in the gas sample.

Data analysis begins with the demodulated signal, known as an interferogram, which is converted to a single-beam spectrum via the Fast Fourier Transform (FFT). To account for instrument response, a non-infrared absorbing gas is passed through the cell before sampling, and this baseline is subtracted from the sample signal. The logarithmic ratio of the sample beam to the background beam produces an absorbance spectrum over the infrared range, containing responses from all infrared-active compounds. The height of the absorbance peak is directly proportional to the compound's concentration.

The FTIR CEMS system will utilize a MKS Multigas 2030 FTIR, which is a highly sensitive instrument capable of detecting toxic gases at levels as low as 10–100 parts per billion (ppb). The system enables simultaneous analysis and display of required gases and uses permanent calibration spectrum which will be calibrated daily for O_2, and on an as required basis for CO, HCl, and NH_3. A patented, linearized detector response ensures consistent calibration across all instruments, while a heated sample line maintains temperature before gas enters the cell. Automatic temperature and pressure compensation ensures accuracy. Precision Partners and CEMTEK verify the CO and O_2 CEMS will be installed, calibrated, maintained, and continuously operated in compliance with Performance Specification 4B. The span level of the CO CEMS is 0-200 ppmv, dry basis (low-range span), 0-3,000 ppmv, dry basis (high-range span). The span level of the O2 CEMS is 0-25% oxygen.

The Multigas 2030 software offers robust quantitative analysis of all required compounds simultaneously, with automatic corrections for temperature and pressure variations. It can acquire and analyze samples in under one second, continuously acquiring spectra while computing gas concentrations. A residual spectrum feature identifies unaccounted spectral data, simplifying QA/QC verification and allowing saved spectra to be reprocessed at any time using the same or alternative calibration sets.

The system is specifically designed for process and environmental monitoring and can operate at spectral resolutions up to 0.5 cm^{-1}, even in hostile environments with vibration and temperature fluctuations. Its high-speed data processing produces low-noise infrared spectra. A single analyzer can measure all required components without requiring moisture removal prior to analysis, supporting hot/wet sampling methods. It is engineered for highly corrosive applications and excels at measuring water-soluble and reactive gases such as HCl and NH_3. Its rugged design and versatility make it well suited for the Hybrid Burn Chamber application.

Hot/Wet FTIR technology based CEMS is an ideal technology to monitor emissions and conditions of the Hybrid Burn Chamber. The Hot/Wet FTIR is not affected or corroded as all gases and components are heated above the dewpoint to maintain a safe analyzer environment. The ability of one Hot/Wet FTIR analyzer to measure multiple gases simultaneously provides a one analyzer solution, improves overall system integrity, requires less space and reductions in analyzer failures. The simple design of the system removes the requirement for chillers, filters, scrubbers, extra pumps, resulting in lower maintenance and less failure points.

APPENDIX IV

ROCKET MOTOR CONSTITUENTS

(contained in *Appendix XIII – Confidential Material* of the RCRA permit application)

VI. Geology Report

Provide all Part B responsive information in Appendix VI. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

This portion of the application applies to owners or operators of new hazardous waste management facilities; areal and/or capacity expansions of existing hazardous waste management facilities; and existing industrial solid waste facilities that store, process or dispose of hazardous waste in surface impoundments, landfills, land treatment units, waste piles (except those waste piles that meet the requirements of Section V.E.10.b. of this application), and tanks or drip pads which require a contingent post-closure plan.

For a new Compliance Plan or modification/amendment to an existing Compliance Plan of Section XI of this application, submit a Geology Report which contains updated site geologic information derived from on-going investigations since submittal of the last Permit modification/amendment application.

Submit a Geology Report which includes at a minimum the following information. This report and all specifications, details, calculations/estimates and each original sheet of plans, drawings, maps, cross-sections, other graphics, such as limits of contamination maps, etc. or any other geoscientific work must be signed and sealed by a Professional Geoscientist licensed in the State of Texas under the Professional Geoscientists Practice Act.

A. Geology and Topography

Information addressing the requirements below is included in Appendix VI.A – Geology and Topography. The Geology information has been signed and sealed by a Professional Geoscientist licensed in the State of Texas under the Professional Geoscientist Practice Act. Table VI.A.1. - Major Geologic Formations is included.

1. Active Geologic Processes

Provide a description and interpretation of the active geologic processes in the vicinity of the facility. This description should include:

a. An identification of any faults (active or otherwise) in the area of the facility. The preparer should determine which Holocene sediments or man-made structures have been displaced. The report should contain a description of the investigation techniques used to identify faults and should assess the degree, if any, to which a particular fault increases the long-term potential for waste migration. The clearance required from active faults to ensure that liner systems will not be disrupted will be based upon site specific factors such as the zone of significant surface deformation, uncertainty in locating the fault, activity of the fault, and a distance to provide a reasonable margin of safety. These issues should be addressed when discussing the offset of an industrial solid waste facility unit from an active fault.

To satisfy the requirements of 30 TAC 305.50(a)(4)(D) and 305.50(a)(10)(E), for a proposed hazardous waste management facility or a modification or amendment of a permit which includes a capacity expansion of an existing hazardous waste management facility, submit the following.

(1) A geologic literature review should be conducted, from which useful information on the possibility of faulting at a given site may be revealed. This includes, but is not limited to, maps of surface faults, subsurface

structure, and field investigations by the author(s).

(2) Descriptions and maps of faulting, fracturing, and lineations in the area are necessary. An aerial photo with lineation interpretations is suggested.

(3) The maps and cross-sections are to be constructed using an amount of data necessary to adequately describe the geology of the area. Surface data, including data regarding known surface expressions, such as surface faults, gas seeps, lineations, etc., should be accounted for in the subsurface interpretations. A surface structure map should be prepared, incorporating all of the subsurface data as well as known surface features.

(4) A minimum of two structural cross-sections, utilizing available oil field and/or water well electric log data, shall be made perpendicular to each other, crossing at the proposed surface unit location. These cross-sections should define geologic units, indicating especially Holocene sediments and Underground Sources of Drinking Water (USDWs), as well as lithology. The cross-sections should be constructed from the surface, down through the shallowest major structure or the base of the Holocene, whichever is deeper. These cross-sections need to be on a scale necessary to depict the local geology (3000' radius from the site location minimum). If needed to adequately describe the local geology, then a larger radius or deeper area of review may be necessary.

(5) A minimum of two structural subsurface maps need to be prepared. One map should be made on the shallowest mappable subsurface marker, the other on a deeper horizon that shows the underlying major structure. Additional maps may be necessary.

(6) Field surveillance will be necessary to check the area of the facility for surface features, such as lineations, and to investigate potential surface faults as indicated by, but not limited to, aerial photos, topographic maps, and seismic and subsurface structural maps.

(7) The above requirements do not limit the use of any additional information, such as seismic data, isopach maps, or potentiometric maps, that may help in defining the geology of the area of review.

(8) If faulting exists within 3000 feet of the surface unit, it must be demonstrated that the fault has not had displacement within Holocene time. If such a fault does exist, it cannot pass within 200 feet of the surface unit.

(9) If a fault that has been active within the Holocene is located within 3000 feet of the surface unit, it must be demonstrated that, a.) the fault is not transmissive, i.e., it will not provide for groundwater movement that would result in endangerment to human health or the environment, and b.) there is no actual and/ or potential problem of subsidence, which could endanger the stability of the surface unit.

b. A discussion of the extent of land surface subsidence in the vicinity of the facility including total recorded subsidence and past and projected rates of subsidence. For facilities located at low elevations along the coast which have experienced appreciable rates of subsidence, the potential for future submergence beneath Gulf water should be addressed.

c. A discussion of the degree to which the facility is subject to erosion. The potential for erosion due to surface water processes such as overland flow, channeling, gullying, and fluvial processes such as meandering streams and

undercut banks should be evaluated. If the facility is located in a low-lying coastal area, historical rates of shoreline erosion should also be provided.

d. Complete Table VI.A.1. - Major Geologic Formations

2. **Applicable to Land Based Units Only.** Regional Physiography and Topography (applicable only to owners or operators of facilities that store, process, or dispose of hazardous waste in surface impoundments, landfills, land treatment units, waste piles, except waste piles exempt from groundwater monitoring requirements, and tanks which require a contingent post-closure plan)

This section is N/A. There are no land based units.

a. Distance and direction to nearest surface water body
b. Slope of land surface
c. Direction of slope
d. Maximum elevation of facility
e. Minimum elevation of facility

3. **Applicable to Land Based Units Only.** Regional Geology (applicable only to owners or operators of facilities that store, process, or dispose of hazardous waste in surface impoundments, landfills, land treatment units, waste piles, except waste piles exempt from groundwater monitoring requirements, and tanks which require a contingent post-closure plan)

This section is N/A. There are no land based units.

Provide a description of the regional geology of the area. This section should include:

a. A geologic map of the region with text describing the stratigraphic and lithologic properties of the map units. An appropriate section of a published map series such as the Geologic Atlas of Texas prepared by the Bureau of Economic Geology is acceptable.

b. A description of the generalized stratigraphic column in the facility area from the base of the lowermost aquifer capable of providing usable groundwater to the land surface. At least the uppermost 1,000 feet of section below the facility should be described. The geologic age, lithology, variation in lithology, thickness, depth, geometry, hydraulic conductivity, and depositional history of each geologic unit should be described based upon available geologic information. Regional stratigraphic cross sections should be provided, where available.

4. Subsurface Soils Investigation Report **(Applicable to land based units or units requiring contingent closure and post-closure).**

This section is N/A. There are no land based units or units requiring contingent closure and post-closure.

This section should contain the results of an investigation of subsurface conditions for each land based unit and/or unit which requires contingent closure and post-closure care. If several units are in close proximity, a single investigation for the area will suffice. This report should include:

a. The logs of borings performed at the waste management area. All borings must be conducted in accordance with established field exploration methods. Investigation procedures should be discussed in the report. A sufficient number of borings should be performed to establish subsurface stratigraphy and to identify and allow assessment of potential pathways for pollution migration. Borings must be sufficiently deep to allow identification of the uppermost aquifer and underlying hydraulically interconnected aquifers. Borings should penetrate through the uppermost aquifer and all deeper hydraulically interconnected aquifers, deep enough to identify the aquiclude at the lower boundary. Borings should be completed to a depth at least 30 feet below the deepest excavation planned at the waste management area.

b. A text which describes the investigator's interpretations of the subsurface stratigraphy based upon the field investigation. If appropriate, soils may be assigned to generalized strata to aid in the discussion.

c. A text which describes the investigator's interpretations of the subsurface stratigraphy based upon the field investigation. If appropriate, soils may be assigned to generalized strata to aid in the discussion.

d. Complete Table VI.A.4. - Waste Management Area Subsurface Conditions and provide in the report data which describes the geotechnical properties of the subsurface soil materials. All laboratory and field tests must be performed in accordance with recognized procedures. A brief discussion of test procedures should be included. All major strata encountered during the field investigation phase should be characterized with regard to: Unified Soil Classification, moisture content, percent less than number 200 sieve, Atterberg limits (liquid limit, plastic limit, and plasticity index), and coefficient of permeability. Field permeability tests should be used to determine the coefficient of permeability of sand or silt units and should also be used to supplement laboratory tests for more clay-rich soils. In addition, particle size distribution and relative density based upon penetration resistance should be determined for coarse-grained soils. For fine-grained soils the following parameters should also be determined: cohesive shear strength based upon either penetrometer or unconfined compression tests, dry unit weight, and degree of saturation(s). For the major soil strata encountered, the maximum, minimum, and average for each of these variables should be compiled.

e. For land treatment units, provide a description of the surficial soils at the site which includes:

(1) The name and description of the soil series at the site;
(2) Important physical properties of the series such as depth, permeability, available water capacity, soil pH, and erosion factors;
(3) Engineering properties and classifications such as USDA texture, Unified Soil Classification, size gradation, and Atterberg limits (liquid limit, plastic limit, and plasticity index); and
(4) The cation exchange capacity (CEC) of the soil(s) expressed in units of meq/100g.

Much of this information may be obtained by consulting the county soil survey published by the United States Department of Agriculture, Soil Conservation Service. If available, a copy of an aerial photograph showing soil series units on the land treatment area should be provided.

If an aerial photograph is not available, include a soil series map as an attachment to this subsurface soils investigation report.

B. Facility Groundwater - RESERVED

C. Exemption from Groundwater Monitoring for an Entire Facility - RESERVED

D. Unsaturated Zone Monitoring - RESERVED

Section VI – Geology Report

Appendix VI.A – Geology and Topography

Active Geologic Processes

Table VI.A.1 – Major Geologic Formations is included in this appendix. The facility's location falls into the Tertiary age Midway Group. Attachment VI.A.1 includes a geologic atlas of the area and geologic maps showing the location of the ESD site in relation to the geologic units. On these maps, "Emi" represents the Midway Group. There are no active geological processes in the area of the ESD facility.

The following figures are included in Attachment VI.A.1:

- Figure VI.A.1-1 - Geologic Atlas
- Figure VI.A.1-2 - Geologic Units
- Figure VI.A.1-3 - Geologic Units with Description

Topographic Maps

Topographic maps are included in Attachment C to the Part A Application Form.

Faults

There are no faults within 3,000 feet of the facility. Any fault zones are several miles away from the facility. The nearest fault is shown on the first page of Attachment VI.A.2 and is approximately 2.5 miles south-southeast of the facility. It is designated as a normal fault within the undivided Midway Group.

Section 3.5.4 of the *U.S. Army BRAC 2005; Environmental Condition of Property Report, Lone Star Army Ammunition Plant, Texarkana, TX; Final, 20 November 2006* (ECP Report) states that the east-west Luling-Mexia-Talco Fault system is in the vicinity of LSAAP. However, no displacement is believed to be in the Tertiary or Recent sediments (*United States Army Toxic and Hazardous Materials Agency (USATHAMA). 1978. Installation Assessment of Lone Star Army Ammunition Plant, Report No. 124. July*). An excerpt of this report can be found in *Attachment II.1* of this Part B Permit Application. A map showing the Luling Fault Zone, the Mexia Fault Zone, and the Talco Fault Zone is shown in Attachment VI.A.2. A second page is included where the facility site is labeled on a zoomed in section of the map. As the map shows, while the facility is in the vicinity of the fault system mentioned above, it is still several miles away from the facility. This map was accessed on December 5, 2022 and can be found at the following website: Fault Tectonics of the East Texas Basin. PDF (utexas.edu) <https://store.beg.utexas.edu/geologic-circulars/2875-gc8204.html>.

A USGS map showing the U.S. Quaternary Faults is shown in Attachment VI.A.2. A second page is included where the facility site is labeled on zoomed in section of the map. As the map shows, the facility is not within the fault area. This map was accessed on December 5, 2022 and can be found at the following website: Faults | U.S. Geological Survey (usgs.gov); U.S. Quaternary Faults (arcgis.com). <https://www.usgs.gov/programs/earthquake-hazards/faults>.

The following figures are included in Attachment VI.A.2:

- Figure VI.A.2-1 – Nearest Faults to Facility
- Figure VI.A.2-2 - Luling, Mexia, and Talco Fault Zones
- Figure VI.A.2-3 - Luling, Mexia, and Talco Fault Zones in Relation to Facility
- Figure VI.A.2-4 - U.S. Quaternary Faults
- Figure VI.A.2-5 - U.S. Quaternary Faults in Relation to Facility
- Figure VI.A.3-1 - Frequency of Damaging Earthquake Shaking Around the U.S.

Earthquakes

A map titled the "Figure VI.A.3-1 - Frequency of Damaging Earthquake Shaking Around the U.S." is included in Attachment VI.A.3 and shows that the expected number of occurrences of damaging earthquake shaking in 10,000 years is 2-4 occurrences. This map was accessed on December 5, 2022 and can be found at the following website: https://www.usgs.gov/media/images/frequency-damaging-earthquake-shaking-around-us.

Subsidence and Erosion

There are no areas that would be prone to anomalous erosion or land subsidence due to the fact that there are no abrupt changes in land surface elevation and there are no major fluvial environments in the immediate area. The facility is not located in a low-lying coastal area, so historical rates of shoreline erosion are not included.

Regional Physiography and Topography

Not Applicable

This section is only applicable to land based units. There are no land based units at the facility.

Regional Geology

Not Applicable

This section is only applicable to land based units. There are no land based units at the facility.

Subsurface Soils Investigation Report

Not Applicable

This section is only applicable to land based units or units requiring contingent and post-closure. There are no land based units at the facility and no units requiring contingent and post-closure care.

Table VI.A.1. – Major Geologic Formations

Names Of Major Geologic Formation(s) Beneath The Facility	Lithology Of The Major Geologic Formation	Formation Thickness (Feet)	Depth To Top Of Formation	
			Feet/MSL[(1)]	Feet/BGS[(2)]
Tertiary age Midway Group	The Midway Group is described as massive blocky clay that locally contains glauconitic sand. It contains calcareous clay and clay-shale and is grey to bluish gray in color with reddish-brown iron stained lenses of sands and silts. More information on the Midway Group can be found in Section 3.5.4 of the ECP Report, which is included as *Attachment II.1* of *Appendix II – Facility Siting Criteria*.	600 feet	300-450 (Source: Section 3.5.2 of the ECP Report)	

(1) MSL: Mean Sea Level
MLGL: Mean Low-tide Gulf Level
(2) BGS: Below Grade Surface

Certification

I certify under penalty of law that this appendix, *Appendix VI.A – Geology and Topography*, *Attachment VI.A.1 – Geologic Information*, *Attachment VI.A.2 – Fault Information*, and *Attachment VI.A.3 – Earthquake Information* and the geologic information in *Appendix II – Facility Siting Criteria* were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the units, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

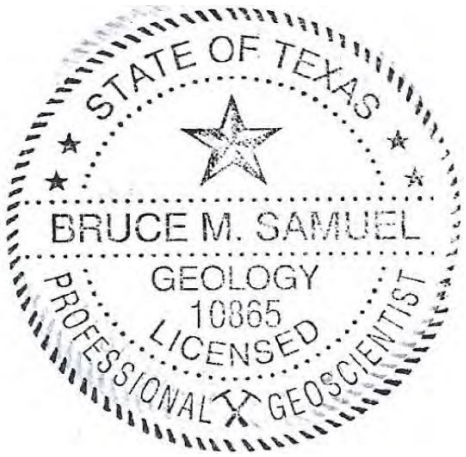
Bruce M. Samuel, Texas P.G. # 10865

Name of Professional Geoscientist licensed in the State of Texas under the Professional Geoscientists Practice Act

Signature

7/19/2023

Date



Seal

ATTACHMENT VI.A.1

GEOLOGIC INFORMATION

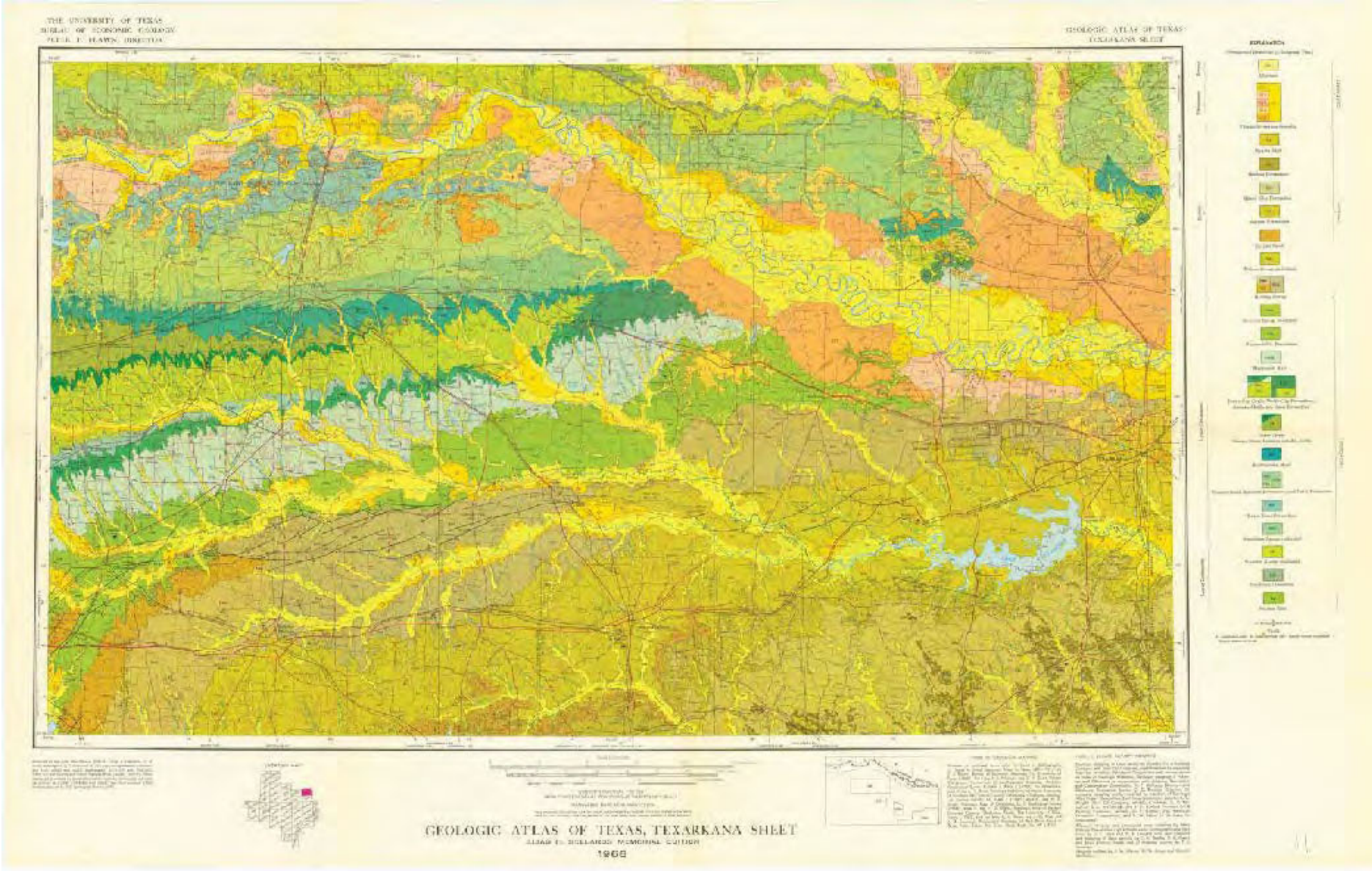


Figure VI.A.1-1 - Geologic Atlas

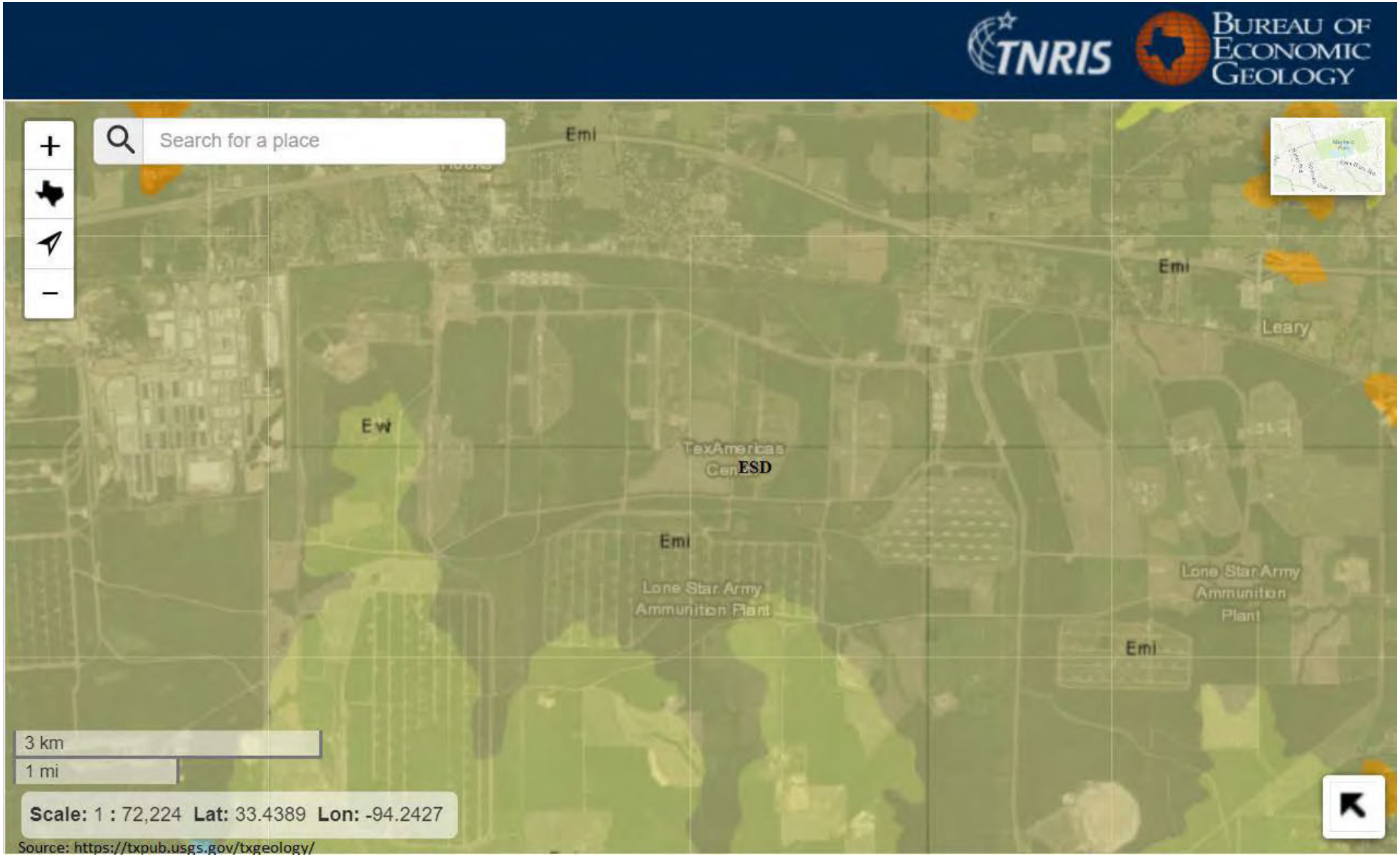


Figure VI.A.1-2 - Geologic Units

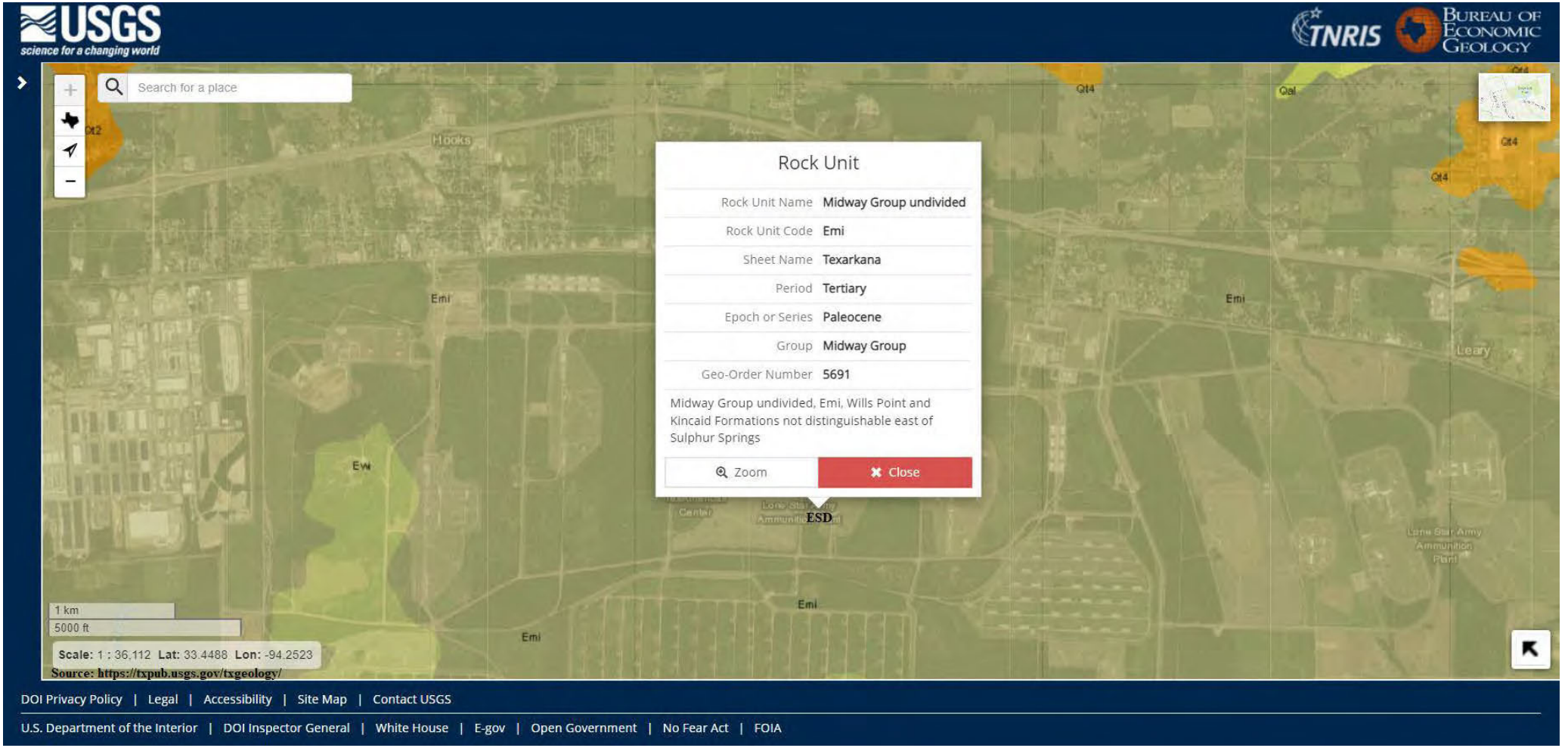
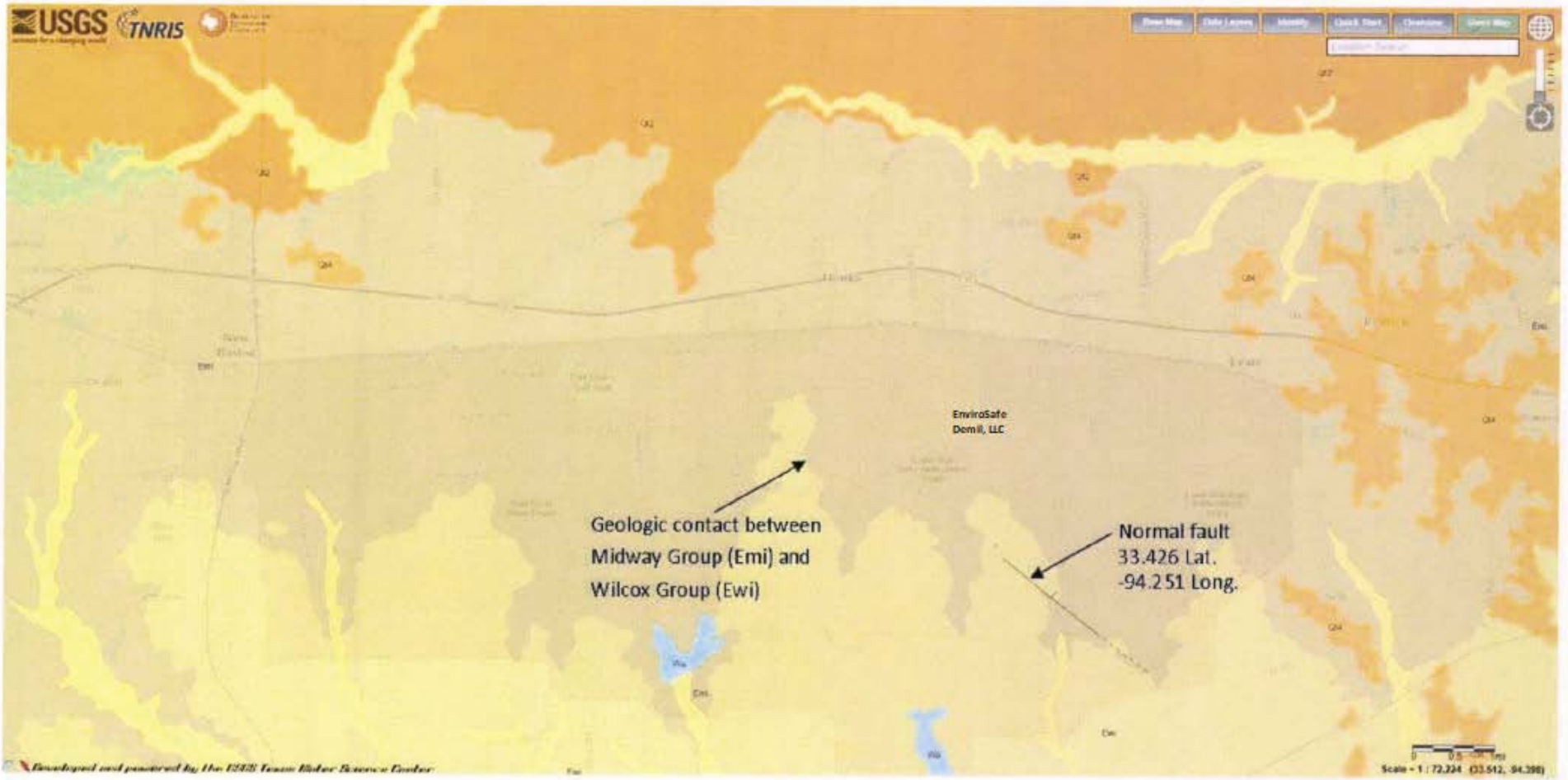


Figure VI.A.1-3 - Geologic Units with Description

ATTACHMENT VI.A.2

FAULT INFORMATION



Source: http://txpub.usgs.gov/RDM/i3C4WC8WC5WCiWC

Figure VI.A.2-1 – Nearest Faults to Facility

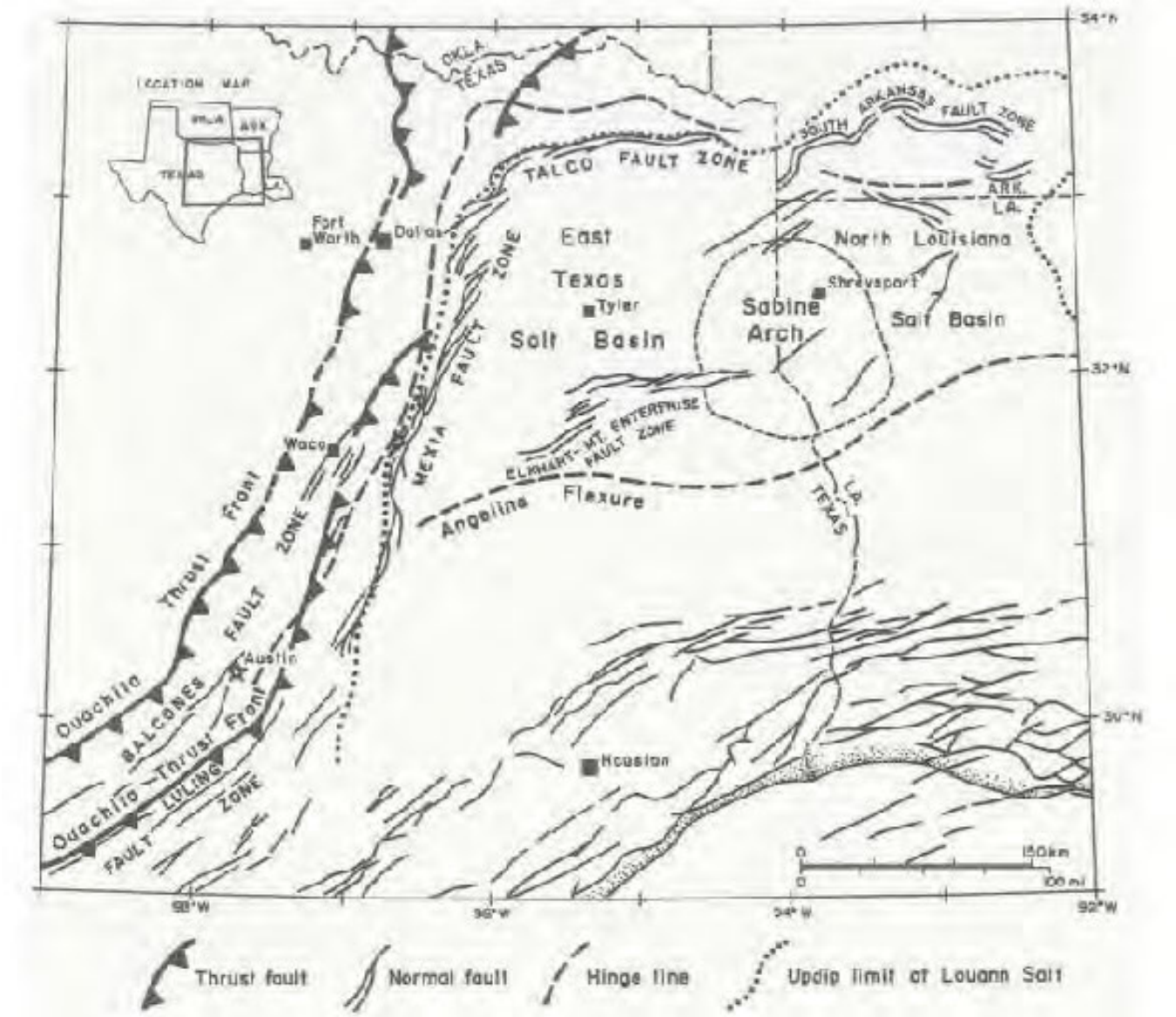


Figure 2. Regional tectonic setting of the East Texas Basin. Position of Angelina Flexure is mapped at base of Austin Chalk. Adapted from Martin (1978).

Figure VI.A.2-2 - Luling, Mexia, and Talco Fault Zones

Figure VI.A.2-3 - Luling, Mexia, and Talco Fault Zones in Relation to Facility

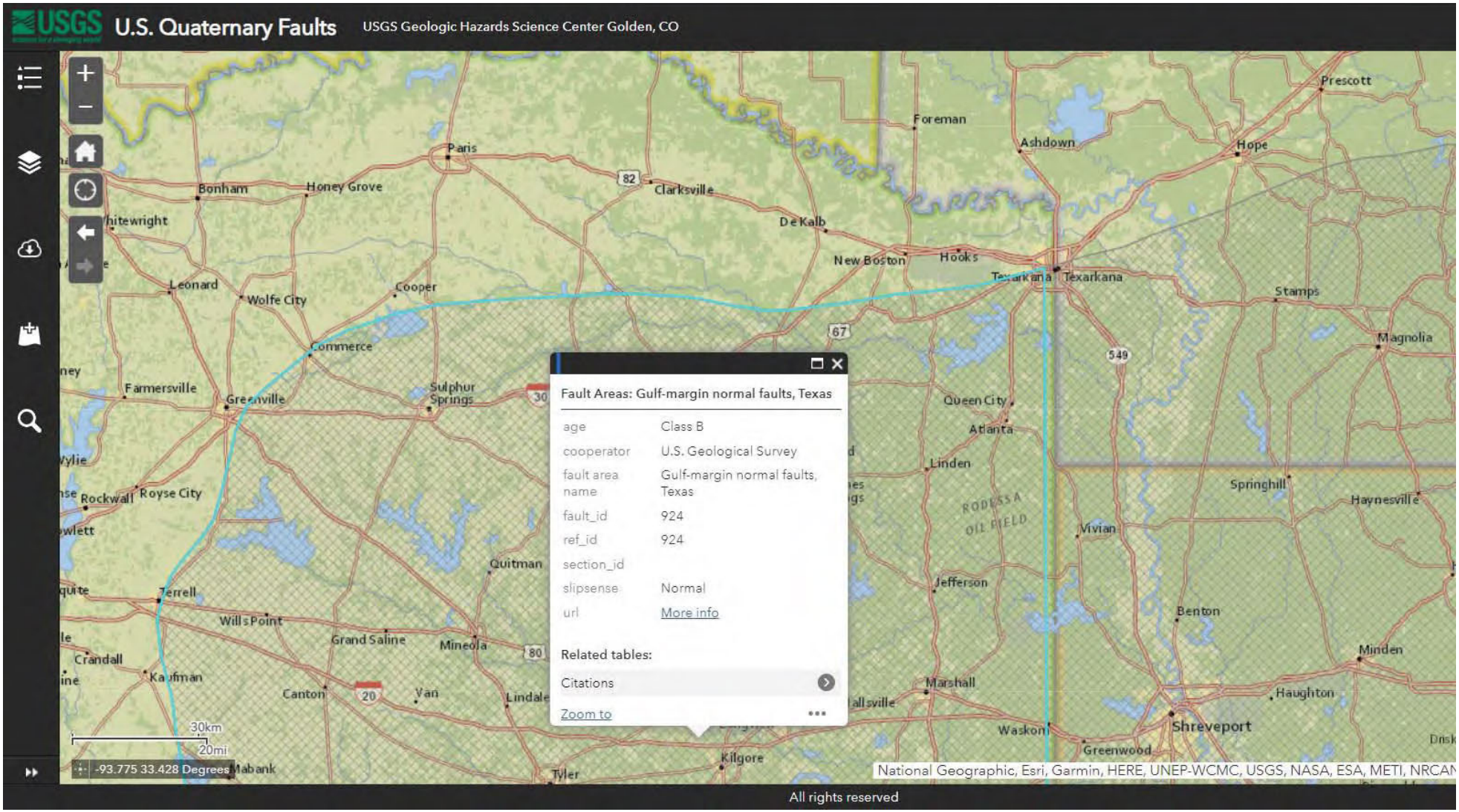


Figure VI.A.2-4 - U.S. Quaternary Faults

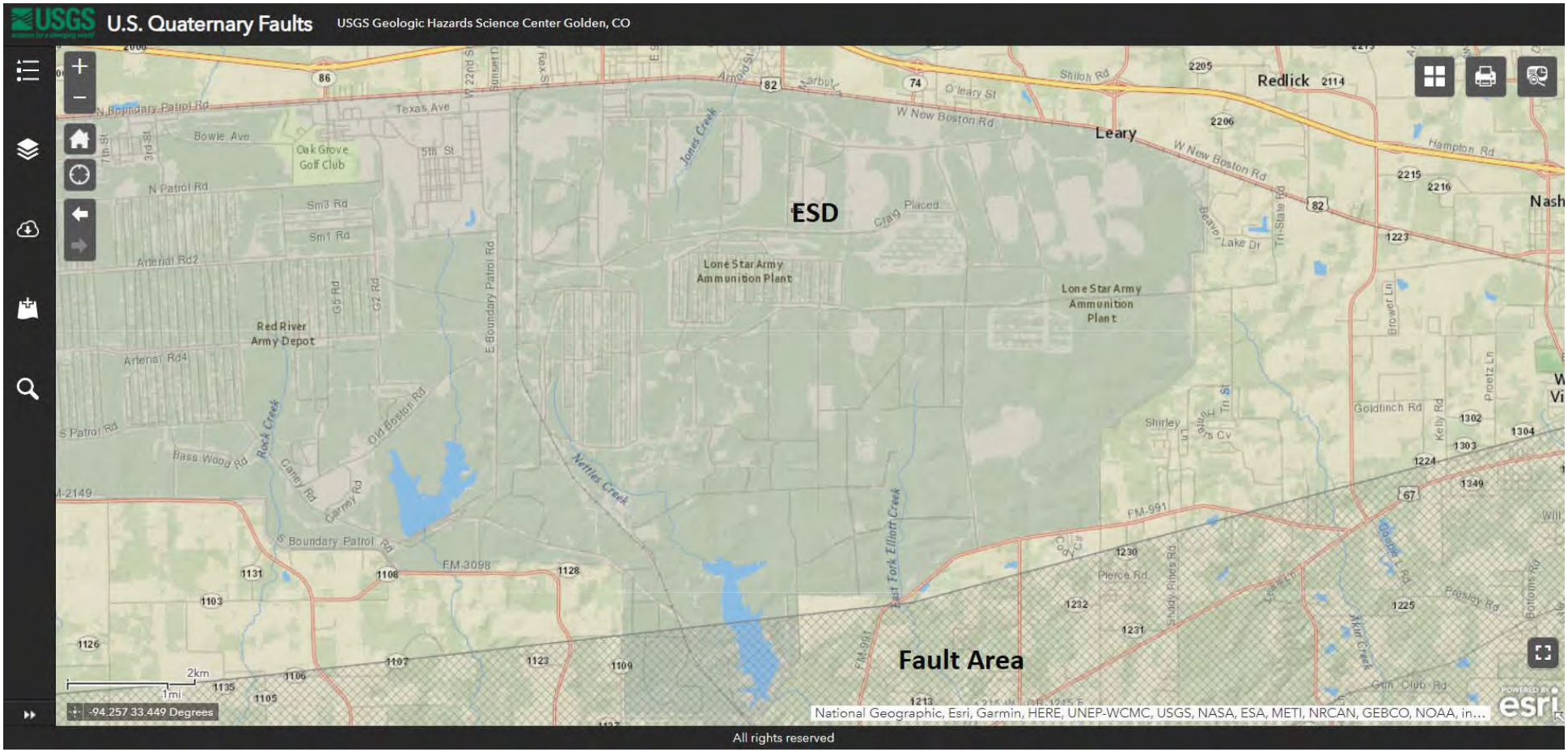


Figure VI.A.2-5 - U.S. Quaternary Faults in Relation to Facility

ATTACHMENT VI.A.3

EARTHQUAKE INFORMATION

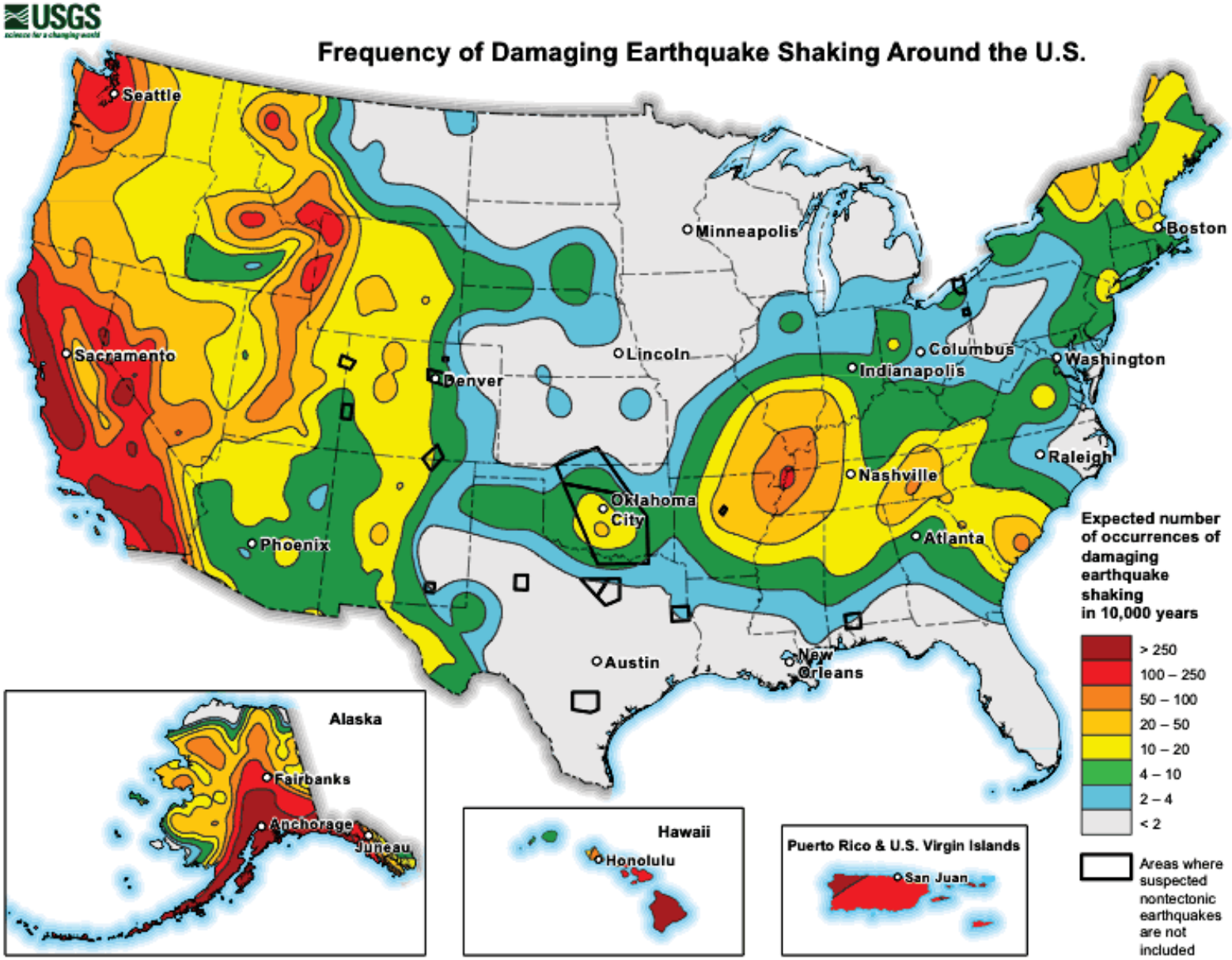


Figure VI.A.3-1 - Frequency of Damaging Earthquake Shaking Around the U.S.

Section VI - Geology Report

Appendix VI.B - Appendix VI.D

Appendix VI.B - Facility Groundwater

Not Applicable

No past monitoring has shown the presence of hazardous constituents in the groundwater.

Appendix VI.C - Exemption from Groundwater Monitoring for an Entire Facility

Not Applicable

ESD is not requesting any exemption. Groundwater monitoring is not required.

Appendix VI.D - Unsaturated Zone Monitoring

Not Applicable

This section is only applicable to land treatment units. There are no land treatment units at the facility.

VII. Closure and Post-Closure Plans

Provide all Part B responsive information in Appendix VII. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

For multiple units provide an include all Part B responsive information in a separate Appendix for each unit.

Submit a full closure plan and post-closure plan, if applicable, which contains all the information required by 30 TAC 335.8, 335.169, 335.172, 335.174, 335.177, 335.178, 335.551-335.569, 30 TAC Chapter 350, 40 CFR 264.112, 264.118, 264.178, 264.197, 264.228, 264.258, 264.280, 264.310, 264.351, 264.575, 264.601, 264.603, 264.1102, 270.14(b)(13), 270.17(f), 270.18(h), 270.20(f), 270.21(e), 270.23(a)(2) & (3), and 270.26(c)(16) where applicable. The owner of property on which an existing disposal facility is located must also submit documentation that a notation has been placed in the deed to the facility that will in perpetuity notify any potential purchasers of the property that the land has been used to manage hazardous wastes and its use is restricted (see 30 TAC 335.5). For hazardous waste disposal units that were closed before submission of the application, the applicant should submit documentation to show that plats and notices required under 40 CFR 264.116 and 264.119 have been filed.

A. Closure

This section applies to the owners and operators of all hazardous waste management facilities to be permitted. The applicant must close the facility in a manner that minimizes need for further maintenance and controls, or eliminates, to the extent necessary to protect human health and the environment, the post-closure release of hazardous waste, hazardous constituents, leachate, contaminated rainfall, or waste decomposition products to the groundwater, surface waters, or to the atmosphere.

The facility type and type of unit to be closed can determine the level of detail sufficient for a closure plan.

For each unit to be permitted, complete Table VII.A. - Unit Closure and list the facility components to be decontaminated, possible methods of decontamination, and possible methods of disposal of wastes and waste residues generated during unit closure. All ancillary components must be included in calculating closure cost estimates.

Appendix VII.A – Closure Plan is included and addresses the closure of the facility. Table VII.A – Unit Closure is included.

Additionally, if the applicant plans to close a surface impoundment in accordance with 30 TAC 335.169(a)(1) and the impoundment does not comply with the liner requirements of 30 TAC Section 335.168(a) then the closure plan for the impoundment must include both a plan for complying with 30 TAC 335.169(a)(1) and a contingent plan for complying with 30 TAC 335.169(a)(2).

N/A – there will be no surface impoundments at the facility.

Guidance on design of a closure cap and final cover for landfills is given in TCEQ Technical Guideline No. 3, and EPA publication 530-SW-85-014 presents guidance on construction quality assurance of liner construction.

N/A – there will be no landfills at the facility.

If a waste pile does not comply with the liner requirements of 30 TAC Section 335.170(a)(1) then the closure plan for the waste pile must include both a plan for complying with 40 CFR 264.258(a) and a contingent plan for complying with 40 CFR 264.258(b).

N/A – there will be no waste piles at the facility.

The final certification of closure of a land treatment unit may be prepared by an independent licensed Professional Geoscientist in lieu of an independent licensed Professional Engineer. [30 TAC 335.172(b)]

N/A – there will be no land treatment units at the facility.

B. Closure Cost Estimate (including contingent closure) [30 TAC 335.178, 40 CFR 264.142]

This section applies to owners or operators of all hazardous waste facilities, except state and federal agencies. A detailed estimate, in current dollars, of the cost of closing the facility should be included in the report. The cost estimate must include the cost of closure at the point in the facilities operating life when the extent and manner of its operation would make closure the most expensive. The TCEQ has published Technical Guideline No. 10, Closure and Post-Closure Cost Estimates, for calculating closure costs which should be consulted. Closure costs should be developed on the basis of abandonment of the site at full capacity and closure activities to be conducted by a third party with no operable on-site equipment. The costs for closing each unit must be detailed.

Appendix VII.B – Closure Cost Estimate is included and addresses the closure costs of the facility. Table VII.B. - Unit Closure Cost Estimate is included.

1. If closure costs are based on contractor bids, the applicant should submit a copy of the bid specification and each contractor's response.

2. If closure costs are based on a detailed analysis, the applicant should submit details of item costs and number of each item, and details of costs for equipment rental, third party labor and supervision, transportation, analytical costs, etc. Provide an itemized cost on Table VII.B. - Unit Closure Cost Estimate for a complete, third party permitted facility closure.

   As units are added or deleted from these tables through future permit amendments or modifications, the remaining itemized unit costs should be updated for inflation when re-calculating the revised total cost in current dollars.

3. The closure plan may propose on-site disposal of wastes, residues, etc. during closure of a unit, and this may be executed if on-site capacity exists in other units during closure of a unit. However, the cost estimate for closure must be based on off-site shipment and disposal during closure of all wastes, waste residues, wastes generated by decontamination, contaminated stormwater, and leachate.

4. For each surface impoundment, waste pile, or tank system required to have a contingent closure plan, the cost for closure under the contingent closure

plan should be detailed, as well as the cost of proposed closure. The more expensive of the cost of the proposed closure of a unit versus the cost of the contingent closure of the unit should be used in the total facility closure cost estimate.

C. Post-closure - RESERVED

D. Post-closure Cost Estimate [40 CFR 264.144] - RESERVED

E. Closure and Post-Closure Cost Summary

Please Complete Table VII.E.1. - Permitted Unit Closure Cost Summary

Please Complete Table VII.E.2. - Permitted Unit Post-Closure Cost Summary

Table VII.E.1 – Permitted Unit Closure Cost Summary is included.

Table VII.E.2 – Permitted Unit Post-Closure Cost Summary is not applicable.

Section VII – Closure and Post-Closure Plans

Appendix VII.A – Closure Plan

30 TAC 335.8, 335.169, 335.172, 335.174, 335.177, 335.178, 335.551-335.569, 30 TAC Chapter 350, 40 CFR 264.112, 264.118, 264.178, 264.197, 264.228, 264.258, 264.280, 264.310, 264.351, 264.575, 264.601, 264.603, 264.1102, 270.14(b)(13), 270.17(f), 270.18(h), 270.20(f), 270.21(e), 270.23(a)(2) & (3), and 270.26(c)(16) where applicable.

1.0 FACILITY DESCRIPTION

EnviroSafe Demil, LLC (ESD) is located in Hooks, Texas. A facility map is included in *Attachment B – Legal Description of the Facility* of the Part A Application Form.

The facility's RCRA permitted units consist of 3 storage magazines ~~(2 additional storage magazines are reserved for future use)~~, 1 preparation building, and 1 processing unit with air pollution control systems (APCS). The Rocket Motor Ops Building, the Hybrid Burn Chamber (HBC), and the associated APCS equipment will be located on the southern portion of the main facility. The storage magazines are ~~adjacent~~ proximate to the main facility. The earth covered magazines (ECMs) are located at LSAAP's former line V-13 and an above ground magazine (AGM) is located at LSAAP's Beech #10 location.

2.0 FINAL VS. PARTIAL CLOSURE

The facility will be closed in a manner that minimizes the need for further maintenance and controls necessary to protect human health and the environment. Groundwater contamination or surface water contamination from this facility are unlikely because of the type of the materials handled, operating practices, and the design of the equipment where the materials are processed. Because all wastes will be removed during closure, there will be no possibility of post-closure releases of hazardous waste, hazardous constituents, leachate, contaminated rainfall, or waste decomposition products to the groundwater, subsurface environment, surface waters, or to the atmosphere.

Final closure constitutes taking all equipment used to store, prepare, and process hazardous materials on-site out of hazardous waste service. Final closure will be commenced based on this Closure Plan. The decontamination procedures and criteria used in this Closure Plan are expressed in terms of final closure.

Partial closure is defined as removing a particular storage magazine, preparation building, or processing unit from hazardous waste service. For example, closure of only one storage magazine would constitute partial closure. If it is decided that a partial closure will be commenced, only the sections of this Closure Plan that are applicable to the unit being closed will be performed.

Table VII.A – Unit Closure lists the facility components to be decontaminated, possible methods of decontamination, and possible methods of disposal of wastes and waste residues generated during unit closure.

3.0 MAXIMUM EXTENT OF OPERATIONS

3.1 Estimate of Maximum Inventory of Hazardous Waste

The maximum inventory of hazardous waste at closure is conservatively estimated as shown in Table 3-1. The storage magazines are not kept completely full and the values shown in Table 3-1 assume all of the storage magazines are filled to capacity. Therefore, this estimate represents a worst-case scenario for wastes on-site at any time.

3.2 Management of Maximum Hazardous Waste Inventory

Once the notification of intent to close has been submitted, the facility will ensure that all hazardous materials stored in the magazines are either shipped off-site for processing and disposal or is promptly processed in the HBC prior to the commencement of closure of that unit. Any energetic materials remaining and any debris resulting from cleanup activities will be shipped off-site for processing and disposal.

The ash/debris from the HBC and the wastes from the APCS will be removed, containerized, and disposed of off-site at either a landfill (if determined to be non-hazardous) or at a Treatment, Storage, and Disposal Facility (TSDF) (if determined to be hazardous). For the purposes of calculating the worst-case closure cost estimate, these materials are assumed to be hazardous.

Table 3-1
Estimate of Maximum Inventory of Hazardous Waste

Description	Maximum Inventory [a,b]
Storage Magazines	
Above Ground Magazine (AGM)	100,000 lbs HD 1.3 NEW 100,000 lbs HD 1.4 NEW 333,333 lbs Total Weight of Energetic Materials and Packaging [b,c]
Earth Covered Magazine (ECM) V-13-1	300,000 lbs HD 1.3 NEW ~~Unlimited~~ 300,000 lbs HD 1.4 NEW 1,000,000 lbs Total Weight of Energetic Materials and Packaging [b,c]
Earth Covered Magazine (ECM) V-13-2	200,000 lbs HD 1.1 NEW 150,000 lbs HD 1.2.1 NEW 200,000 lbs HD 1.2.2 NEW 200,000 lbs HD 1.3 NEW ~~Unlimited~~ 200,000 lbs HD 1.4 NEW 666,667 lbs Total Weight of Energetic Materials and Packaging [b,c]
~~Earth Covered Magazine (ECM) V-13-3 (reserved for future use)~~ [e]	~~None; reserved for future use~~ [e]
~~Earth Covered Magazine (ECM) V-13-4 (reserved for future use)~~ [e]	~~None; reserved for future use~~ [e]
Preparation Building	
Rocket Motor Ops Building	None; Materials are not stored in the Rocket Motor Ops Building and prepared materials must be processed in the HBC during the same operating shift. Therefore, there would be no inventory left in the Rocket Motor Ops Building during Closure. However, the rated capacity for normal operations (not storage) is as follows: 80 lbs HD 1.1 NEW 1,500 lbs HD 1.2.2 NEW 10,000 lbs HD 1.3 NEW 10,000 lbs HD 1.4 NEW 33,333 lbs Total Weight
Processing Unit	
Hybrid Burn Chamber (HBC)	None; Materials are not stored in the HBC and therefore, there would be no inventory left in the Hybrid Burn Chamber during Closure. However, the rated capacity for normal operations (not storage) is as follows: 250 lbs HD 1.3 NEW per batch 250 lbs HD 1.4 NEW per batch 833 lbs Total Weight per batch

Notes:
[a] NEW stands for Net Explosive Weight.

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[b] Per 40 CFR §264.112(b)(3), the closure plan must include an estimate of the maximum inventory of hazardous waste ever on-site over the active life of the facility. The values in this table are an extremely conservative estimate of the maximum inventory ever on-site (see footnote c).

[b,c] Th~~is~~ total weight of energetic materials and packaging is calculated assuming the maximum numerical explosive limit (of any HD class) is present at closure. An average NEW of 30% is assumed for all packaged energetic material, which is an extremely conservative estimate. Actual NEW in packaged energetic material actually ranges from 41-64%, meaning that the total weight of energetic materials is much lower than estimated in the tables above.

[e] ~~These storage magazines are reserved for future use. However, in the event they are placed into service, the same methods used to close the other earth covered magazines (V-13-1 and V-13-2) will be used.~~

4.0 DECONTAMINATION METHODS

4.1 Equipment, Structures and Facilities

Decontamination of the following areas is addressed in this Closure Plan:

- Storage Magazines
  - Above Ground Magazine
  - Earth Covered Magazine V-13-1
  - Earth Covered Magazine V-13-2
  - ~~Earth Covered Magazine V-13-3 (reserved for future use)~~
  - ~~Earth Covered Magazine V-13-4 (reserved for future use)~~
- Preparation Building
  - Rocket Motor Ops Building
- Processing Unit
  - Hybrid Burn Chamber (HBC) and the associated APCS

The less than 180 day hazardous waste accumulation areas will be closed in accordance with 40 CFR §264.111 and §264.114. The requirement to have a written Closure Plan does not apply to areas designated as less than 180 day hazardous waste accumulation areas. Therefore, these areas are not addressed by this document.

4.2 General Procedures for Facility Decontamination

The procedures for decontamination of equipment will follow a combination of 40 CFR §268.45 (Table 1) and DOD Ammunition and Explosive Safety Standards. In general, the procedures described herein are also consistent with the "Guide for Decontaminating Buildings, Structures and Equipment at Superfund Sites," US EPA, Office of Research and Development, EPA/600/2-85/028, March 1985.

The decontamination plan that follows is based on subsequent "restricted/industrial use" of all decontaminated equipment, structures and facilities either at the facility or at off-site industrial facilities.

Decontamination is expected to proceed by emptying the storage magazines of any energetic materials by either shipping the materials off-site or by processing the materials in the HBC, if the HBC is still operating. The storage magazines, preparation building, HBC, and its associated APCS will then be decontaminated. While decontaminating the HBC by flashing the burn pan, as described in Section 4.5, the air pollution control systems will be in operation to control any potential air emissions from this step in the decontamination process.

No equipment in hazardous waste service nor any equipment used in the closure will be removed from the facility or returned to other service until it is decontaminated and verified clean. All equipment including mobile equipment which comes into contact with hazardous waste will be decontaminated. Any hazardous residues generated during decontamination will be disposed at appropriately permitted off-site facilities that are able to handle these types of wastes. After full decontamination, the structures and equipment may continue in non-hazardous waste service for the remainder of their useful lives. Alternatively, equipment may be dismantled and scrapped or sold as used equipment.

During decontamination operations, personnel will use personal protective equipment (PPE) appropriate to each task. Clean up procedures will follow all OSHA requirements as specified in 29 CFR §1910.120, Hazardous Waste Operations and Emergency Response.

All equipment or structures in hazardous waste service at the start of closure will be emptied as thoroughly as possible before cleaning begins. Any personnel who must enter confined spaces in order to clean them will follow OSHA "Confined Space Entry" procedures (29 CFR §1910.146).

The majority of the equipment to be cleaned is made of mild steel and the structures to be cleaned are made from concrete. Hydroblasting or steam cleaning may be used to clean this equipment and the concrete. These methods are appropriate for removing explosives and heavy metal contamination from either concrete or metal surfaces according to the Guide for Decontaminating Buildings, Structures and Equipment at Superfund Sites, EPA/600/2-85/028, page 12. Hydroblasting and steam cleaning (physical extraction) are also appropriate "Alternative Treatment Standards for Hazardous Debris" for metal or concrete surfaces as listed under 40 CFR §268.45 (Table 1) and constitutes “Physical Extraction: *High Pressure Steam and Water Sprays*."

In the event that hydroblasting or steam cleaning fails to achieve satisfactory results as described in Section 5.0, an aqueous cleaner may be selected based on its ability to dissolve the particular hazardous wastes that have been handled by each piece of equipment. If this method is used, this would constitute "Chemical Extraction: *Liquid Phase Solvent Extraction*" as defined under 40 CFR §268.45 (Table 1) which is also an appropriate "alternate treatment technology" for metal or concrete surfaces.

All wash water will be collected from cleaning operations and will be stored temporarily on-site in drums or containers and will be handled as described in Section 6.1.

4.3 Procedures for Closing the Storage Magazines

The storage magazines (Above Ground Magazine and Earth Covered Magazines) will be closed in accordance with 40 CFR §264.1202. In accordance with DOD Ammunition and Explosive Safety Standards, DoD 6055.9-STD, storage facilities no longer used to store ammunition and explosives must follow the process described below to ensure that that no threats to human health or the environment remain when the unit is no longer to be used to store ammunition and explosives.

1. Empty the storage facility of all ammunition and explosives and related materials.
2. Clean the storage facility, as required, to remove any visible explosives residue.
3. Visually inspect the storage facility for the presence of remaining ammunition and explosives or visible explosives residue by a knowledgeable individual.
4. Remove all fire and chemical hazard symbols and mark the storage facility as empty.
5. Secure the storage facility to prevent inadvertent use or access.
6. Notify the applicable emergency response and regulatory authorities of the change in the storage facility's use.
7. Record the date the storage facility was inspected, the name and position of the inspector, and the results in permanent real estate records.

In addition to the requirements above, the storage magazines will also be decontaminated in order to ensure there is no threat to human health or the environment.

Inventory Removal

When closure commences, no additional energetic materials will be added to the storage magazines. The storage magazines will be emptied of any energetic materials by either shipping the material off-site to an approved TSDF or by processing the material in the HBC, if the HBC is still operating.

Decontamination

The floor will be swept clean of all loose debris and the sweepings will be placed in antistatic bags, soaked with a desensitizing agent and sealed. The antistatic bag containing the floor sweepings will be shipped to an approved hazardous waste TSDF facility. After sweeping the loose debris from the floor surface, the concrete floors and walls of the storage magazines will be decontaminated by hydroblasting or steam cleaning. The wash water will be contained and collected from the building floor and will be pumped into drums or containers so that possible contamination is not spread. The wash water will be handled as described in Section 6.1. The

concrete surfaces of the storage magazines will be considered adequately decontaminated when they meet the criteria described in Section 5.2.

Securing the Magazine(s)

The storage magazines will be left in place after closure. All fire and chemical hazard symbols may be removed and the magazines will be locked to prevent inadvertent use or access.

Certification of Closure

The storage magazine(s) will be certified closed as described in Section 9.0.

4.4 Procedures for Closing the Preparation Building

The preparation building (Rocket Motor Ops Building) will be closed in accordance with 40 CFR §264.601.

Inventory Removal

When closure commences for the preparation building, there will be no inventory in the building. Therefore, there is no need for inventory removal.

Decontamination

The floor will be swept clean of all loose debris and the sweepings will be placed in antistatic bags, soaked with a desensitizing agent and sealed. The antistatic bag containing the floor sweepings will be shipped to an approved hazardous waste TSDF facility. After sweeping the loose debris from the floor surface, any equipment, work benches, tables, concrete floors, and concrete and brick walls of the building will be decontaminated by hydroblasting or steam cleaning. The wash water will be contained and collected from the building floor and will be pumped into drums or containers so that possible contamination is not spread. The wash water will be handled as described in Section 6.1. The metal surfaces of equipment, work benches, or tables will be considered adequately decontaminated when they meet the criteria described in Section 5.1. The concrete surfaces of the building will be considered adequately decontaminated when they meet the criteria described in Section 5.2.

Dismantling of Equipment

The equipment within the preparation building may be left in place for other service, it may be dismantled and sent for scrap metal recycling, or it may be sold as used equipment. If the equipment cannot be cleaned to the required standards, it will be disposed of at an approved hazardous waste TSDF facility. The building will be left in place after closure.

Certification of Closure

The preparation building will be certified closed as described in Section 9.0.

4.5 Procedures for Closing the HBC and the Associated APCS

The HBC will be closed in accordance with 40 CFR §264.601. If possible, the HBC will be closed after all materials in the storage magazines have been processed in the HBC.

The wash water for the HBC and all the associated APCS components will be contained and collected and will be pumped into drums or containers so that possible contamination is not spread. The wash water will be handled as described in Section 6.1. Any equipment surface will be considered adequately decontaminated when it meets the criteria described in Section 5.1.

Inventory Removal

When closure commences for the HBC, there will be no inventory in the HBC. Therefore, there is no need for inventory removal.

Flashing the HBC Burn Pan

It is unlikely that explosives will remain on surfaces inside the HBC. To ensure that this is not the case upon closure, the HBC burn pan will be flashed (with no energetic material present) with an appropriate fuel and oxidizer to heat the burn pan to a temperature that exceeds the decomposition temperature of the explosive materials processed in the unit. Flashing the burn pan in the HBC ensures that all explosives have been consumed. The exhaust gas from the HBC will then be sent through the APCS. When the HBC pressure is confirmed to be negative relative to ambient, the HBC loading door will be opened and the HBC and APCS will be shutdown.

HBC Wash System Activation

Next, facility procedures for the HBC Wash System will be used to initially clean the interior of the HBC of ash or condensate materials. The wash system water from this initial cleaning step will be collected in drums or containers for shipment off-site for proper disposal. The filter press system solids will be placed in drums for shipment off-site for proper disposal. The amount of material removed and where it was sent will be recorded and maintained in the operating record.

After the HBC Wash System has completed its' cycle, if any remaining ash or debris remains inside the HBC, it will be removed using facility procedures. This waste will be placed in drums for shipment off-site.

HBC Decontamination

Cleaning of the HBC surfaces will be accomplished by hydroblasting or steam cleaning. As mentioned in Section 4.2, these methods are appropriate for cleaning metal surfaces of explosives or heavy metal contamination. All ancillary components, including piping and ductwork, to the HBC and the associated APCS will also be hydroblasted or steam cleaned.

HBC Wash System Decontamination

Prior to the HBC and APCS being cleaned, the caustic storage tank will be emptied of the caustic material used in the neutralization system during normal operations. This will be done in order to avoid getting the material wet.

As previously mentioned, the wash system water from the initial cleaning step of the HBC will be collected in drums or containers for shipment off-site for proper disposal and the filter press system solids will be placed in drums for shipment off-site for proper disposal. After that, the HBC Wash System will be cleaned by hydroblasting or steam cleaning, as described in Section 4.2.

Air Pollution Control System (APCS) Decontamination

In general, the APCS equipment will be left in-place and cleaned in-place. Dismantling before cleaning would risk release of contaminants and exposure of workers. Cleaning will typically be conducted by workers on undisturbed equipment using a hand-held lance. Holes may have to be cut into some equipment and fittings or attachments made to accommodate workers and equipment. Cleaned equipment may be used in subsequent non-hazardous operations or dismantled and scrapped or sold as used equipment.

Prior to the HBC and the associated APCS being hydroblasted or steam cleaned, the following steps will be taken to prepare the equipment for cleaning:

- The fuel train supplying the afterburner will be emptied of any remaining fuel.
- ~~The drum below the cyclone separator's hopper used to collect particulate will be sealed and sent off-site for disposal. Another drum or container will be placed below the hopper and will be used to collect the wash water from cleaning the equipment. The drum or container will be fitted with discharge piping that will send the water to a collection tank or additional drums where it will be handled as described in Section 6.1.~~
- The ammonia tank will be emptied of the ammonia used during normal operations.
- The dry sorbent injection system will be emptied of the caustic material used during normal operations in order to avoid getting the material wet.

- The ~~drum~~ waste collection bins below the ~~baghouse~~ ceramic filters used to collect particulate and sorbent waste will be sealed and sent off-site for disposal. Another waste collection bin ~~drum~~ or container will be placed below the ~~baghouse~~ ceramic filters and will be used to collect the wash water from cleaning the equipment. The ~~drum or~~ container will be fitted with discharge piping that will send the water to a collection tank or ~~additional~~ drums where it will be handled as described in Section 6.1.
- ~~The selective catalytic reduction system and the ammonia tank will be emptied of the ammonia used during normal operations.~~
- All ceramic filters ~~(baghouse and HEPA)~~ will be removed and disposed of as potential hazardous waste. If the unit will be used in subsequent non-hazardous operations, new filters will be installed before commencing operations.

As described in Section 4.2, the APCS equipment will be cleaned by hydroblasting or steam cleaning the areas where the exhaust gases would have contacted the equipment. The APCS equipment that will be cleaned includes:

- Afterburner
- Evaporative quench
- Reaction duct
- Ammonia injection system
- Dry sorbent injection system
- Ceramic filters
- ~~Afterburner~~
- ~~Evaporative quench~~
- ~~Cyclone separator~~
- ~~Dry sorbent injection system~~
- ~~Baghouse housing~~
- ~~HEPA filter housing~~
- ~~Selective catalytic reduction system~~

ID Fan / Stack Decontamination

The interior metals surfaces of the ID fan, ductwork sections, and stack will be hydroblasted or steam cleaned, as described in Section 4.2. If necessary, holes will be cut at appropriate locations in the ductwork and stack to facilitate "snakes" to be inserted. Low point drains will be cut in the ductwork where appropriate to drain the wash water. The resulting wash water will be sent to a collection tank or drums where it will be handled as described in Section 6.1.

Concrete Pad Decontamination

The concrete pad around the HBC and the associated APCS will be decontaminated by hydroblasting or steam cleaning or by using mechanical methods (chiseling, scarification, etc.) where deemed appropriate. The concrete underneath the area where materials are placed into the unit and the concrete underneath the area where dust is removed from the APCS will be focal points for cleaning. The wash water will be contained and collected and will be pumped into drums or containers so that possible contamination is not spread. The wash water will be handled as described in Section 6.1. The concrete surfaces will be adequately decontaminated when they meet the criteria described in Section 5.2.

Dismantling of Equipment

The equipment may be left in place for other service, it may be dismantled and sent for scrap metal recycling, or it may be sold as used equipment. If the equipment cannot be cleaned to the required standards, it will be disposed of at an approved hazardous waste TSDF facility.

Certification of Closure

The HBC and the associated APCS will be certified closed as described in Section 9.0.

4.6 Procedures for Decontaminating Cleaning Equipment

4.6.1 Non-Porous Equipment

All non-porous machinery, equipment, and tools used during closure/cleaning operations will be decontaminated before being returned to other service. Decontamination of this equipment will be conducted only when all permanent equipment, structures and facilities have been decontaminated.

Non-porous items such as forklifts, temporary containers, drums, sprayers, non-porous PPE (such as goggles, boots and hardhats), portable pumps, plastic sheeting, etc. will be thoroughly water washed after use but before being allowed to leave the facility. Equipment will remain inside the facility until decontamination is complete. When non-porous equipment is cleaned, it shall be done on a containment slab such that all wash water is contained. The wash water will be collected in drums or containers and handled as described in Section 6.1.

Non-porous equipment will be adequately decontaminated when it meets the criteria described in Section 5.3.

4.6.2 Porous Equipment

Porous equipment such as rags, porous PPE, and absorbents that cannot be effectively cleaned will be containerized and sent off-site for proper processing and disposal. See Section 6.2 for a description of disposal practices for solid waste.

5.0 CRITERIA FOR DETERMINING WHEN DECONTAMINATION IS COMPLETE

5.1 Metal Surfaces

Metal surfaces will be cleaned until surfaces meet the definition of "clean debris surface" as defined in 40 CFR §268.45 (Table 1) after surface cleaning by "Physical Extraction: *High Pressure Steam and Water Sprays*." Where feasible, the ductwork will be visually inspected. Where visual inspection is not possible, the ductwork will be considered clean when wash water exiting at the drain is clear. If one cleaning technique such as steam cleaning fails to achieve "clean debris surface," then another method such as hydroblasting may be tried.

It should be noted that metal surfaces may be rusted or discolored due to age, extreme heat, and long service. Therefore, metal surfaces will be considered to have achieved "clean debris surface" when coloration is consistent and uniform on a localized basis even though surfaces may not be returned to white metal.

5.2 Concrete Surfaces

The concrete surfaces will be considered decontaminated when the upper surface meets the definition of "clean debris surface" contained in 40 CFR §268.45 (Table 1) after surface cleaning by "Physical Extraction: *High Pressure Steam and Water Sprays*" or by "Physical Extraction: *Scarification, Grinding, and Planing.*"

5.3 Non-Porous Decontamination Equipment

Most of the non-porous decontamination equipment used to clean units for closure will be equipment currently in use at the facility or owned by a contractor. As such, much of it will be stained or rusted from prior use. Non-porous equipment used to decontaminate the facility will be inspected before starting decontamination work and areas of staining, rust or discoloration will be noted and recorded in the final closure report. These areas cannot be expected to achieve the "clean debris surface" definition of 40 CFR §268.45 (Table 1, Footnotes 3 and 9).

Except for areas discussed in the preceding paragraph, non-porous equipment will be cleaned until surfaces meet the definition of "clean debris surface" as defined in 40 CFR §268.45 (Table 1) after surface cleaning by "physical extraction: high pressure steam and water sprays." If one cleaning technique such as steam cleaning fails to achieve "clean debris surface," then another method such as hydroblasting may be tried.

Alternatively, equipment may be sent off-site for processing and disposal without decontamination as hazardous waste.

6.0 DISPOSAL OF WASH WATER AND WASTES FROM DECONTAMINATION OPERATIONS

6.1 Wash Water

The wash water obtained from decontamination and from cleaning operations will be temporarily stored on-site in drums or containers until it can be sampled for Toxic Characteristic Leaching Procedure (TCLP) metals and explosive compounds to verify that it is not hazardous. If analytical results indicate that the wash water is hazardous, it will be shipped off-site to an approved TSDF.

6.2 Non-Liquid Wastes

Solids such as dirt, ash, debris, ground concrete from scarification or grinding, and any porous items that cannot be effectively cleaned will be containerized and sent off-site for processing and disposal. Other items such as electrical wiring, insulation, pallets and contaminated clean up equipment such as brooms, clothing, porous PPE, cloth wipes, rags, and scrapers will be handled in the same manner. The filters removed from the APCS equipment will be containerized and sent off-site for processing and disposal.

7.0 RUN-ON and RUN-OFF CONTROL

Any precipitation that falls within the facility boundaries is diverted away from storage, preparation, or processing areas by ditches and culvert systems. There is no uncontrolled run-off from the areas that handle hazardous materials. Run-off from the areas that handle hazardous materials is prevented as follows:

- Storage magazines – materials are is stored in covered and enclosed magazines
- Preparation building operations – preparation of materials is conducted inside a covered building
- Processing unit operations – operations are conducted inside the enclosed HBC which is located on a concrete pad

8.0 GROUNDWATER AND SOIL MONITORING

Once the equipment, structures and areas are decontaminated, there will be no hazardous waste remaining on the site. Therefore, no groundwater monitoring should be required.

All equipment in hazardous waste service is located on concrete or asphalted areas or is within a building. Therefore, there is no soil exposed to waste spills or releases and there are no other known or suspected areas of soil contamination.

9.0 CLOSURE CERTIFICATION

Within 60 days of completion of final closure, the facility will submit a certification that the hazardous waste management unit or facility was closed in accordance with the specifications of the approved Closure Plan (40 CFR §264.115). This certification will be made to the Regional Administrator's office and the Texas Commission on Environmental Quality (TCEQ) Industrial and Hazardous Waste (IHW) Section by registered mail and will be signed by the owner or operator and by an independent registered Professional Engineer.

The independent registered Professional Engineer will submit a report to the Regional Administrator and the TCEQ IHW Section documenting work activities associated with closure. Submittal of this document will constitute final closure. The independent registered Professional Engineer will, as much as feasible, observe the work activities listed in the Closure Schedule (see Section 10.2). When work schedules conflict such that it is not feasible for the independent registered Professional Engineer to observe closure activities, the facility will provide to the independent registered Professional Engineer with documentation sufficient to evaluate adherence to this Closure Plan for the work in question. The report submitted will list notable observations, pertinent details, a brief summary of work activities and certification that, in the opinion of the independent registered Professional Engineer, a clean debris surface for the equipment being cleaned has been achieved.

The clean debris surface definitions listed in 40 CFR §268.45 (Table 1) is obviously a matter of some interpretation. It is important to note that metal surfaces may be rusted or discolored due to age, extreme heat, and long service and not due to hazardous residue. Therefore, cleaning operations will be considered to have achieved "clean debris surface" when coloration is consistent and uniform on a localized basis even though surfaces may not be returned to white metal.

10.0 FINAL CLOSURE SCHEDULE

10.1 Expected Year of Final Closure

The facility has no plans to shut down in the foreseeable future. However, for the purpose of compliance with the hazardous waste management regulations, an estimate of the expected year of closure is in 30 years.

10.2 Expected Closure Schedule

A projected general final closure schedule is described in Table 10-1. The estimated active time to conduct the final closure is 16 weeks. The closure must be completed within 180 days after receiving the final energetic material shipment.

The facility will submit the notification of intent to close to the Regional Administrator at least 45 days prior to the date on which final closure is expected to begin. After the facility receives the last shipment of energetic material, it has 30 days to commence closure operations.

Within 90 days of receipt of the last shipment of energetic materials, no hazardous waste inventory will be allowed to remain on-site, unless approved by the Regional Administrator.

As described in Section 9.0, within 60 days after completion of final closure, a certification of closure will be submitted.

Table 10-1
Proposed Closure Schedule

Activity	Week																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17-25
Inventory Removal																	
Evaluate inventory for on-site processing or shipment	X	X															
Process materials in HBC, if available, or ship materials off-site		X	X	X	X	X	X	X									
Ensure all materials have been processed in the HBC or shipped off-site (ensure storage magazines are empty)								X									
Closure of Storage Magazines																	
Sweep floors of loose debris								X									
Steam clean floors and walls (collect wash water)									X	X							
Containerize wash water for sampling and analysis									X	X							
Analyze wash water from steam cleaning										X	X	X					
After verifying the magazines are clean, remove fire and chemical hazard symbols													X				
Secure the magazines with locks													X				
Closure of Preparation Building																	
Sweep floors of loose debris								X									
Steam clean floors and walls (collect wash water)									X	X							
Containerize wash water for sampling and analysis									X	X							
Analyze wash water from steam cleaning										X	X	X					
After verifying the equipment is clean, dismantle equipment (or leave in place)													X	X			

Notes:

This is an example of a possible schedule. Actual timeframes for certain activities may vary.

Table 10-1
Proposed Closure Schedule (continued)

Activity	Week																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17-25
Closure of the HBC																	
Preparing Equipment for Decontamination:																	
Flash the HBC burn pan (APCS in operation)									X								
Activate the HBC Wash System per facility procedures									X								
Collect HBC Wash System water for off-site disposal									X								
Collect HBC Wash System filter press solids for off-site disposal									X								
Containerize any remaining ash or debris in the HBC										X							
Empty the caustic storage tank supplying the HBC Wash System neutralization system										X							
Empty afterburner fuel train of any remaining fuel										X							
~~Seal drum below cyclone's hopper for off-site disposal~~										~~X~~							
Remove caustic material from dry sorbent injection system										X							
Seal ~~drum~~ waste collection bins below the ~~baghouse~~ ceramic filters for off-site disposal										X							
Remove ~~baghouse filters and HEPA~~ceramic filters and containerize for off-site disposal										X							
Empty ammonia tank ~~and selective catalytic reduction system~~ of ammonia										X							
Set up water collection drums or containers										X							
Ship containerized materials to off-site facility										X							
Decontamination of HBC and APCS:																	
Steam clean or hydroblast all HBC surfaces											X	X					
Steam clean or hydroblast all HBC Wash System surfaces											X	X					
Steam clean or hydroblast the afterburner components												X					
Steam clean or hydroblast the evaporative quench												X					
Steam clean or hydroblast ~~cyclone separator~~ reaction duct												X					
Steam clean or hydroblast ammonia injection system													X				
Steam clean or hydroblast dry sorbent injection system													X				

Notes:

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This is an example of a possible schedule. Actual timeframes for certain activities may vary.

Table 10-1
Proposed Closure Schedule (continued)

Activity	Week																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17-25
Steam clean or hydroblast ~~baghouse~~ ceramic filter housing													X				
~~Steam clean or hydroblast HEPA filter housing~~													~~X~~				
~~Steam clean or hydroblast ammonia tank, selective catalytic reduction system, and associated piping~~													~~X~~				
Steam clean or hydroblast ID fan, ductwork, and stack													X				
Containerize wash water for sampling and analysis											X	X	X				
Analyze wash water from steam cleaning or hydroblasting												X	X	X			
Final hazardous waste shipment containing PPE, wash water, clean up materials, etc., as applicable														X	X	X	
Closure Certification																	
Independent Registered Professional Engineer prepares Closure Report (submitted within 60 days of completion of final closure)																	X

Notes:

This is an example of a possible schedule. Actual timeframes for certain activities may vary.

Table VII.A. - Unit Closure

For each unit to be permitted, list the facility components to be decontaminated, the possible methods of decontamination, and the possible methods of disposal of wastes and waste residues generated during unit closure:

Equipment or HWM Unit	Possible Methods of Decontamination[1]	Possible Methods of Disposal[1]
Above Ground Magazine	-remove all stored material -sweep floors -steam clean or hydroblast floors and walls	-on-site processing of materials in HBC or ship materials off-site to an approved TSDF -ship floor sweepings off-site to an approved TSDF -ship wash water to an approved TSDF if determined to be hazardous
Earth Covered Magazine V-13-1	-remove all stored material -sweep floors -steam clean or hydroblast floors and walls	-on-site processing of materials in HBC or ship materials off-site to an approved TSDF -ship floor sweepings off-site to an approved TSDF -ship wash water to an approved TSDF if determined to be hazardous
Earth Covered Magazine V-13-2	-remove all stored material -sweep floors -steam clean or hydroblast floors and walls	-on-site processing of materials in HBC or ship materials off-site to an approved TSDF -ship floor sweepings off-site to an approved TSDF -ship wash water to an approved TSDF if determined to be hazardous
Rocket Motor Ops Building	-sweep floors -steam clean or hydroblast floors and walls	-ship floor sweepings off-site to an approved TSDF; -ship wash water to an approved TSDF if determined to be hazardous
Hybrid Burn Chamber (HBC) and APCS	-flash the HBC burn pan while APCS is operating -containerize debris and filters -steam clean or hydroblast equipment and concrete pads	-cleaned equipment will be left in place to be used in subsequent non-hazardous operation or dismantled and scrapped or sold as used equipment -filters will be disposed of off-site -wash water from steam cleaning or hydroblasting will be sent to an approved TSDF if determined to be hazardous -debris from cleanup activities will be shipped off-site

~~Earth Covered Magazine V-13-3 (reserved for future use)~~	~~-remove all stored material~~ ~~-sweep floors~~ ~~-steam clean or hydroblast floors and walls~~	~~-on-site processing of materials in HBC or ship materials off-site to an approved TSDF~~ ~~-ship floor sweepings off-site to an approved TSDF~~ ~~-ship wash water to an approved TSDF if determined to be hazardous~~

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Note:
[1] Applicants may list more than one appropriate method.

~~**Table VII.A. – Unit Closure (continued)**~~

~~**Equipment or HWM Unit**~~	~~**Possible Methods of Decontamination[1]**~~	~~**Possible Methods of Disposal[1]**~~
~~Earth Covered Magazine V-13-4 (reserved for future use)~~	~~-remove all stored material~~ ~~-sweep floors~~ ~~-steam clean or hydroblast floors and walls~~	~~-on-site processing of materials in HBC or ship materials off-site to an approved TSDF~~ ~~-ship floor sweepings off-site to an approved TSDF~~ ~~-ship wash water to an approved TSDF if determined to be hazardous~~

~~Note:~~
~~[1] Applicants may list more than one appropriate method.~~

Section VII – Closure and Post-Closure Plans

Appendix VII.B – Closure Cost Estimate

30 TAC 335.178, 40 CFR §264.142

1.0 INTRODUCTION

EnviroSafe Demil, LLC (ESD) has developed a closure cost estimate in accordance with 30 TAC 335.178 and 40 CFR §264.142. The Closure Plan is included as *Appendix VII.A - Closure Plan* of the permit application and the closure cost estimate is included in this document. Closure activities in this estimate are consistent with those described in the Closure Plan, plus several worst-case assumptions have been made in accordance with TCEQ's Technical Guidance No. 10 document.

The closure cost estimate will be adjusted annually for inflation in accordance with 40 CFR §264.142(b). If the Closure Plan requires revisions that result in an increased closure cost estimate, the closure cost estimate will be revised as specified in 40 CFR §264.142(c). The most current closure cost estimate will be kept at the facility in accordance with 40 CFR §264.142(d).

2.0 METHODOLOGY

The methodology used in developing these closure costs involved determining the specific activities to be performed based on the Closure Plan. Once these activities were defined, the information was input into the U.S. Environmental Protection Agency's CostPro software, Version 6.1. This software is used to support financial assurance requirements related to closure activities at Resource Conservation and Recovery Act (RCRA) facilities. CostPro software provides a consistent, accurate and rapid method of evaluating cost estimates for closure.

The most recent version of the U.S. EPA's CostPro software, Version 6.1, has pricing values from 2009, so the closure costs resulting from the CostPro software must be adjusted from 2009 dollars to current dollars. The cost is adjusted by applying an inflation factor derived from the most recent Implicit Price Deflator (IPD) values for Gross National Product as specified in 40 CFR §264.142(b).

3.0 ASSUMPTIONS

As required by 40 CFR §264.142(a)(1), this cost estimate includes the cost of closure at the point in the facility's active life when the extent and manner of its' operation would make closure most expensive. The Closure Plan lists the maximum inventory of hazardous waste that is permitted at the facility. The storage magazines are not kept completely full and the values shown in the

Closure Plan assume all of the storage magazines are filled to capacity. Therefore, this estimate represents a worst-case scenario for wastes on-site at any time.

The CostPro worksheets included in *Attachment VII.B – CostPro Closure Cost Estimates* were completed in March 2023 and were based on a previous APCS design. Table IB_01-1 for the Hybrid Burn Chamber includes 4,238 square feet for the surface area of the APCS from the previous design. The surface area for the updated, current APCS is 4,070 square feet, so the previously conducted estimates in CostPro assume more surface area than the current APCS design. Therefore, the March 2023 CostPro estimate is conservative and is used as the basis for the Closure Cost Estimates in this document.

It is expected that the HBC will be available to process energetic materials prior to and during closure. However, for the purposes of this cost estimate, it is assumed that the HBC is inoperative and that all inventory will be shipped off-site. It assumed that 50% of the energetic materials will be sent to Expal USA in Hooks, Texas and 50% will be sent to Clean Harbors in Coalfax, Louisiana.

As required by 40 CFR §264.142(a)(2) and 30 TAC 335.178, it is assumed for the purpose of this cost estimate that at the time of closure, a third party will execute all closure activities. In reality, facility personnel may perform the majority of these activities and the cost of closure activities would be lower. However, this conservative assumption was made to ensure that adequate funds were reserved in the event that all activities were performed by a third party.

As a worst-case scenario, it is assumed that all of the wash water is collected in drums or containers and is shipped off-site for processing and disposal. It is assumed that the wash water is sampled and analyzed for proper characterization before being shipped off-site for processing and disposal.

As required by 40 CFR §264.142(a)(3), this closure cost estimate does not incorporate any salvage value that may be realized with the sale of hazardous waste, facility structures, equipment, land, or any other assets associated with the facility.

Personal protective equipment will be utilized as necessary during all closure activities with potential for contamination and/or injury. CostPro accounts for the cost of appropriate PPE in the labor and equipment cost rates.

Additionally, as a conservative assumption, this closure cost estimate was calculated assuming that each storage magazine, the preparation building, and the processing unit would be closed

independently and not at the same time. If they were closed at the same time, the cost of the closure could be lower due to shared expenses for rental equipment, equipment and crew mobilization, shared expenses for clean-up waste and debris being shipped offsite, etc.

4.0 COST ESTIMATE INFORMATION

The CostPro worksheets are included in *Attachment VII.B – CostPro Closure Cost Estimates*. The closure cost estimates are divided by area of the facility as follows:

Storage Magazines
Above Ground Magazine
Earth Covered Magazine (V-13-1)
Earth Covered Magazine (V-13-2)

HBC Area
Rocket Motor Ops Building
Hybrid Burn Chamber (HBC)

The facility chose to use the "Container Storage Area" worksheets for both the storage magazines and the preparation building. These worksheets cover all the required closure steps and closure costs associated with the closure of the storage magazine and the preparation building. In order to account for cleaning the walls of the Above Ground Magazine and the Rocket Motor Ops Building, the height of the walls for each building was entered for "secondary containment system berm" height. From this entry, CostPro calculated the surface area of the walls to be cleaned and the costs to clean the wall were included in the cost estimate. The walls of the Earth Covered Magazines are a half-cylinder shape. CostPro is not set up to calculate the surface area for this shape, so the surface area for the walls of the Earth Covered Magazines was entered directly into CostPro under "Surface Area of Other Structures." CostPro then calculated the costs to clean the walls based on the surface area entered.

The facility chose to use the "Incinerators and BIFs" program in the CostPro software to calculate the closure costs for the HBC. While the HBC is not an incinerator or BIF, this program was the closest program the CostPro software had available to calculate the closure costs. The "User Defined Activity" worksheets were added to the standard "Incinerators and BIFs" worksheets in order to add the cost of flashing the HBC burn pan to the closure cost estimate.

The CostPro software calculates all aspects of closure. The costs for removal of wastes, decontamination, sampling and analysis, transportation, and off-site processing and disposal of the

wastes and wash water generated during closure are all included in the CostPro cost estimate. Additionally, the CostPro software includes the costs of engineering expenses, certification of closure, and a 10% contingency.

The closure cost estimate assumes that offsite management is required to oversee the closure activities. A value of 5% of the direct capital costs of the project was selected to cover supervisory engineering and administrative expenses related to overseeing the closure activities per the approved Closure Plan. This percentage was selected based on information from the EPA's guidance on closure costs for a facility having an existing approved Closure Plan.

An independent registered Professional Engineer will certify that the facility is closed in accordance with the specifications of the Closure Plan. This requires the Professional Engineer to review the Closure Plan, make site visits throughout the closure process and to prepare a final certification document. Costs associated with closure certification are included in this cost estimate.

In order to ensure that adequate funds are available for tasks that may be determined at the actual time of closure, an overall 10% contingency has been added to the total closure cost estimate, in accordance with TCEQ's Technical Guidance No. 10 document.

5.0 CONCLUSION

The closure cost estimates are based on pricing calculated by the CostPro software, Version 6.1, in 2009 dollars. The closure cost estimates have been adjusted to current dollars using the Implicit Price Deflator values for Gross National Product as specified in 40 CFR §264.142(b). The total closure cost estimate in ~~2023~~ 2025 dollars is shown in Table 5-1.

Table VII.B. - Unit Closure Cost Estimate shows the itemized costs for the closure of each unit. *Table VII.E.1 – Permitted Unit Closure Cost Summary* shows a summary of closure cost estimates for the whole facility.

This closure cost estimate should be updated periodically using inflation factors or by recalculating the costs in current dollars.

Table 5-1
Closure Cost Estimate (CCE) Summary

Commented [MS1]: Table updated to include 2024 and 2025, but due to formatting issues, changes were not tracked.

Unit	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Above Ground Magazine																	
CCE based on CostPro Version 6.1 (2009 cost basis)	$89,718	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculated CCE (using inflation factor)	-	$90,811	$92,689	$94,413	$96,018	$97,690	$98,588	$99,523	$101,284	$103,537	$105,243	$106,658	$111,521	$119,453	$123,871	$126,947	$130,501
IPD for Gross National Product [a]	88.581	89.660	91.514	93.217	94.801	96.452	97.339	98.262	100.000	102.225	103.909	105.306	110.108	117.939	122.301	125.338	128.888
Inflation Factor [b]	-	1.012	1.021	1.019	1.017	1.017	1.009	1.009	1.018	1.022	1.016	1.013	1.046	1.071	1.037	1.025	1.028
Earth Covered Magazine (V-13-1)																	
CCE based on CostPro Version 6.1 (2009 cost basis)	$145,867	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculated CCE (using inflation factor)	-	$147,643	$150,696	$153,501	$156,109	$158,828	$160,288	$161,808	$164,670	$168,334	$171,107	$173,408	$181,315	$194,210	$201,393	$206,394	$212,173
IPD for Gross National Product [a]	88.581	89.660	91.514	93.217	94.801	96.452	97.339	98.262	100.000	102.225	103.909	105.306	110.108	117.939	122.301	125.338	128.888
Inflation Factor [b]	-	1.012	1.021	1.019	1.017	1.017	1.009	1.009	1.018	1.022	1.016	1.013	1.046	1.071	1.037	1.025	1.028
Earth Covered Magazine (V-13-2)																	
CCE based on CostPro Version 6.1 (2009 cost basis)	$103,161	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculated CCE (using inflation factor)	-	$104,417	$106,577	$108,560	$110,405	$112,327	$113,360	$114,435	$116,459	$119,051	$121,012	$122,639	$128,231	$137,351	$142,431	$145,968	$150,055
IPD for Gross National Product [a]	88.581	89.660	91.514	93.217	94.801	96.452	97.339	98.262	100.000	102.225	103.909	105.306	110.108	117.939	122.301	125.338	128.888
Inflation Factor [b]	-	1.012	1.021	1.019	1.017	1.017	1.009	1.009	1.018	1.022	1.016	1.013	1.046	1.071	1.037	1.025	1.028

Notes:

[a] The Implicit Price Deflator (IPD) values for Gross National Product are from: U.S. Bureau of Economic Analysis, "Table 1.1.9. Implicit Price Deflators for Gross Domestic Product" (accessed Monday, April 27, 2026). <https://apps.bea.gov/iTable/?reqid=19&step=3&isuri=1&1921=survey&1903=13&_gl=1*ki9q7t*_ga*MTU2NzY3NjUwMi4xNjc3NjAzMzE0*_ga_J4698JNNFT*MTcxMTE0NDQ1Ny4yLjEuMTcxMTE0NDQ2Mi41NS4wLjA.#eyJhcHBpZCI6MTksInN0ZXBzIjpbMSwyLDMsM10sImRhdGEiOltbIk5JUEFfVGFibGVfTGlzdCIsIjEzIl0sWyJDYXRlZ29yaWVzIiwiU3VydmV5Il0sWyJGaXJzdF9ZZWFyIiwiMjAwOSJdLFsiTGFzdF9ZZWFyIiwiMjAyMyJdLFsiU2NhbGUiLCIwIl0sWyJTZXJpZXMiLCJBIl1dfQ==>

[b] The inflation factors are calculated as specified in 40 CFR §264.142(b).

Table 5-1
Closure Cost Estimate (CCE) Summary (continued)

Unit	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Rocket Motor Ops Building																	
CCE based on CostPro Version 6.1 (2009 cost basis)	$83,786	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculated CCE (using inflation factor)	-	$84,806	$86,560	$88,171	$89,669	$91,231	$92,070	$92,943	$94,587	$96,691	$98,284	$99,605	$104,147	$111,554	$115,680	$118,553	$121,872
IPD for Gross National Product [a]	88.581	89.660	91.514	93.217	94.801	96.452	97.339	98.262	100.000	102.225	103.909	105.306	110.108	117.939	122.301	125.338	128.888
Inflation Factor [b]	-	1.012	1.021	1.019	1.017	1.017	1.009	1.009	1.018	1.022	1.016	1.013	1.046	1.071	1.037	1.025	1.028
Hybrid Burn Chamber (HBC)																	
CCE based on CostPro Version 6.1 (2009 cost basis)	$65,451	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculated CCE (using inflation factor)	-	$66,248	$67,618	$68,877	$70,047	$71,267	$71,922	$72,604	$73,888	$75,533	$76,777	$77,809	$81,357	$87,143	$90,366	$92,610	$95,203
IPD for Gross National Product [a]	88.581	89.660	91.514	93.217	94.801	96.452	97.339	98.262	100.000	102.225	103.909	105.306	110.108	117.939	122.301	125.338	128.888
Inflation Factor [b]	-	1.012	1.021	1.019	1.017	1.017	1.009	1.009	1.018	1.022	1.016	1.013	1.046	1.071	1.037	1.025	1.028
Total Closure Cost Estimate	$487,982	$493,926	$504,140	$513,521	$522,247	$531,343	$536,229	$541,314	$550,888	$563,145	$572,422	$580,118	$606,572	$649,712	$673,742	$690,472	$709,805
TOTAL CLOSURE COST ESTIMATE IN CURRENT DOLLARS (2025)		**$709,805**															

Notes:

[a] The Implicit Price Deflator (IPD) values for Gross National Product are from: U.S. Bureau of Economic Analysis, "Table 1.1.9. Implicit Price Deflators for Gross Domestic Product" (accessed Monday, April 27, 2026). <https://apps.bea.gov/iTable/?reqid=19&step=3&isuri=1&1921=survey&1903=13&_gl=1*ki9q7t*_ga*MTU2NzY3NjUwMi4xNjc3NjAzMzE0*_ga_J4698JNNFT*MTcxMTE0NDQ1Ny4yLjEuMTcxMTE0NDQ2Mi41NS4wLjA.#eyJhcHBpZCI6MTksInN0ZXBzIjpbMSwyLDMsM10sImRhdGEiOltbIk5JUEFfVGFibGVfTGlzdCIsIjEzIl0sWyJDYXRlZ29yaWVzIiwiU3VydmV5Il0sWyJGaXJzdF9ZZWFyIiwiMjAwOSJdLFsiTGFzdF9ZZWFyIiwiMjAyMyJdLFsiU2NhbGUiLCIwIl0sWyJTZXJpZXMiLCJBll1dfQ==>

[b] The inflation factors are calculated as specified in 40 CFR §264.142(b).

Table VII.B. - Unit Closure Cost Estimate

Task	Cost [a]
Above Ground Magazine	
Inventory removal	$1,030.80
Decontamination by steam cleaning	$30,050.31
Sampling and analysis	$1,968.12
Transportation	$7,284.06
Treatment and disposal	$33,422.71
Subtotal of closure costs	*$73,756.00*
Engineering expenses (5% of subtotal of closure costs)	$3,687.80
Certification of Closure	$4,118.00
Subtotal	*$81,561.80*
Contingency (10%)	$8,156.18
Total Closure Cost (2009 dollars)	$89,717.98
Total Closure Cost (~~2023~~ 2025 dollars) [a]	**$130,501~~$123,747~~**

Notes:

[a] The most recent version of the U.S. EPA's CostPro software, Version 6.1, has pricing values from 2009, so the closure costs resulting from the CostPro software must be adjusted from 2009 dollars to current dollars. The Total Closure Cost is adjusted by applying an inflation factor derived from the most recent Implicit Price Deflator (IPD) values for Gross National Product as specified in 40 CFR §264.142(b).

Table VII.B. - Unit Closure Cost Estimate
(continued)

Task	Cost [a]
Earth Covered Magazine (V-13-1)	
Inventory removal	$2,078.94
Decontamination by steam cleaning	$6,110.03
Sampling and analysis	$1,968.12
Transportation	$16,262.94
Treatment and disposal	$95,949.42
Subtotal of closure costs	*$122,369.45*
Engineering expenses (5% of subtotal of closure costs)	$6,118.47
Certification of Closure	$4,118.00
Subtotal	*$132,605.92*
Contingency (10%)	$13,260.59
Total Closure Cost (2009 dollars)	$145,866.51
Total Closure Cost (~~2023~~ 2025 dollars) [a]	**$212,173~~$201,192~~**

Notes:

[a] The most recent version of the U.S. EPA's CostPro software, Version 6.1, has pricing values from 2009, so the closure costs resulting from the CostPro software must be adjusted from 2009 dollars to current dollars. The Total Closure Cost is adjusted by applying an inflation factor derived from the most recent Implicit Price Deflator (IPD) values for Gross National Product as specified in 40 CFR §264.142(b).

Table VII.B. - Unit Closure Cost Estimate
(continued)

Task	Cost [a]
Earth Covered Magazine (V-13-2)	
Inventory removal	$1,399.14
Decontamination by steam cleaning	$6,110.03
Sampling and analysis	$1,968.12
Transportation	$11,773.50
Treatment and disposal	$64,144.02
Subtotal of closure costs	*$85,394.81*
Engineering expenses (5% of subtotal of closure costs)	$4,269.74
Certification of Closure	$4,118.00
Subtotal	*$93,782.55*
Contingency (10%)	$9,378.25
Total Closure Cost (2009 dollars)	$103,160.80
Total Closure Cost (~~2023~~ 2025 dollars) [a]	**$150,55~~$142,289~~**

Notes:

[a] The most recent version of the U.S. EPA's CostPro software, Version 6.1, has pricing values from 2009, so the closure costs resulting from the CostPro software must be adjusted from 2009 dollars to current dollars. The Total Closure Cost is adjusted by applying an inflation factor derived from the most recent Implicit Price Deflator (IPD) values for Gross National Product as specified in 40 CFR §264.142(b).

Table VII.B. - Unit Closure Cost Estimate
(continued)

Task	Cost [a]
Rocket Motor Ops Building	
Inventory removal	$741.00
Decontamination by steam cleaning	$61,106.91
Sampling and analysis	$1,968.12
Transportation	$2,233.44
Treatment and disposal	$2,570.36
Subtotal of closure costs	*$68,619.83*
Engineering expenses (5% of subtotal of closure costs)	$3,430.99
Certification of Closure	$4,118.00
Subtotal	*$76,168.82*
Contingency (10%)	$7,616.88
Total Closure Cost (2009 dollars)	$83,785.70
Total Closure Cost (~~2023~~ 2025 dollars) [a]	**$121,872~~$115,565~~**

Notes:

[a] The most recent version of the U.S. EPA's CostPro software, Version 6.1, has pricing values from 2009, so the closure costs resulting from the CostPro software must be adjusted from 2009 dollars to current dollars. The Total Closure Cost is adjusted by applying an inflation factor derived from the most recent Implicit Price Deflator (IPD) values for Gross National Product as specified in 40 CFR §264.142(b).

Table VII.B. - Unit Closure Cost Estimate
(continued)

Task	Cost [a]
Hybrid Burn Chamber (HBC)	
Inventory removal	$827.71
Decontamination of unit	$27,761.52
Decontamination of concrete	$7,175.51
Sampling and analysis	$3,936.24
Transportation	$2,233.44
Treatment and disposal	$3,698.13
Other tasks (disassembly of ancillary piping)	$5,958.40
Other tasks (flashing HBC burn pan)	$1,154.82
Subtotal of closure costs	*$52,745.77*
Engineering expenses (5% of subtotal of closure costs)	$2,637.29
Certification of Closure	$4,118.00
Subtotal	*$59,501.06*
Contingency (10%)	$5,950.11
Total Closure Cost (2009 dollars)	$65,451.17
Total Closure Cost (~~2023~~ 2025 dollars) [a]	**$95,203~~$90,276~~**

Notes:

[a] The most recent version of the U.S. EPA's CostPro software, Version 6.1, has pricing values from 2009, so the closure costs resulting from the CostPro software must be adjusted from 2009 dollars to current dollars. The Total Closure Cost is adjusted by applying an inflation factor derived from the most recent Implicit Price Deflator (IPD) values for Gross National Product as specified in 40 CFR §264.142(b).

Table VII.E.1 – Permitted Unit Closure Cost Summary

Existing Unit Closure Cost Estimate	
Unit	**Cost**
Not Applicable	N/A
Total Existing Unit Closure Cost Estimate [1]	**N/A**

Proposed Unit Closure Cost Estimate	
Unit	**Cost (~~2023~~ 2025 dollars)**
Above Ground Magazine	~~$123,747~~$130,501
Earth Covered Magazine (V-13-1)	~~$201,192~~$212,173
Earth Covered Magazine (V-13-2)	~~$142,289~~$150,055
Rocket Motor Ops Building	~~$115,565~~$121,872
Hybrid Burn Chamber (HBC)	~~$90,276~~$95,203
Total Proposed Unit Closure Cost Estimate (~~2023~~ 2025 dollars) [1]	**$709,805~~$673,070~~**

[1] As units are added or deleted from these tables through future permit amendments or modifications, the remaining itemized unit costs should be updated for inflation when recalculating the revised total cost in current dollars.

ATTACHMENT VII.B

COSTPRO CLOSURE COST ESTIMATES

COSTPRO CLOSURE COST ESTIMATES

STORAGE MAGAZINES

Above Ground Magazine
Earth Covered Magazine (V-13-1)
Earth Covered Magazine (V-13-2)

EnviroSafe Demil, LLC

Address: 401 N Montague Street
Hooks
TEXAS
75561

Contact: TJ Ogden 206-999-8684
Michael Wentz 360-480-9320

Comments: STORAGE MAGAZINES:
Above Ground Magazine
Earth Covered Magazine (V-13-1)
Earth Covered Magazine (V-13-2)

Activity	Units	Closure Cost
Container Storage Area	3	$338,745.29
		$338,745.29
Additional Costs		$0.00
Total Estimated Cost		**$338,745.29**

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	$1,030.80	
Demolition and Removal of Pads (CS-04)	$0.00	
Removal of Process Equipment (CS-05)	$0.00	
Removal of Soil (CS-06)	$0.00	
Backfill and Grading (BF-01)	$0.00	
Decontamination (DC-01)	$30,050.31	
Sampling and Analysis (SA-02)	$1,968.12	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$7,284.06	
Treatment and Disposal (TD-01)	$33,422.71	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$73,756.00	
Percentage of Engineering Expenses	5.0	%
Engineering Expenses	$3,687.80	
Certification of Closure (CS-07)	$4,118.00	
Subtotal	$81,561.80	
Percentage of Contingency Allowance	10.0	%
Contingency Allowance	$8,156.18	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$89,717.98	

Container Storage Areas Inventory (CS_01-1)

MAXIMUM PERMITTED CAPACITY

Volume of liquid waste	0.0	gal
Volume of solid waste	330.0	yd3
Percent of loose solid debris	100.0	%
Percent of drummed solid waste	0.0	%
Percent of baled waste or other monolithic waste	0.0	%
Volume of loose solid debris	330.0	yd3
Volume of solid waste in drums	0.0	yd3
Volume of monolithic waste	0.0	yd3

SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Length (excluding any curbs or berm)	225.0	ft
Width (excluding any curbs or berm)	60.0	ft
Surface Area of Containment System Pad	13,500.0	ft2
Surface Area of Containment System Pad in yd2	1,500.0	yd2

VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Thickness	1.0	ft
Volume of Containment System Pad	13,500.0	ft3
Volume of Containment System Pad in yd3	500.0	yd3

SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Inside Perimeter	570.0	ft
Height	16.0	ft
Surface Area of Containment System Berm	9,120.0	ft2
Surface Area of Containment System Berm in yd2	1,013.3	yd2

VOLUME OF SECONDARY CONTAINMENT SYSTEM BERM

Thickness	1.0	ft
Volume of Containment System Berm	9,120.0	ft3
Volume of Containment System Berm in yd3	337.8	yd3

SURFACE AREA OF OTHER STRUCTURES

Surface Area of Other Structures	0.0	ft2
Surface Area of Other Structures in yd2	0.0	yd2

VOLUME OF OTHER STRUCTURES

Volume of Other Structures	0.0	yd3

VOLUME OF CONTAMINATED SOIL TO BE REMOVED

Facility: EnviroSafe Demil, LLC **Unit:** Above Ground Magazine 03/17/2023

Length	0.0	ft
Width	0.0	ft
Depth	0.0	ft
Volume of Contaminated Soil to be Removed	0.0	ft3
Volume of Contaminated Soil to be Removed in yd3	0.0	yd3

AREA OF SITE TO BE GRADED WITHOUT SOIL REMOVAL

Length	0.0	ft
Width	0.0	ft
Area of Site to be Graded Without Soil Removal	0.0	ft2
Area of Site to be Graded Without Soil Removal in yd2	0.0	yd2

Notes: Above Ground Magazine
Dimensions: 225 feet x 60 feet with 16 feet walls

The maximum inventory of energetic wastes in this storage magazine is 100000 lbs NEW. The maximum total weight of the packaging and energetic material is calculated to be 333333 lbs. CostPro calculates the costs to remove and treat wastes in yd3 rather than lbs so the average density of pine (37.45 lb/ft3) which is used in the palleting/packaging was used to convert the weight to yd3. The “volume of solid waste” includes the packaging and energetic material and is 330 yd3.

Container Storage Areas Removal of Waste (CS_03-1)

REMOVAL OF LOOSE SOLID DEBRIS

Volume of loose debris waste	330.0	yd3
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per yd3	$2.06	per yd3
Cost to Remove Loose Solid Debris	$679.80	

REMOVAL OF DRUMMED WASTE

Number of Drums	0	Drums
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per drum	$3.57	
Cost to Remove Waste in Drums	$0.00	

REMOVAL OF SOLID MONOLITHIC WASTE

Number of monolithic forms	0.0	Forms
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per form	$14.26	per Form
Cost to Remove Monolithic Waste	$0.00	

DRY SWEEP STORAGE PROCESS, HANDLING AREA

Surface area to dry sweep	13,500.0	ft2
Surface area to dry sweep in thousand square feet (MSF)	13.5	MSF
Labor and equipment cost per ft2	$26.00	per MSF
Cost to Dry Sweep Area	$351.00	
TOTAL COST OF WASTE REMOVAL	$1,030.80	

Container Storage Areas Certification of Closure (CS_07-1)

Number of units requiring certification of closure	1	Units
Cost of certification of closure per unit	$4,118.00	
TOTAL COST OF CERTIFICATION OF CLOSURE	$4,118.00	

Decontamination Summary (DC_01-1)

Decontamination of Unit by Steam Cleaning or Pressure Washing (DC-02)	$30,050.31
Decontamination of Unit by Sandblasting (DC-03)	$0.00
Decontamination of Heavy Equipment (DC-04)	$0.00
TOTAL COST OF DECONTAMINATION	$30,050.31

Decontamination by Steam Cleaning or Pressure Wash (DC_02-1)

Area of unit to be decontaminated	22,620.0	ft2
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per hour	$65.77	per Work Hour
Work rate to steam clean or pressure wash one ft2	0.0202	Work hr per ft2
Number of hours required to steam clean or pressure wash the unit	456.9	Work hrs
Subtotal of labor and equipment costs to decontaminate unit by steam cleaning or pressure washing	$30,050.31	
Ratio of decontamination fluid to area	0.1	gals per ft2
Volume of decontamination fluid generated	2,262.0	gal
Decontamination fluid container type:	Bulk	
Number of drums required to contain decontamination fluid for removal	0	Drums
Cost of one drum	$83.85	per Drum
Cost of drums needed to contain decontamination fluid	$0.00	
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING	$30,050.31	

Sampling and Analysis Inventory (SA_01-1)

Number of Drilling and Subsurface Soil Samples (2.5-inch boring)	0	Samples
Number of Drilling and Subsurface Soil Samples (4-inch boring)	0	Samples
Number of Concrete Core Samples	0	Samples
Number of Wipe Sample Locations	0	Sample Location
Number of Surface Water and Liquid Sample Locations	3	Sample Location
Number of Soil, Sludge, and Sediment Soil Samples	0	Sample Location
Number of Groundwater Sample Locations	0	Sample Location
Number of Lysimeters to be Sampled	0	Lysimeters

Notes: The wash water will be collected in containers and will be sampled and analyzed for proper characterization before being shipped off-site for processing and disposal.

Sampling and Analysis Summary (SA_02-1)

Drilling and Subsurface Soil Sample - 2.5-Inch-Diameter-Holes (SA-03)	$0.00
Drilling and Subsurface Soil Sample - 4-Inch-Diameter-Holes (SA-04)	$0.00
Concrete Core Sample (SA-05)	$0.00
Wipe Sample (SA-06)	$0.00
Surface Water and Liquid Sample (SA-07)	$1,968.12
Soil, Sludge, and Sediment Sample (SA-08)	$0.00
Groundwater Sample (SA-09)	$0.00
Soil-Pore Liquid Sample (SA-10)	$0.00
Analysis of Subsurface Soil Sample (SA-11)	$0.00
TOTAL SAMPLING AND ANALYSIS COST	$1,968.12

Surface Water and Liquid Samples (SA_07-1)

COLLECTION OF SURFACE WATER AND LIQUID SAMPLES		
Number of sampling locations	3	Sample Location
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per work hour	$91.88	per Work Hour
Work rate required to collect samples from one sampling location	0.5000	Work hrs per Sample
Number of hours required to collect all samples	1.5	Work hrs
Cost of Collection per Sampling Event	$137.82	per Event
ANALYSIS OF SURFACE WATER AND LIQUID SAMPLES		
Cost of Analysis per Sampling Event	$1,830.30	per Event
SAMPLING EVENTS		
Number of sampling events	1	Events
TOTAL COST OF SAMPLING AND ANALYSIS OF SURFACE WATER AND LIQUID SAMPLES	$1,968.12	

Notes: The wash water will be collected in containers and will be sampled and analyzed for proper characterization before being shipped off-site for processing and disposal.

Facility: EnviroSafe Demil, LLC **Unit:** Above Ground Magazine 03/17/2023

Surface Water and Liquid Samples (SA_07)
Cost of Analysis per Sampling Event

Method		Standard	Qty	Quick	Qty	Total
Targeted TCLP (metals, volatiles, semivolatiles only)	Both	$610.10	3	$1,220.20	0	$1,830.30

Treatment and Disposal Summary (TD_01-1)

Treatment and Disposal of Wastes (TD-02)	$32,311.40
Treatment and Disposal of Decontamination Fluids (TD-03)	$1,111.31
Total Cost of Treatment and Disposal	$33,422.71

Treatment and Disposal of Waste (TD_02-1)

SOLID WASTE TREATMENT AND DISPOSAL

Solid Waste Type (Optional: Enter Name)	Packaged Energetic Material	
Volume in yd3 of solid waste to be treated and disposed of	330.0	yd3
Treatment and disposal costs per yd3	$96.38	per yd3
Cost to Treat and Dispose of Solid Waste	$31,805.40	

LIQUID WASTE TREATMENT AND DISPOSAL

Liquid Waste Type (Optional: Enter Name)	0	
Volume in gallons of liquid waste to be treated and disposed of	0.0	gal
Treatment and disposal costs per gallon	$0.00	per Gallon
Cost to Treat and Dispose of Liquid Waste	$0.00	

DRUMMED WASTE TREATMENT AND DISPOSAL

Drummed Waste Type (Optional: Enter Name)	Floor Sweeping	
Number of drums to be treated and disposed of	2	Drums
Treatment and disposal costs per drum	$253.00	per Drum
Cost to Treat and Dispose of Drummed Waste	$506.00	
TOTAL COST FOR TREATMENT AND DISPOSAL OF WASTE	$32,311.40	

Notes: Assumption: 2 drums of floor sweepings

Treatment and Disposal of Decon Fluid (TD_03-1)

Volume of decontamination fluid generated from closure activities

Volume of decontamination fluid from Primary Unit	0.0	gal
Volume of decontamination fluid generated by steam cleaning or pressure washing (DC-02)	2,262.0	gal
Volume of decontamination fluid from heavy equipment (DC-04)	0.0	gal
Total Volume of Decontamination Fluid	2,262.0	gal
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per hour	$77.41	per Work Hour
Work rate to pump decontamination fluid to a holding tank	0.0001	Work hr per gal
Number of hours required to pump decontamination fluid to a holding tank	0.2262	Work hrs
Subtotal of labor and equipment costs to pump decontamination fluid to a holding tank	$17.51	
Number of days required to rent a holding tank	1	Days
Holding tank rental fee (10,000 gal tank per day)	$189.00	per Day
Number of tanks required	1	Tanks
Subtotal of tank rental costs	$189.00	
Cost for treatment and disposal	$0.40	per Gallon
Treatment and disposal costs for bulk liquid	$904.80	
TOTAL COST TO TREAT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID	$1,111.31	

Notes: Costs to ship the collected wash water off-site for processing and disposal are included as a worst-case scenario.

Transportation of Waste (TR_01-1)

TRANSPORTATION OF WASTE IN DRUMS

Number of drums of waste	2	Drums
Number of truckloads needed to transport waste in drums	1	Truckloads
Type of waste	Hazardous	
Number of miles	198.0	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of 55-gallon drums	$1,116.72	per Truckload
Cost to Transport Waste in Drums	$1,116.72	

TRANSPORTATION OF BULK LIQUID

Gallons of liquid waste	2,262.0	gal
Number of truckloads needed to transport bulk free liquid waste	1	Truckloads
Type of waste	Hazardous	
Number of miles	198.0	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of bulk liquids	$1,116.72	per Truckload
Cost to Transport Bulk Liquid Wastes	$1,116.72	

TRANSPORTATION OF BULK WASTE

Number of waste debris boxes	9	Containers
Number of truckloads needed to transport bulk waste	9	Truckloads
Type of waste	Hazardous	
Number of miles	99.5	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of bulk waste	$561.18	per Truckload
Cost to Transport Bulk Waste	$5,050.62	
TOTAL COST OF TRANSPORTATION OF WASTE	$7,284.06	

Notes: Costs to ship the collected wash water off-site for processing and disposal are included as a worst-case scenario.
Mileage is shown from the facility to Clean Harbors in Coalfax Louisiana for the transportation of waste in drums (floor sweepings) and the transportation of bulk liquid (wash water).
It is assumed that 50% of the energetic materials will be sent to Expal USA in Hooks Texas (1 mile distance) and 50% will be sent to Clean Harbors in Coalfax Louisiana (198 miles distance). Therefore an average mileage of 99.5 miles is included for transportation of bulk waste (energetic materials).

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	$2,078.94	
Demolition and Removal of Pads (CS-04)	$0.00	
Removal of Process Equipment (CS-05)	$0.00	
Removal of Soil (CS-06)	$0.00	
Backfill and Grading (BF-01)	$0.00	
Decontamination (DC-01)	$6,110.03	
Sampling and Analysis (SA-02)	$1,968.12	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$16,262.94	
Treatment and Disposal (TD-01)	$95,949.42	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$122,369.45	
Percentage of Engineering Expenses	5.0	%
Engineering Expenses	$6,118.47	
Certification of Closure (CS-07)	$4,118.00	
Subtotal	$132,605.92	
Percentage of Contingency Allowance	10.0	%
Contingency Allowance	$13,260.59	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$145,866.51	

Container Storage Areas Inventory (CS_01-1)

MAXIMUM PERMITTED CAPACITY

Volume of liquid waste	0.0	gal
Volume of solid waste	989.0	yd3
Percent of loose solid debris	100.0	%
Percent of drummed solid waste	0.0	%
Percent of baled waste or other monolithic waste	0.0	%
Volume of loose solid debris	989.0	yd3
Volume of solid waste in drums	0.0	yd3
Volume of monolithic waste	0.0	yd3

SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Length (excluding any curbs or berm)	60.0	ft
Width (excluding any curbs or berm)	27.0	ft
Surface Area of Containment System Pad	1,620.0	ft2
Surface Area of Containment System Pad in yd2	180.0	yd2

VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Thickness	1.0	ft
Volume of Containment System Pad	1,620.0	ft3
Volume of Containment System Pad in yd3	60.0	yd3

SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Inside Perimeter	0.0	ft
Height	0.0	ft
Surface Area of Containment System Berm	0.0	ft2
Surface Area of Containment System Berm in yd2	0.0	yd2

VOLUME OF SECONDARY CONTAINMENT SYSTEM BERM

Thickness	0.0	ft
Volume of Containment System Berm	0.0	ft3
Volume of Containment System Berm in yd3	0.0	yd3

SURFACE AREA OF OTHER STRUCTURES

Surface Area of Other Structures	2,981.0	ft2
Surface Area of Other Structures in yd2	331.2	yd2

VOLUME OF OTHER STRUCTURES

Volume of Other Structures	0.0	yd3

Facility: EnviroSafe Demil, LLC **Unit:** Earth Covered Magazine (V-13-1) 03/17/2023

VOLUME OF CONTAMINATED SOIL TO BE REMOVED

Length	0.0	ft
Width	0.0	ft
Depth	0.0	ft
Volume of Contaminated Soil to be Removed	0.0	ft3
Volume of Contaminated Soil to be Removed in yd3	0.0	yd3

AREA OF SITE TO BE GRADED WITHOUT SOIL REMOVAL

Length	0.0	ft
Width	0.0	ft
Area of Site to be Graded Without Soil Removal	0.0	ft2
Area of Site to be Graded Without Soil Removal in yd2	0.0	yd2

Notes: Earth Covered Magazine
Dimensions: 60 feet long x 27 feet wide; arched-shaped with a midline height of 13 feet
Surface Area of Other Structures is the surface area of the arched-shaped walls/ceiling.

The maximum inventory of energetic wastes in this storage magazine is 300000 lbs NEW. The maximum total weight of the packaging and energetic material is calculated to be 1000000 lbs. CostPro calculates the costs to remove and treat wastes in yd3 rather than lbs so the average density of pine (37.45 lb/ft3) which is used in the palleting/packaging was used to convert the weight to yd3. The “volume of solid waste” includes the packaging and energetic material and is 989 yd3.

Container Storage Areas Removal of Waste (CS_03-1)

REMOVAL OF LOOSE SOLID DEBRIS

Volume of loose debris waste	989.0	yd3
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per yd3	$2.06	per yd3
Cost to Remove Loose Solid Debris	$2,037.34	

REMOVAL OF DRUMMED WASTE

Number of Drums	0	Drums
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per drum	$3.57	
Cost to Remove Waste in Drums	$0.00	

REMOVAL OF SOLID MONOLITHIC WASTE

Number of monolithic forms	0.0	Forms
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per form	$14.26	per Form
Cost to Remove Monolithic Waste	$0.00	

DRY SWEEP STORAGE PROCESS, HANDLING AREA

Surface area to dry sweep	1,620.0	ft2
Surface area to dry sweep in thousand square feet (MSF)	1.6	MSF
Labor and equipment cost per ft2	$26.00	per MSF
Cost to Dry Sweep Area	$41.60	
TOTAL COST OF WASTE REMOVAL	$2,078.94	

Container Storage Areas Certification of Closure (CS_07-1)

Number of units requiring certification of closure	1	Units
Cost of certification of closure per unit	$4,118.00	
TOTAL COST OF CERTIFICATION OF CLOSURE	$4,118.00	

Decontamination Summary (DC_01-1)

Decontamination of Unit by Steam Cleaning or Pressure Washing (DC-02)	$6,110.03
Decontamination of Unit by Sandblasting (DC-03)	$0.00
Decontamination of Heavy Equipment (DC-04)	$0.00
TOTAL COST OF DECONTAMINATION	$6,110.03

Decontamination by Steam Cleaning or Pressure Wash (DC_02-1)

Area of unit to be decontaminated	4,601.0	ft2
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per hour	$65.77	per Work Hour
Work rate to steam clean or pressure wash one ft2	0.0202	Work hr per ft2
Number of hours required to steam clean or pressure wash the unit	92.9	Work hrs
Subtotal of labor and equipment costs to decontaminate unit by steam cleaning or pressure washing	$6,110.03	
Ratio of decontamination fluid to area	0.1	gals per ft2
Volume of decontamination fluid generated	460.1	gal
Decontamination fluid container type:	Bulk	
Number of drums required to contain decontamination fluid for removal	0	Drums
Cost of one drum	$83.85	per Drum
Cost of drums needed to contain decontamination fluid	$0.00	
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING	$6,110.03	

Sampling and Analysis Inventory (SA_01-1)

Number of Drilling and Subsurface Soil Samples (2.5-inch boring)	0	Samples
Number of Drilling and Subsurface Soil Samples (4-inch boring)	0	Samples
Number of Concrete Core Samples	0	Samples
Number of Wipe Sample Locations	0	Sample Location
Number of Surface Water and Liquid Sample Locations	3	Sample Location
Number of Soil, Sludge, and Sediment Soil Samples	0	Sample Location
Number of Groundwater Sample Locations	0	Sample Location
Number of Lysimeters to be Sampled	0	Lysimeters

Notes: The wash water will be collected in containers and will be sampled and analyzed for proper characterization before being shipped off-site for processing and disposal.

Sampling and Analysis Summary (SA_02-1)

Drilling and Subsurface Soil Sample - 2.5-Inch-Diameter-Holes (SA-03)	$0.00
Drilling and Subsurface Soil Sample - 4-Inch-Diameter-Holes (SA-04)	$0.00
Concrete Core Sample (SA-05)	$0.00
Wipe Sample (SA-06)	$0.00
Surface Water and Liquid Sample (SA-07)	$1,968.12
Soil, Sludge, and Sediment Sample (SA-08)	$0.00
Groundwater Sample (SA-09)	$0.00
Soil-Pore Liquid Sample (SA-10)	$0.00
Analysis of Subsurface Soil Sample (SA-11)	$0.00
TOTAL SAMPLING AND ANALYSIS COST	$1,968.12

Surface Water and Liquid Samples (SA_07-1)

COLLECTION OF SURFACE WATER AND LIQUID SAMPLES

Number of sampling locations	3	Sample Location
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per work hour	$91.88	per Work Hour
Work rate required to collect samples from one sampling location	0.5000	Work hrs per Sample
Number of hours required to collect all samples	1.5	Work hrs
Cost of Collection per Sampling Event	$137.82	per Event

ANALYSIS OF SURFACE WATER AND LIQUID SAMPLES

Cost of Analysis per Sampling Event	$1,830.30	per Event

SAMPLING EVENTS

Number of sampling events	1	Events
TOTAL COST OF SAMPLING AND ANALYSIS OF SURFACE WATER AND LIQUID SAMPLES	$1,968.12	

Notes: The wash water will be collected in containers and will be sampled and analyzed for proper characterization before being shipped off-site for processing and disposal.

Facility: EnviroSafe Demil, LLC **Unit:** Earth Covered Magazine (V-13-1) 03/17/2023

Surface Water and Liquid Samples (SA_07)
Cost of Analysis per Sampling Event

Method		Standard	Qty	Quick	Qty	Total
Targeted TCLP (metals, volatiles, semivolatiles only)	Both	$610.10	3	$1,220.20	0	$1,830.30

Treatment and Disposal Summary (TD_01-1)

Treatment and Disposal of Wastes (TD-02)	$95,572.82
Treatment and Disposal of Decontamination Fluids (TD-03)	$376.60
Total Cost of Treatment and Disposal	$95,949.42

Treatment and Disposal of Waste (TD_02-1)

SOLID WASTE TREATMENT AND DISPOSAL

Solid Waste Type (Optional: Enter Name)	Packaged Energetic Material	
Volume in yd3 of solid waste to be treated and disposed of	989.0	yd3
Treatment and disposal costs per yd3	$96.38	per yd3
Cost to Treat and Dispose of Solid Waste	$95,319.82	

LIQUID WASTE TREATMENT AND DISPOSAL

Liquid Waste Type (Optional: Enter Name)	0	
Volume in gallons of liquid waste to be treated and disposed of	0.0	gal
Treatment and disposal costs per gallon	$0.00	per Gallon
Cost to Treat and Dispose of Liquid Waste	$0.00	

DRUMMED WASTE TREATMENT AND DISPOSAL

Drummed Waste Type (Optional: Enter Name)	Floor Sweepings	
Number of drums to be treated and disposed of	1	Drums
Treatment and disposal costs per drum	$253.00	per Drum
Cost to Treat and Dispose of Drummed Waste	$253.00	
TOTAL COST FOR TREATMENT AND DISPOSAL OF WASTE	$95,572.82	

Notes: Assumption: 1 drum of floor sweepings

Treatment and Disposal of Decon Fluid (TD_03-1)

Volume of decontamination fluid generated from closure activities

Volume of decontamination fluid from Primary Unit	0.0	gal
Volume of decontamination fluid generated by steam cleaning or pressure washing (DC-02)	460.1	gal
Volume of decontamination fluid from heavy equipment (DC-04)	0.0	gal
Total Volume of Decontamination Fluid	460.1	gal
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per hour	$77.41	per Work Hour
Work rate to pump decontamination fluid to a holding tank	0.0001	Work hr per gal
Number of hours required to pump decontamination fluid to a holding tank	0.04601	Work hrs
Subtotal of labor and equipment costs to pump decontamination fluid to a holding tank	$3.56	
Number of days required to rent a holding tank	1	Days
Holding tank rental fee (10,000 gal tank per day)	$189.00	per Day
Number of tanks required	1	Tanks
Subtotal of tank rental costs	$189.00	
Cost for treatment and disposal	$0.40	per Gallon
Treatment and disposal costs for bulk liquid	$184.04	
TOTAL COST TO TREAT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID	$376.60	

Notes: Costs to ship the collected wash water off-site for processing and disposal are included as a worst-case scenario.

Transportation of Waste (TR_01-1)

TRANSPORTATION OF WASTE IN DRUMS

Number of drums of waste	1	Drums
Number of truckloads needed to transport waste in drums	1	Truckloads
Type of waste	Hazardous	
Number of miles	198.0	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of 55-gallon drums	$1,116.72	per Truckload
Cost to Transport Waste in Drums	$1,116.72	

TRANSPORTATION OF BULK LIQUID

Gallons of liquid waste	460.1	gal
Number of truckloads needed to transport bulk free liquid waste	1	Truckloads
Type of waste	Hazardous	
Number of miles	198.0	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of bulk liquids	$1,116.72	per Truckload
Cost to Transport Bulk Liquid Wastes	$1,116.72	

TRANSPORTATION OF BULK WASTE

Number of waste debris boxes	25	Containers
Number of truckloads needed to transport bulk waste	25	Truckloads
Type of waste	Hazardous	
Number of miles	99.5	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of bulk waste	$561.18	per Truckload
Cost to Transport Bulk Waste	$14,029.50	
TOTAL COST OF TRANSPORTATION OF WASTE	$16,262.94	

Notes: Costs to ship the collected wash water off-site for processing and disposal are included as a worst-case scenario.
Mileage is shown from the facility to Clean Harbors in Coalfax Louisiana for the transportation of waste in drums (floor sweepings) and the transportation of bulk liquid (wash water).
It is assumed that 50% of the energetic materials will be sent to Expal USA in Hooks Texas (1 mile distance) and 50% will be sent to Clean Harbors in Coalfax Louisiana (198 miles distance). Therefore an average mileage of 99.5 miles is included for transportation of bulk waste (energetic materials).

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	$1,399.14	
Demolition and Removal of Pads (CS-04)	$0.00	
Removal of Process Equipment (CS-05)	$0.00	
Removal of Soil (CS-06)	$0.00	
Backfill and Grading (BF-01)	$0.00	
Decontamination (DC-01)	$6,110.03	
Sampling and Analysis (SA-02)	$1,968.12	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$11,773.50	
Treatment and Disposal (TD-01)	$64,144.02	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$85,394.81	
Percentage of Engineering Expenses	5.0	%
Engineering Expenses	$4,269.74	
Certification of Closure (CS-07)	$4,118.00	
Subtotal	$93,782.55	
Percentage of Contingency Allowance	10.0	%
Contingency Allowance	$9,378.25	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$103,160.80	

Container Storage Areas Inventory (CS_01-1)

MAXIMUM PERMITTED CAPACITY

Volume of liquid waste	0.0	gal
Volume of solid waste	659.0	yd3
Percent of loose solid debris	100.0	%
Percent of drummed solid waste	0.0	%
Percent of baled waste or other monolithic waste	0.0	%
Volume of loose solid debris	659.0	yd3
Volume of solid waste in drums	0.0	yd3
Volume of monolithic waste	0.0	yd3

SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Length (excluding any curbs or berm)	60.0	ft
Width (excluding any curbs or berm)	27.0	ft
Surface Area of Containment System Pad	1,620.0	ft2
Surface Area of Containment System Pad in yd2	180.0	yd2

VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Thickness	1.0	ft
Volume of Containment System Pad	1,620.0	ft3
Volume of Containment System Pad in yd3	60.0	yd3

SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Inside Perimeter	0.0	ft
Height	0.0	ft
Surface Area of Containment System Berm	0.0	ft2
Surface Area of Containment System Berm in yd2	0.0	yd2

VOLUME OF SECONDARY CONTAINMENT SYSTEM BERM

Thickness	0.0	ft
Volume of Containment System Berm	0.0	ft3
Volume of Containment System Berm in yd3	0.0	yd3

SURFACE AREA OF OTHER STRUCTURES

Surface Area of Other Structures	2,981.0	ft2
Surface Area of Other Structures in yd2	331.2	yd2

VOLUME OF OTHER STRUCTURES

Volume of Other Structures	0.0	yd3

Facility: EnviroSafe Demil, LLC **Unit:** Earth Covered Magazine (V-13-2) 03/17/2023

VOLUME OF CONTAMINATED SOIL TO BE REMOVED

Length	0.0	ft
Width	0.0	ft
Depth	0.0	ft
Volume of Contaminated Soil to be Removed	0.0	ft3
Volume of Contaminated Soil to be Removed in yd3	0.0	yd3

AREA OF SITE TO BE GRADED WITHOUT SOIL REMOVAL

Length	0.0	ft
Width	0.0	ft
Area of Site to be Graded Without Soil Removal	0.0	ft2
Area of Site to be Graded Without Soil Removal in yd2	0.0	yd2

Notes: Earth Covered Magazine
Dimensions: 60 feet long x 27 feet wide; arched-shaped with a midline height of 13 feet
Surface Area of Other Structures is the surface area of the arched-shaped walls/ceiling.

The maximum inventory of energetic wastes in this storage magazine is 200000 lbs NEW. The maximum total weight of the packaging and energetic material is calculated to be 666667 lbs. CostPro calculates the costs to remove and treat wastes in yd3 rather than lbs so the average density of pine (37.45 lb/ft3) which is used in the palleting/packaging was used to convert the weight to yd3. The “volume of solid waste” includes the packaging and energetic material and is 659 yd3.

Container Storage Areas Removal of Waste (CS_03-1)

REMOVAL OF LOOSE SOLID DEBRIS

Volume of loose debris waste	659.0	yd3
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per yd3	$2.06	per yd3
Cost to Remove Loose Solid Debris	$1,357.54	

REMOVAL OF DRUMMED WASTE

Number of Drums	0	Drums
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per drum	$3.57	
Cost to Remove Waste in Drums	$0.00	

REMOVAL OF SOLID MONOLITHIC WASTE

Number of monolithic forms	0.0	Forms
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per form	$14.26	per Form
Cost to Remove Monolithic Waste	$0.00	

DRY SWEEP STORAGE PROCESS, HANDLING AREA

Surface area to dry sweep	1,620.0	ft2
Surface area to dry sweep in thousand square feet (MSF)	1.6	MSF
Labor and equipment cost per ft2	$26.00	per MSF
Cost to Dry Sweep Area	$41.60	
TOTAL COST OF WASTE REMOVAL	$1,399.14	

Container Storage Areas Certification of Closure (CS_07-1)

Number of units requiring certification of closure	1	Units
Cost of certification of closure per unit	$4,118.00	
TOTAL COST OF CERTIFICATION OF CLOSURE	$4,118.00	

Decontamination Summary (DC_01-1)

Decontamination of Unit by Steam Cleaning or Pressure Washing (DC-02)	$6,110.03
Decontamination of Unit by Sandblasting (DC-03)	$0.00
Decontamination of Heavy Equipment (DC-04)	$0.00
TOTAL COST OF DECONTAMINATION	$6,110.03

Decontamination by Steam Cleaning or Pressure Wash (DC_02-1)

Area of unit to be decontaminated	4,601.0	ft2
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per hour	$65.77	per Work Hour
Work rate to steam clean or pressure wash one ft2	0.0202	Work hr per ft2
Number of hours required to steam clean or pressure wash the unit	92.9	Work hrs
Subtotal of labor and equipment costs to decontaminate unit by steam cleaning or pressure washing	$6,110.03	
Ratio of decontamination fluid to area	0.1	gals per ft2
Volume of decontamination fluid generated	460.1	gal
Decontamination fluid container type:	Bulk	
Number of drums required to contain decontamination fluid for removal	0	Drums
Cost of one drum	$83.85	per Drum
Cost of drums needed to contain decontamination fluid	$0.00	
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING	$6,110.03	

Sampling and Analysis Inventory (SA_01-1)

Number of Drilling and Subsurface Soil Samples (2.5-inch boring)	0	Samples
Number of Drilling and Subsurface Soil Samples (4-inch boring)	0	Samples
Number of Concrete Core Samples	0	Samples
Number of Wipe Sample Locations	0	Sample Location
Number of Surface Water and Liquid Sample Locations	3	Sample Location
Number of Soil, Sludge, and Sediment Soil Samples	0	Sample Location
Number of Groundwater Sample Locations	0	Sample Location
Number of Lysimeters to be Sampled	0	Lysimeters

Notes: The wash water will be collected in containers and will be sampled and analyzed for proper characterization before being shipped off-site for processing and disposal.

Sampling and Analysis Summary (SA_02-1)

Drilling and Subsurface Soil Sample - 2.5-Inch-Diameter-Holes (SA-03)	$0.00
Drilling and Subsurface Soil Sample - 4-Inch-Diameter-Holes (SA-04)	$0.00
Concrete Core Sample (SA-05)	$0.00
Wipe Sample (SA-06)	$0.00
Surface Water and Liquid Sample (SA-07)	$1,968.12
Soil, Sludge, and Sediment Sample (SA-08)	$0.00
Groundwater Sample (SA-09)	$0.00
Soil-Pore Liquid Sample (SA-10)	$0.00
Analysis of Subsurface Soil Sample (SA-11)	$0.00
TOTAL SAMPLING AND ANALYSIS COST	$1,968.12

Surface Water and Liquid Samples (SA_07-1)

COLLECTION OF SURFACE WATER AND LIQUID SAMPLES

Number of sampling locations	3	Sample Location
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per work hour	$91.88	per Work Hour
Work rate required to collect samples from one sampling location	0.5000	Work hrs per Sample
Number of hours required to collect all samples	1.5	Work hrs
Cost of Collection per Sampling Event	$137.82	per Event

ANALYSIS OF SURFACE WATER AND LIQUID SAMPLES

Cost of Analysis per Sampling Event	$1,830.30	per Event

SAMPLING EVENTS

Number of sampling events	1	Events
TOTAL COST OF SAMPLING AND ANALYSIS OF SURFACE WATER AND LIQUID SAMPLES	$1,968.12	

Notes: The wash water will be collected in containers and will be sampled and analyzed for proper characterization before being shipped off-site for processing and disposal.

Facility: EnviroSafe Demil, LLC **Unit:** Earth Covered Magazine (V-13-2) 03/17/2023

Surface Water and Liquid Samples (SA_07)
Cost of Analysis per Sampling Event

Method		Standard	Qty	Quick	Qty	Total
Targeted TCLP (metals, volatiles, semivolatiles only)	Both	$610.10	3	$1,220.20	0	$1,830.30

Treatment and Disposal Summary (TD_01-1)

Treatment and Disposal of Wastes (TD-02)	$63,767.42
Treatment and Disposal of Decontamination Fluids (TD-03)	$376.60
Total Cost of Treatment and Disposal	$64,144.02

Treatment and Disposal of Waste (TD_02-1)

SOLID WASTE TREATMENT AND DISPOSAL

Solid Waste Type (Optional: Enter Name)	Packaged Energetic Material	
Volume in yd3 of solid waste to be treated and disposed of	659.0	yd3
Treatment and disposal costs per yd3	$96.38	per yd3
Cost to Treat and Dispose of Solid Waste	$63,514.42	

LIQUID WASTE TREATMENT AND DISPOSAL

Liquid Waste Type (Optional: Enter Name)	0	
Volume in gallons of liquid waste to be treated and disposed of	0.0	gal
Treatment and disposal costs per gallon	$0.00	per Gallon
Cost to Treat and Dispose of Liquid Waste	$0.00	

DRUMMED WASTE TREATMENT AND DISPOSAL

Drummed Waste Type (Optional: Enter Name)	Floor Sweepings	
Number of drums to be treated and disposed of	1	Drums
Treatment and disposal costs per drum	$253.00	per Drum
Cost to Treat and Dispose of Drummed Waste	$253.00	
TOTAL COST FOR TREATMENT AND DISPOSAL OF WASTE	$63,767.42	

Notes: Assumption: 1 drum of floor sweepings

Treatment and Disposal of Decon Fluid (TD_03-1)

Volume of decontamination fluid generated from closure activities

Volume of decontamination fluid from Primary Unit	0.0	gal
Volume of decontamination fluid generated by steam cleaning or pressure washing (DC-02)	460.1	gal
Volume of decontamination fluid from heavy equipment (DC-04)	0.0	gal
Total Volume of Decontamination Fluid	460.1	gal
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per hour	$77.41	per Work Hour
Work rate to pump decontamination fluid to a holding tank	0.0001	Work hr per gal
Number of hours required to pump decontamination fluid to a holding tank	0.04601	Work hrs
Subtotal of labor and equipment costs to pump decontamination fluid to a holding tank	$3.56	
Number of days required to rent a holding tank	1	Days
Holding tank rental fee (10,000 gal tank per day)	$189.00	per Day
Number of tanks required	1	Tanks
Subtotal of tank rental costs	$189.00	
Cost for treatment and disposal	$0.40	per Gallon
Treatment and disposal costs for bulk liquid	$184.04	
TOTAL COST TO TREAT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID	$376.60	

Notes: Costs to ship the collected wash water off-site for processing and disposal are included as a worst-case scenario.

Transportation of Waste (TR_01-1)

TRANSPORTATION OF WASTE IN DRUMS

Number of drums of waste	1	Drums
Number of truckloads needed to transport waste in drums	1	Truckloads
Type of waste	Hazardous	
Number of miles	198.0	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of 55-gallon drums	$1,116.72	per Truckload
Cost to Transport Waste in Drums	$1,116.72	

TRANSPORTATION OF BULK LIQUID

Gallons of liquid waste	460.1	gal
Number of truckloads needed to transport bulk free liquid waste	1	Truckloads
Type of waste	Hazardous	
Number of miles	198.0	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of bulk liquids	$1,116.72	per Truckload
Cost to Transport Bulk Liquid Wastes	$1,116.72	

TRANSPORTATION OF BULK WASTE

Number of waste debris boxes	17	Containers
Number of truckloads needed to transport bulk waste	17	Truckloads
Type of waste	Non-Hazardous	
Number of miles	99.5	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of bulk waste	$561.18	per Truckload
Cost to Transport Bulk Waste	$9,540.06	
TOTAL COST OF TRANSPORTATION OF WASTE	$11,773.50	

Notes: Costs to ship the collected wash water off-site for processing and disposal are included as a worst-case scenario.
Mileage is shown from the facility to Clean Harbors in Coalfax Louisiana for the transportation of waste in drums (floor sweepings) and the transportation of bulk liquid (wash water).
It is assumed that 50% of the energetic materials will be sent to Expal USA in Hooks Texas (1 mile distance) and 50% will be sent to Clean Harbors in Coalfax Louisiana (198 miles distance). Therefore an average mileage of 99.5 miles is included for transportation of bulk waste (energetic materials).

COSTPRO CLOSURE COST ESTIMATES

HBC AREA

Rocket Motor Ops Building
Hybrid Burn Chamber (HBC)

EnviroSafe Demil, LLC

Address: 401 N Montague Street
Hooks
TEXAS
75561

Contact: TJ Ogden 206-999-8684
Michael Wentz 360-480-9320

Comments: HBC AREA:
Rocket Motor Ops Building is included as "Container Storage Area"
Hybrid Burn Chamber (HBC) is included as "Incinerators/BIFs"

Activity	Units	Closure Cost
Container Storage Area	1	$83,785.70
Incinerators/BIFs	1	$65,451.17
		$149,236.87
Additional Costs		$0.00
Total Estimated Cost		**$149,236.87**

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	$741.00	
Demolition and Removal of Pads (CS-04)	$0.00	
Removal of Process Equipment (CS-05)	$0.00	
Removal of Soil (CS-06)	$0.00	
Backfill and Grading (BF-01)	$0.00	
Decontamination (DC-01)	$61,106.91	
Sampling and Analysis (SA-02)	$1,968.12	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$2,233.44	
Treatment and Disposal (TD-01)	$2,570.36	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$68,619.83	
Percentage of Engineering Expenses	5.0	%
Engineering Expenses	$3,430.99	
Certification of Closure (CS-07)	$4,118.00	
Subtotal	$76,168.82	
Percentage of Contingency Allowance	10.0	%
Contingency Allowance	$7,616.88	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$83,785.70	

Container Storage Areas Inventory (CS_01-1)

MAXIMUM PERMITTED CAPACITY

Volume of liquid waste	0.0	gal
Volume of solid waste	0.0	yd3
Percent of loose solid debris	0.0	%
Percent of drummed solid waste	0.0	%
Percent of baled waste or other monolithic waste	0.0	%
Volume of loose solid debris	0.0	yd3
Volume of solid waste in drums	0.0	yd3
Volume of monolithic waste	0.0	yd3

SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Length (excluding any curbs or berm)	407.0	ft
Width (excluding any curbs or berm)	70.0	ft
Surface Area of Containment System Pad	28,490.0	ft2
Surface Area of Containment System Pad in yd2	3,165.6	yd2

VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Thickness	1.0	ft
Volume of Containment System Pad	28,490.0	ft3
Volume of Containment System Pad in yd3	1,055.2	yd3

SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Inside Perimeter	1,094.0	ft
Height	16.0	ft
Surface Area of Containment System Berm	17,504.0	ft2
Surface Area of Containment System Berm in yd2	1,944.9	yd2

VOLUME OF SECONDARY CONTAINMENT SYSTEM BERM

Thickness	1.0	ft
Volume of Containment System Berm	17,504.0	ft3
Volume of Containment System Berm in yd3	648.3	yd3

SURFACE AREA OF OTHER STRUCTURES

Surface Area of Other Structures	0.0	ft2
Surface Area of Other Structures in yd2	0.0	yd2

VOLUME OF OTHER STRUCTURES

Volume of Other Structures	0.0	yd3

VOLUME OF CONTAMINATED SOIL TO BE REMOVED

Facility: EnviroSafe Demil, LLC **Unit:** Rocket Motor Ops Building 03/17/2023

Length	0.0	ft
Width	0.0	ft
Depth	0.0	ft
Volume of Contaminated Soil to be Removed	0.0	ft3
Volume of Contaminated Soil to be Removed in yd3	0.0	yd3

AREA OF SITE TO BE GRADED WITHOUT SOIL REMOVAL

Length	0.0	ft
Width	0.0	ft
Area of Site to be Graded Without Soil Removal	0.0	ft2
Area of Site to be Graded Without Soil Removal in yd2	0.0	yd2

Notes: Rocket Motor Ops Building
Dimensions: 407 feet x 70 feet with 16-foot walls with 2 separate areas:
407+407+70+70+70+70 = 1094 ft inside perimeter

Container Storage Areas Removal of Waste (CS_03-1)

REMOVAL OF LOOSE SOLID DEBRIS

Volume of loose debris waste	0.0	yd3
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per yd3	$2.06	per yd3
Cost to Remove Loose Solid Debris	$0.00	

REMOVAL OF DRUMMED WASTE

Number of Drums	0	Drums
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per drum	$3.57	
Cost to Remove Waste in Drums	$0.00	

REMOVAL OF SOLID MONOLITHIC WASTE

Number of monolithic forms	0.0	Forms
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per form	$14.26	per Form
Cost to Remove Monolithic Waste	$0.00	

DRY SWEEP STORAGE PROCESS, HANDLING AREA

Surface area to dry sweep	28,490.0	ft2
Surface area to dry sweep in thousand square feet (MSF)	28.5	MSF
Labor and equipment cost per ft2	$26.00	per MSF
Cost to Dry Sweep Area	$741.00	
TOTAL COST OF WASTE REMOVAL	$741.00	

Container Storage Areas Certification of Closure (CS_07-1)

Number of units requiring certification of closure	1	Units
Cost of certification of closure per unit	$4,118.00	
TOTAL COST OF CERTIFICATION OF CLOSURE	$4,118.00	

Decontamination Summary (DC_01-1)

Decontamination of Unit by Steam Cleaning or Pressure Washing (DC-02)	$61,106.91
Decontamination of Unit by Sandblasting (DC-03)	$0.00
Decontamination of Heavy Equipment (DC-04)	$0.00
TOTAL COST OF DECONTAMINATION	$61,106.91

Decontamination by Steam Cleaning or Pressure Wash (DC_02-1)

Area of unit to be decontaminated	45,994.0	ft2
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per hour	$65.77	per Work Hour
Work rate to steam clean or pressure wash one ft2	0.0202	Work hr per ft2
Number of hours required to steam clean or pressure wash the unit	929.1	Work hrs
Subtotal of labor and equipment costs to decontaminate unit by steam cleaning or pressure washing	$61,106.91	
Ratio of decontamination fluid to area	0.1	gals per ft2
Volume of decontamination fluid generated	4,599.4	gal
Decontamination fluid container type:	Bulk	
Number of drums required to contain decontamination fluid for removal	0	Drums
Cost of one drum	$83.85	per Drum
Cost of drums needed to contain decontamination fluid	$0.00	
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING	$61,106.91	

Sampling and Analysis Inventory (SA_01-1)

Number of Drilling and Subsurface Soil Samples (2.5-inch boring)	0	Samples
Number of Drilling and Subsurface Soil Samples (4-inch boring)	0	Samples
Number of Concrete Core Samples	0	Samples
Number of Wipe Sample Locations	0	Sample Location
Number of Surface Water and Liquid Sample Locations	3	Sample Location
Number of Soil, Sludge, and Sediment Soil Samples	0	Sample Location
Number of Groundwater Sample Locations	0	Sample Location
Number of Lysimeters to be Sampled	0	Lysimeters

Notes: The wash water will be collected in containers and will be sampled and analyzed for proper characterization before being shipped off-site for processing and disposal.

Sampling and Analysis Summary (SA_02-1)

Drilling and Subsurface Soil Sample - 2.5-Inch-Diameter-Holes (SA-03)	$0.00
Drilling and Subsurface Soil Sample - 4-Inch-Diameter-Holes (SA-04)	$0.00
Concrete Core Sample (SA-05)	$0.00
Wipe Sample (SA-06)	$0.00
Surface Water and Liquid Sample (SA-07)	$1,968.12
Soil, Sludge, and Sediment Sample (SA-08)	$0.00
Groundwater Sample (SA-09)	$0.00
Soil-Pore Liquid Sample (SA-10)	$0.00
Analysis of Subsurface Soil Sample (SA-11)	$0.00
TOTAL SAMPLING AND ANALYSIS COST	$1,968.12

Surface Water and Liquid Samples (SA_07-1)

COLLECTION OF SURFACE WATER AND LIQUID SAMPLES		
Number of sampling locations	3	Sample Location
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per work hour	$91.88	per Work Hour
Work rate required to collect samples from one sampling location	0.5000	Work hrs per Sample
Number of hours required to collect all samples	1.5	Work hrs
Cost of Collection per Sampling Event	$137.82	per Event
ANALYSIS OF SURFACE WATER AND LIQUID SAMPLES		
Cost of Analysis per Sampling Event	$1,830.30	per Event
SAMPLING EVENTS		
Number of sampling events	1	Events
TOTAL COST OF SAMPLING AND ANALYSIS OF SURFACE WATER AND LIQUID SAMPLES	$1,968.12	

Notes: The wash water will be collected in containers and will be sampled and analyzed for proper characterization before being shipped off-site for processing and disposal.

Facility: EnviroSafe Demil, LLC **Unit:** Rocket Motor Ops Building 03/17/2023

Surface Water and Liquid Samples (SA_07)
Cost of Analysis per Sampling Event

Method		Standard	Qty	Quick	Qty	Total
Targeted TCLP (metals, volatiles, semivolatiles only)	Both	$610.10	3	$1,220.20	0	$1,830.30

Treatment and Disposal Summary (TD_01-1)

Treatment and Disposal of Wastes (TD-02)	$506.00
Treatment and Disposal of Decontamination Fluids (TD-03)	$2,064.36
Total Cost of Treatment and Disposal	$2,570.36

Treatment and Disposal of Waste (TD_02-1)

SOLID WASTE TREATMENT AND DISPOSAL		
Solid Waste Type (Optional: Enter Name)	0	
Volume in yd3 of solid waste to be treated and disposed of	0.0	yd3
Treatment and disposal costs per yd3	$0.00	per yd3
Cost to Treat and Dispose of Solid Waste	$0.00	
LIQUID WASTE TREATMENT AND DISPOSAL		
Liquid Waste Type (Optional: Enter Name)	0	
Volume in gallons of liquid waste to be treated and disposed of	0.0	gal
Treatment and disposal costs per gallon	$0.00	per Gallon
Cost to Treat and Dispose of Liquid Waste	$0.00	
DRUMMED WASTE TREATMENT AND DISPOSAL		
Drummed Waste Type (Optional: Enter Name)	Floor Sweeping	
Number of drums to be treated and disposed of	2	Drums
Treatment and disposal costs per drum	$253.00	per Drum
Cost to Treat and Dispose of Drummed Waste	$506.00	
TOTAL COST FOR TREATMENT AND DISPOSAL OF WASTE	$506.00	

Notes: Assumption: 2 drums of floor sweepings

Treatment and Disposal of Decon Fluid (TD_03-1)

Volume of decontamination fluid generated from closure activities

Volume of decontamination fluid from Primary Unit	0.0	gal
Volume of decontamination fluid generated by steam cleaning or pressure washing (DC-02)	4,599.4	gal
Volume of decontamination fluid from heavy equipment (DC-04)	0.0	gal
Total Volume of Decontamination Fluid	4,599.4	gal
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per hour	$77.41	per Work Hour
Work rate to pump decontamination fluid to a holding tank	0.0001	Work hr per gal
Number of hours required to pump decontamination fluid to a holding tank	0.45994	Work hrs
Subtotal of labor and equipment costs to pump decontamination fluid to a holding tank	$35.60	
Number of days required to rent a holding tank	1	Days
Holding tank rental fee (10,000 gal tank per day)	$189.00	per Day
Number of tanks required	1	Tanks
Subtotal of tank rental costs	$189.00	
Cost for treatment and disposal	$0.40	per Gallon
Treatment and disposal costs for bulk liquid	$1,839.76	
TOTAL COST TO TREAT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID	$2,064.36	

Notes: Costs to ship the collected wash water off-site for processing and disposal are included as a worst-case scenario.

Transportation of Waste (TR_01-1)

TRANSPORTATION OF WASTE IN DRUMS

Number of drums of waste	2	Drums
Number of truckloads needed to transport waste in drums	1	Truckloads
Type of waste	Hazardous	
Number of miles	198.0	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of 55-gallon drums	$1,116.72	per Truckload
Cost to Transport Waste in Drums	$1,116.72	

TRANSPORTATION OF BULK LIQUID

Gallons of liquid waste	4,599.4	gal
Number of truckloads needed to transport bulk free liquid waste	1	Truckloads
Type of waste	Hazardous	
Number of miles	198.0	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of bulk liquids	$1,116.72	per Truckload
Cost to Transport Bulk Liquid Wastes	$1,116.72	

TRANSPORTATION OF BULK WASTE

Number of waste debris boxes	0	Containers
Number of truckloads needed to transport bulk waste	0	Truckloads
Type of waste	Hazardous	
Number of miles	198.0	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of bulk waste	$1,116.72	per Truckload
Cost to Transport Bulk Waste	$0.00	
TOTAL COST OF TRANSPORTATION OF WASTE	$2,233.44	

Notes: Costs to ship the collected wash water off-site for processing and disposal are included as a worst-case scenario.
Mileage is shown from the facility to Clean Harbors in Coalfax Louisiana

Incinerators and BIFs Summary (IB_02-1)

Removal of Waste Residue (IB-03)	$827.71	
Decontamination of the Unit (IB-04)	$27,761.52	
Disassembly of Ancillary Piping (IB-05)	$5,958.40	
Demolition and Removal (IB-06)	$0.00	
Removal of Soil (IB-07)	$0.00	
Backfill and Grading (BF-01)	$0.00	
Decontamination (DC-01)	$7,175.51	
Sampling and Analysis (SA-02)	$3,936.24	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$2,233.44	
Treatment and Disposal (TD-01)	$3,698.13	
User Defined Cost (UD-01)	$1,154.82	
Subtotal of Closure Costs	$52,745.77	
Percentage of Engineering Expenses	5.0	%
Engineering Expenses	$2,637.29	
Certification of Closure (IB-08)	$4,118.00	
Subtotal	$59,501.06	
Percentage of Contingency Allowance	10.0	%
Contingency Allowance	$5,950.11	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$65,451.17	

Incinerators and BIFs Inventory (IB_01-1)

UNIT DESCRIPTION

Type of incinerator or BIF	HBC	
Type of Air Pollution Control Device (APCD)	See Notes	
Type of heat recovery system	0	
Length of ancillary piping	0.0	ft

MAXIMUM VOLUME OF SCRUBBER LIQUID

Maximum Volume of Scrubber Liquid	0.0	gal

MAXIMUM VOLUME OF NONLIQUID WASTE

Volume of incinerator or BIF ash	1.6	yd3
Volume of baghouse/cyclone/ESP dust	1.1	yd3
Volume of Nonliquid Waste	2.7	yd3

SURFACE AREA OF INCINERATOR OR BIF

Surface area of combustion chamber(s)	3,387.0	ft2
Surface area of APCD	4,238.0	ft2
Surface area of heat recovery equipment	0.0	ft2
Surface area of exhaust gas duct	0.0	ft2
Surface area of stack	455.0	ft2
Surface Area of Incinerator or BIF	8,080.0	ft2

SURFACE AREA OF ANCILLARY PIPING AND CONTAINMENT AREAS

Surface area of ancillary piping	853.0	ft2
Surface area of containment areas	0.0	ft2
Surface area of other structures	1,489.0	ft2
Surface Area of Ancillary Piping and Containment Areas	2,342.0	ft2

VOLUME OF MATERIAL TO BE DEMOLISHED AND REMOVED

Volume of materials constituting the incineration system	0.0	ft3
Volume of ancillary piping materials	0.0	ft3
Volume of other miscellaneous materials (such as containment areas) to be removed	0.0	ft3
Volume of Materials to be Demolished and Removed	0.0	ft3
Volume of Materials to be Demolished and Removed in yd3	0.0	yd3

VOLUME OF CONTAMINATED SOIL TO BE REMOVED

Length	0.0	ft
Width	0.0	ft
Depth	0.0	ft

Facility: EnviroSafe Demil, LLC **Unit:** Hybrid Burn Chamber 03/17/2023

Volume of Contaminated Soil to be Removed	0.0	ft3
Volume of Contaminated Soil to be Removed in yd3	0.0	yd3

Notes: The APCS system is composed of the following equipment:
•Afterburner
•Evaporative quench
•Cyclone separator
•Dry sorbent injection system
•Baghouse housing
•HEPA filter housing
•Selective catalytic reduction system
•ID Fan
•Stack

The "Maximum Volume of Nonliquid Wastes" includes an assumption of a total of 6 55-gallon drums of ash/debris from the HBC system / filter cakes and 4 55-gallon drums of used baghouse and HEPA filters / particulate dust from the APCS.

The "Surface area of other structures" includes the surface area of the HBC feed system.

Incinerators and BIFs Rem. of Waste Residue (IB_03-1)

REMOVAL, TREATMENT, AND DISPOSAL OF SCRUBBER LIQUID

Maximum volume of scrubber liquid	0.0	gal
Cost to remove, treat, and dispose of scrubber liquid per gallon	$1.16	per Gallon
Total Cost to Remove, Treat, and Dispose of Scrubber Liquid	$0.00	

REMOVAL, TREATMENT, AND DISPOSAL OF NONLIQUID WASTE RESIDUE

Maximum volume of nonliquid waste	2.7	yd3
Maximum volume of nonliquid waste converted to tons	1.8	Tons
Volume Conversion Factor	0.6750	
Cost to remove, treat, and dispose of nonliquid waste per ton	$459.84	per Ton
Total Cost to Remove, Treat, and Dispose of Nonliquid Waste	$827.71	
TOTAL COST OF REMOVAL OF WASTE RESIDUE	$827.71	

Incinerators and BIFs Decontamination of the Unit (IB_04-1)

Surface area of unit to be cleaned	10,422.0	ft
Choose the appropriate level of PPE:	Protection Level D	
Labor and equipment cost per work hour	$65.77	per Work Hour
Work rate required to clean the unit	0.0405	Work hr per ft2
Number of hours required to clean the unit	422.1	Work hrs
Subtotal of labor and equipment cost to clean unit by steam cleaning	$27,761.52	
Rate	0.1	gals per ft2
Volume of decontamination fluid	1,042.2	gal
Decontamination fluid is contained in:	Bulk	
Number of drums required to contain decontamination fluid	0	Drums
Cost of one drum	$83.85	
Cost of drums needed to contain decontamination fluid	$0.00	
TOTAL COST OF DECONTAMINATION OF THE UNIT	$27,761.52	

Notes: The "Surface area of unit to be cleaned" includes the surface area of the feed system and the HBC plus the APCS components.

The APCS system is composed of the following equipment:
•Afterburner
•Evaporative quench
•Cyclone separator
•Dry sorbent injection system
•Baghouse housing
•HEPA filter housing
•Selective catalytic reduction system
•ID Fan
•Stack

Disassembly of Ancillary Piping (IB_05-1)

Length of ancillary piping to be disassembled	853.0	ft
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per work hour	$46.55	per Work Hour
Work rate required to disassemble one foot of ancillary piping	0.1500	Work hr per Ft
Number of hours required to disassemble ancillary piping	128.0	Work hrs
TOTAL COST OF DISASSEMBLY OF ANCILLARY PIPING	$5,958.40	

Incinerators and BIFs Certification of Closure (IB_08-1)

Number of units requiring certification of closure	1	Units
Cost of certification of closure per unit	$4,118.00	
TOTAL COST OF CERTIFICATION OF CLOSURE	$4,118.00	

Decontamination Summary (DC_01-1)

Decontamination of Unit by Steam Cleaning or Pressure Washing (DC-02)	$7,175.51
Decontamination of Unit by Sandblasting (DC-03)	$0.00
Decontamination of Heavy Equipment (DC-04)	$0.00
TOTAL COST OF DECONTAMINATION	$7,175.51

Decontamination by Steam Cleaning or Pressure Wash (DC_02-1)

Area of unit to be decontaminated	5,400.0	ft2
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per hour	$65.77	per Work Hour
Work rate to steam clean or pressure wash one ft2	0.0202	Work hr per ft2
Number of hours required to steam clean or pressure wash the unit	109.1	Work hrs
Subtotal of labor and equipment costs to decontaminate unit by steam cleaning or pressure washing	$7,175.51	
Ratio of decontamination fluid to area	0.1	gals per ft2
Volume of decontamination fluid generated	540.0	gal
Decontamination fluid container type:	Bulk	
Number of drums required to contain decontamination fluid for removal	0	Drums
Cost of one drum	$83.85	per Drum
Cost of drums needed to contain decontamination fluid	$0.00	
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING	$7,175.51	

Notes: The "Area of unit to be decontaminated" includes the surface area of the concrete pad. The surface areas of the HBC system components to be decontaminated are included on worksheet IB_04-1.

Sampling and Analysis Inventory (SA_01-1)

Number of Drilling and Subsurface Soil Samples (2.5-inch boring)	0	Samples
Number of Drilling and Subsurface Soil Samples (4-inch boring)	0	Samples
Number of Concrete Core Samples	0	Samples
Number of Wipe Sample Locations	0	Sample Location
Number of Surface Water and Liquid Sample Locations	6	Sample Location
Number of Soil, Sludge, and Sediment Soil Samples	0	Sample Location
Number of Groundwater Sample Locations	0	Sample Location
Number of Lysimeters to be Sampled	0	Lysimeters

Notes: The wash water will be collected in containers and will be sampled and analyzed for proper characterization before being shipped off-site for processing and disposal. The number of samples includes the drums of water collected from decontaminating the HBC system equipment and the HBC concrete pad.

Sampling and Analysis Summary (SA_02-1)

Drilling and Subsurface Soil Sample - 2.5-Inch-Diameter-Holes (SA-03)	$0.00
Drilling and Subsurface Soil Sample - 4-Inch-Diameter-Holes (SA-04)	$0.00
Concrete Core Sample (SA-05)	$0.00
Wipe Sample (SA-06)	$0.00
Surface Water and Liquid Sample (SA-07)	$3,936.24
Soil, Sludge, and Sediment Sample (SA-08)	$0.00
Groundwater Sample (SA-09)	$0.00
Soil-Pore Liquid Sample (SA-10)	$0.00
Analysis of Subsurface Soil Sample (SA-11)	$0.00
TOTAL SAMPLING AND ANALYSIS COST	$3,936.24

Surface Water and Liquid Samples (SA_07-1)

COLLECTION OF SURFACE WATER AND LIQUID SAMPLES		
Number of sampling locations	6	Sample Location
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per work hour	$91.88	per Work Hour
Work rate required to collect samples from one sampling location	0.5000	Work hrs per Sample
Number of hours required to collect all samples	3.0	Work hrs
Cost of Collection per Sampling Event	$275.64	per Event
ANALYSIS OF SURFACE WATER AND LIQUID SAMPLES		
Cost of Analysis per Sampling Event	$3,660.60	per Event
SAMPLING EVENTS		
Number of sampling events	1	Events
TOTAL COST OF SAMPLING AND ANALYSIS OF SURFACE WATER AND LIQUID SAMPLES	$3,936.24	

Notes: The wash water will be collected in containers and will be sampled and analyzed for proper characterization before being shipped off-site for processing and disposal.

Facility: EnviroSafe Demil, LLC **Unit:** Hybrid Burn Chamber 03/17/2023

Surface Water and Liquid Samples (SA_07)
Cost of Analysis per Sampling Event

Method		Standard	Qty	Quick	Qty	Total
Targeted TCLP (metals, volatiles, semivolatiles only)	Both	$610.10	6	$1,220.20	0	$3,660.60

Treatment and Disposal Summary (TD_01-1)

Treatment and Disposal of Wastes (TD-02)	$2,864.00
Treatment and Disposal of Decontamination Fluids (TD-03)	$834.13
Total Cost of Treatment and Disposal	$3,698.13

Treatment and Disposal of Waste (TD_02-1)

SOLID WASTE TREATMENT AND DISPOSAL

Solid Waste Type (Optional: Enter Name)	0	
Volume in yd3 of solid waste to be treated and disposed of	0.0	yd3
Treatment and disposal costs per yd3	$253.00	per yd3
Cost to Treat and Dispose of Solid Waste	$0.00	

LIQUID WASTE TREATMENT AND DISPOSAL

Liquid Waste Type (Optional: Enter Name)	HBC Wash System Water	
Volume in gallons of liquid waste to be treated and disposed of	200.0	gal
Treatment and disposal costs per gallon	$1.67	per Gallon
Cost to Treat and Dispose of Liquid Waste	$334.00	

DRUMMED WASTE TREATMENT AND DISPOSAL

Drummed Waste Type (Optional: Enter Name)	Ash/debris from HBC; used filters; particulate dust; etc.	
Number of drums to be treated and disposed of	10	Drums
Treatment and disposal costs per drum	$253.00	per Drum
Cost to Treat and Dispose of Drummed Waste	$2,530.00	
TOTAL COST FOR TREATMENT AND DISPOSAL OF WASTE	$2,864.00	

Notes: The "Liquid Waste Treatment and DIspsoal" includes an assumption of 200 gallons of HBC wash water from the HBC wash system activation step of closure.
The "Drummed Waste Treatment and Disposal" includes an assumption of a total of 6 55-gallon drums of ash/debris from the HBC system / filter cakes and 4 55-gallon drums of used baghouse and HEPA filters / particulate dust from the APCS.

Treatment and Disposal of Decon Fluid (TD_03-1)

Volume of decontamination fluid generated from closure activities

Volume of decontamination fluid from Primary Unit	1,042.2	gal
Volume of decontamination fluid generated by steam cleaning or pressure washing (DC-02)	540.0	gal
Volume of decontamination fluid from heavy equipment (DC-04)	0.0	gal
Total Volume of Decontamination Fluid	1,582.2	gal
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per hour	$77.41	per Work Hour
Work rate to pump decontamination fluid to a holding tank	0.0001	Work hr per gal
Number of hours required to pump decontamination fluid to a holding tank	0.15822	Work hrs
Subtotal of labor and equipment costs to pump decontamination fluid to a holding tank	$12.25	
Number of days required to rent a holding tank	1	Days
Holding tank rental fee (10,000 gal tank per day)	$189.00	per Day
Number of tanks required	1	Tanks
Subtotal of tank rental costs	$189.00	
Cost for treatment and disposal	$0.40	per Gallon
Treatment and disposal costs for bulk liquid	$632.88	
TOTAL COST TO TREAT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID	$834.13	

Notes: The "Total volume of decontamination fluid" includes the fluid generated from cleaning the HBC system equipment and the concrete pad.

Transportation of Waste (TR_01-1)

TRANSPORTATION OF WASTE IN DRUMS

Number of drums of waste	10	Drums
Number of truckloads needed to transport waste in drums	1	Truckloads
Type of waste	Hazardous	
Number of miles	198.0	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of 55-gallon drums	$1,116.72	per Truckload
Cost to Transport Waste in Drums	$1,116.72	

TRANSPORTATION OF BULK LIQUID

Gallons of liquid waste	1,582.2	gal
Number of truckloads needed to transport bulk free liquid waste	1	Truckloads
Type of waste	Hazardous	
Number of miles	198.0	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of bulk liquids	$1,116.72	per Truckload
Cost to Transport Bulk Liquid Wastes	$1,116.72	

TRANSPORTATION OF BULK WASTE

Number of waste debris boxes	0	Containers
Number of truckloads needed to transport bulk waste	0	Truckloads
Type of waste	Hazardous	
Number of miles	198.0	Mi
Cost per mile	$5.64	per Mile
Cost to transport one truckload of bulk waste	$1,116.72	per Truckload
Cost to Transport Bulk Waste	$0.00	
TOTAL COST OF TRANSPORTATION OF WASTE	$2,233.44	

Notes: Costs to ship the collected wash water off-site for processing and disposal are included as a worst-case scenario.
Mileage is shown from the facility to Clean Harbors in Coalfax Louisiana.

User Defined Activity (UD_01-2)

NAME OF CLOSURE OR POST-CLOSURE ACTIVITY	Flashing the HBC Burn Pan	
Number of units of work to be performed	1	
Type of unit	Tons	
Appropriate level of PPE	Protection Level B	
Labor, material, and equipment cost per work hour	$77.41	
Work rate to perform one unit of activity	2.0000	Work hrs per Unit
Number of hours required to perform activity	2.0	Work hrs
Additional cost per unit	$0.00	per Unit
Cost to conduct activity	$154.82	

Other cost(s) associated with this activity

Description of other costs	Fuel and Oxidizer
Cost	$1,000.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
TOTAL COST OF USER DEFINED ACTIVITY	$1,154.82

Notes: Costs to flash the HBC burn pan

U.S. BUREAU OF ECONOMIC ANALYSIS

IMPLICIT PRICE DEFLATORS FOR GROSS NATIONAL PRODUCT

Table 1.1.9. Implicit Price Deflators for Gross Domestic Product, Line 27, Gross National Product

Table 1.1.9. Implicit Price Deflators for Gross Domestic Product

[Index numbers, 2017=100]

Last Revised on: April 9, 2026 - Next Release Date April 30, 2026

Line		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Line													
1	**Gross domestic product**	**88.556**	**89.632**	**91.481**	**93.185**	**94.771**	**96.421**	**97.316**	**98.241**	**100.000**	**102.291**	**103.979**	**105.377**
2	**Personal consumption expenditures**	**88.921**	**90.514**	**92.804**	**94.534**	**95.781**	**97.121**	**97.299**	**98.284**	**100.000**	**102.047**	**103.509**	**104.666**
3	Goods	99.084	100.533	104.325	105.620	105.049	104.542	101.350	99.710	100.000	100.811	100.426	99.666
4	Durable goods	116.081	113.946	113.023	111.595	109.551	106.771	104.617	102.337	100.000	98.633	97.686	96.814
5	Nondurable goods	92.000	94.791	100.417	102.831	102.895	103.409	99.735	98.405	100.000	101.935	101.848	101.150
6	Services	84.432	86.077	87.742	89.648	91.659	93.795	95.462	97.629	100.000	102.626	104.965	107.088
7	**Gross private domestic investment**	**95.278**	**93.782**	**94.699**	**95.850**	**96.586**	**98.242**	**98.950**	**98.737**	**100.000**	**101.545**	**102.900**	**104.002**
8	Fixed investment	94.494	93.026	93.991	95.241	96.160	97.923	98.582	98.550	100.000	101.568	102.961	104.245
9	Nonresidential	98.488	96.695	97.756	99.130	99.229	100.170	100.345	99.380	100.000	100.427	101.406	101.970
10	Structures	84.186	83.502	86.244	90.209	91.474	96.213	97.719	97.668	100.000	101.174	105.261	106.852
11	Equipment	106.354	102.543	102.518	103.088	102.857	102.124	101.499	100.206	100.000	99.921	99.982	99.461
12	Intellectual property products	98.877	98.593	99.807	100.292	99.948	100.326	100.626	99.453	100.000	100.582	100.736	101.897
13	Residential	79.930	79.643	80.236	81.006	85.095	89.986	92.454	95.699	100.000	105.640	108.600	112.510
14	Change in private inventories	---	---	---	---	---	---	---	---	---	---	---	---
15	**Net exports of goods and services**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**
16	Exports	93.484	97.378	103.508	104.298	104.457	104.515	99.455	97.457	100.000	103.325	102.829	100.279
17	Goods	98.820	103.284	110.868	111.092	110.344	109.207	101.423	97.467	100.000	103.545	101.850	97.869
18	Services	83.622	86.495	89.957	91.790	93.610	95.880	95.849	97.440	100.000	102.910	104.694	104.985
19	Imports	98.532	104.108	112.041	112.359	110.894	110.067	101.283	97.825	100.000	102.662	100.999	98.891
20	Goods	100.768	107.081	116.289	116.442	114.181	112.660	102.053	97.810	100.000	102.709	100.474	97.766
21	Services	88.378	91.228	94.172	95.134	96.886	98.954	97.966	97.888	100.000	102.464	103.307	104.028
22	**Government consumption expenditures and gross investment**	**86.836**	**89.149**	**91.861**	**93.460**	**95.634**	**97.578**	**97.581**	**97.766**	**100.000**	**103.619**	**105.155**	**107.425**
23	Federal	89.279	91.394	93.900	94.783	95.597	97.215	97.609	98.205	100.000	102.775	104.352	105.423
24	National defense	90.352	92.273	94.979	95.990	96.459	97.850	98.053	98.419	100.000	102.642	104.067	105.374
25	Nondefense	87.637	90.094	92.262	92.927	94.307	96.287	96.968	97.897	100.000	102.968	104.767	105.499
26	State and local	85.201	87.642	90.494	92.579	95.654	97.804	97.567	97.505	100.000	104.126	105.638	108.650
	Addendum:												
27	Gross national product	88.581	89.660	91.514	93.217	94.801	96.452	97.339	98.262	100.000	102.225	103.909	105.306

Line		2021	2022	2023	2024	2025
Line						
1	**Gross domestic product**	**110.186**	**118.023**	**122.390**	**125.428**	**128.979**
2	**Personal consumption expenditures**	**108.972**	**116.100**	**120.511**	**123.666**	**126.917**
3	Goods	104.599	113.639	115.037	114.538	115.331
4	Durable goods	102.182	108.792	107.979	105.751	106.183
5	Nondurable goods	105.830	116.269	118.956	119.493	120.505
6	Services	111.044	117.130	123.091	128.119	132.639
7	**Gross private domestic investment**	**107.661**	**115.757**	**119.059**	**121.001**	**123.204**
8	Fixed investment	108.039	116.507	120.036	122.085	124.358
9	Nonresidential	103.147	109.323	112.793	114.324	116.045
10	Structures	110.427	128.372	135.028	134.698	135.886
11	Equipment	99.908	106.065	110.865	113.173	115.723
12	Intellectual property products	102.609	103.551	104.419	106.144	107.353
13	Residential	125.161	141.779	145.415	149.655	154.264
14	Change in private inventories	---	---	---	---	---
15	**Net exports of goods and services**	**---**	**---**	**---**	**---**	**---**
16	Exports	111.820	122.830	120.949	122.090	124.072
17	Goods	111.702	124.724	119.361	118.920	119.877
18	Services	111.689	118.470	123.618	127.848	131.781
19	Imports	106.030	113.668	111.357	112.211	112.740
20	Goods	105.209	113.066	109.457	109.974	110.022
21	Services	109.566	116.096	119.675	121.990	124.712
22	**Government consumption expenditures and gross investment**	**113.177**	**121.386**	**124.745**	**127.775**	**132.216**
23	Federal	108.918	115.194	120.003	123.896	130.281
24	National defense	109.225	116.078	120.888	125.394	130.880
25	Nondefense	108.518	114.050	118.857	121.953	129.535
26	State and local	115.855	125.305	127.744	130.231	133.449
	Addendum:					
27	Gross national product	110.108	117.939	122.301	125.338	128.888

Appendix VII.C – Post-Closure
Not Applicable
ESD is not a hazardous waste disposal facility and does not have any waste piles, tanks, or surface impoundments.

Appendix VII.D – Post-Closure Cost Estimate
Not Applicable
ESD is not a hazardous waste disposal facility and does not have any waste piles, tanks, or surface impoundments.

VIII. Financial Assurance

Provide all Part B responsive information in Appendix VI. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

A. Financial Assurance Information Requirements for all Applicants (30 TAC Chapter 37, Subchapter P, 305.50(a)(4)(A-E), 335.152(a)(6) and 335.179)

1. Financial Assurance for Closure

An owner or operator must establish financial assurance for the closure of the facility no later than 60 days prior to the first receipt of waste [30 TAC Section 37.31(a)]. Please refer to 30 TAC Chapter 37, Subchapter P, for the financial assurance requirements for closure and provide a signed statement from an authorized signatory per 30 TAC 305.44 regarding how the owner or operator will comply with this provision.

If a financial mechanism has been obtained, provide a copy of the mechanism.

For applications involving a permit transfer, the new owner or operator must provide a financial assurance mechanism (in original form) satisfactory to the TCEQ executive director. Prior to the executive director issuing the permit modification transferring the permit, the new owner or operator must provide proof of financial assurance in compliance with 30 TAC Section 305.64 (g) and Chapter 37, Subchapter P.

ESD will establish financial assurance for the closure of the facility no later than 60 days prior to the first receipt of RCRA hazardous waste. A signed statement regarding how ESD will comply with this provision is provided in Appendix VIII.

2. Financial Assurance for Post-Closure Care (applicable to disposal facilities and contingent post-closure care facilities only)

An owner or operator subject to post-closure monitoring or maintenance requirements must establish financial assurance for the post-closure care of the facility no later than 60 days prior to the first receipt of waste [30 TAC Section 37.31(a)]. Please refer to 30 TAC Chapter 37, Subchapter P for the financial assurance requirements for post-closure and provide a signed statement from an authorized signatory per 30 TAC 305.44 regarding how the owner or operator will comply with this provision.

If a financial mechanism has been obtained, provide a copy of the mechanism.

For applications involving a permit transfer, the new owner or operator must provide a financial assurance mechanism (in original form) satisfactory to the TCEQ executive director. Prior to the executive director issuing the permit modification transferring the permit, the new owner or operator must provide proof of financial assurance in compliance with 30 TAC Section 305.64 (g) and Chapter 37, Subchapter P.

Not Applicable.

3. Financial Assurance for Corrective Action

An owner or operator must establish financial assurance for corrective action of the facility no later than 60 days after the permit or order requiring the corrective action financial assurance is signed by the executive director or commission [30 TAC Section 37.31(b)]. Please refer to 30 TAC Chapter 37, Subchapter P, for the financial assurance requirements for closure and provide a signed statement from an authorized signatory per 30 TAC 305.44 regarding how the owner or operator will comply with this provision and indicate below the type of financial assurance mechanism to cover corrective action for the

facility.

If a financial mechanism has been obtained, provide a copy of the mechanism.

For applications involving permit transfers, the new owner or operator must provide a financial assurance mechanism (in original form) satisfactory to the TCEQ executive director. Prior to the executive director issuing the permit modification transferring the permit, the new owner or operator must provide proof of financial assurance in compliance with 30 TAC Section 305.64 (g) and Chapter 37, Subchapter P.

Not Applicable.

4. Liability Requirements (not required for post-closure care)

All owners or operators must establish financial assurance for third party sudden liability coverage of the facility no later than 60 days prior to the first receipt of waste [30 TAC Section 37.31(a)]. Owners or operators of disposal facilities must establish financial assurance for third party sudden and nonsudden liability coverage of the facility no later than 60 days prior to the first receipt of hazardous waste. Please refer to 30 TAC Chapter 37, Subchapter P, for the financial assurance requirements for liability coverage, and provide a signed statement from an authorized signatory per 30 TAC 305.44 regarding how the owner or operator will comply with this provision.

If a financial mechanism has been obtained, provide a copy of the mechanism.

For applications involving a permit transfer, the new owner or operator must provide a financial assurance mechanism (in original form) satisfactory to the TCEQ executive director. Prior to the executive director issuing the permit modification transferring the permit, the new owner or operator must provide proof of financial assurance in compliance with 30 TAC Section 305.64 (g) and Chapter 37, Subchapter P.

Nonsudden liability coverage is not required because the facility will not operate any disposal facilities.

ESD will establish financial assurance for third party sudden liability coverage of the facility no later than 60 days prior to the first receipt of RCRA hazardous waste. The financial assurance will be in the amount of $1 million per occurrence with an annual aggregate of at least $2 million, exclusive of legal defense costs. A signed statement regarding how ESD will comply with this provision is provided in Appendix VIII.

B. Applicant Financial Disclosure Statements for a new permit, permit amendment, or permit modification, or permit renewal (30 TAC 305.50(a)(4))

Refer to the Supplemental Technical Information Guidance for Applicants Subject to Financial Capability Requirements, included in Section VIII.B., and the requirements listed below as you complete this section.

1. Provide information required in 30 TAC 305.50(a)(4), as applicable to the application request.

   Financial information demonstrating that ESD has sufficient financial resources to operate and close the facility in a safe manner in compliance with the permit and all applicable rules and information about how ESD intends to obtain financing for construction of the facility is included in Appendix VIII.

2. Complete Table VIII.B. if requesting capacity expansion or new construction.

   Table VIII.B is included.

3. For new commercial hazardous waste management facility applications, a written statement signed by an authorized signatory per 30 TAC 305.44 explaining how the applicant intends to provide emergency response financial assurance per 30 TAC 305.50(a)(12)(C) or (D).

   A written statement signed by an authorized signatory per 30 TAC 305.44 explaining how the applicant intends to provide emergency response financial assurance per 30 TAC 305.50(a)(12)(D)(i) is included in Appendix VIII.

4. For renewal applications with no capacity expansion, please complete and submit the attached Financial Disclosure Letter.

   Not Applicable.

Information for Applicants Subject to Financial Capability Requirements

Certain applications involving Hazardous Waste facilities are subject to review of the applicant's financial ability to construct, operate, and/or close the facility, perform post-closure care and corrective action at the facility in accordance with State law as specified in

Section 361.085 of the Texas Health and Safety Code. TCEQ refers to these reviews as financial capability reviews. This document summarizes and clarifies the information required in an application to meet the TCEQ requirements of 30 Texas Administrative Code (TAC) 305.50.

Information requirements vary depending on the type of financial information available to applicants, primarily whether audited financial statements are available as well as the type of application submitted. For each scenario described below, financial information must be provided for the specific applicant.

ESD has included the required financial capability information listed below for Item I.C – "Entities without audited financial statements or entities choosing not to provide the information listed above." The required financial capability information is provided in Appendix VIII.

I. New Facilities, Facility Expansions and Permit Transfers

A. Publicly traded Entities

1. Securities and Exchange Commission (SEC) Form 10-Ks

   This portion of the requirement calls for the two most recent 10-K reports filed.

2. SEC Form 10-Q

   This portion of the requirement calls for a copy of the most recent quarterly report.

3. Explanation statement

   This portion of the requirement calls for a statement signed by an authorized signatory [as described in 30 TAC 305.44(a)] explaining in detail how the applicant demonstrates sufficient financial resources to construct, safely operate, properly close, perform post-closure care, perform corrective action and provide adequate liability coverage for the facility. This statement must also address how the closure, post-closure, corrective action, and liability coverage financial assurance requirements of Chapter 37, Subchapter P will be met. (ie. which financial assurance mechanism is or will be used).

4. Construction capital cost estimates

   This portion of the requirement calls for estimates of capital costs for expansion and/or initial construction if the application encompasses facility expansion, capacity expansion, or new construction.

B. Privately held entities with audited financial statements

1. Audited financial statements

   This portion of the requirement calls for complete copies of the audited financial statements for each of the most recent two fiscal years. If an audit has not been completed for one of the previous two years, a complete copy of the fiscal year end financial statement and federal tax return may be substituted in lieu of the audit not performed. The tax return must be certified by original signature of an authorized signatory as being a "true and correct copy of the return filed with the Internal Revenue Service." Financial statements must be prepared consistent with generally accepted accounting principles and include a balance sheet, income statement, cash flow statement, notes to the financial statement, and an accountant's opinion letter.

2. Quarterly financial statement

   This portion of the requirement calls for a complete copy of the most current quarterly financial statement prepared consistent with generally accepted accounting principles. Internally prepared statements are

satisfactory.

3. Supplementary information statement

   This portion of the requirement calls for a written statement detailing the information that would normally be found in SEC's Form 10-K including descriptions of the business and its operations; identification of any affiliated relationships; credit agreements and terms; any legal proceedings involving the applicant; contingent liabilities; and significant accounting policies.

4. Construction capital cost estimates

   This portion of the requirement calls for estimates of capital costs for expansion and/or initial construction if the application encompasses facility expansion, capacity expansion, or new construction.

5. Explanation statement

   This portion of the requirement calls for a statement signed by an authorized signatory [as described in 30 TAC 305.44(a)] explaining in detail how the applicant demonstrates sufficient financial resources to construct, safely operate, properly close, perform post-closure care, perform corrective action and provide adequate liability coverage for the facility. This statement must also address how the closure, post-closure, corrective action, and liability coverage financial assurance requirements of Chapter 37, Subchapter P will be met (ie. which financial assurance mechanism is or will be used).

C. Entities without audited financial statements or entities choosing not to provide the information listed above

1. Financial Plan

   This portion of the requirement calls for a financial plan (including balance sheets listing assets, liabilities and capital accounts) sufficiently detailed to clearly demonstrate that the applicant will be in a position to readily secure financing for construction, operation, and closure, post-closure, and corrective action if the permit is issued. At least 3 balance sheets should be included as of:
   a) approximately the date of the permit application, b) 12 months after any construction is completed (or assumption of operational control for a permit transfer), and c) 24 months after any construction is completed (or assumption of operational control for a permit transfer).

2. Letters of opinion

   The submitted financial plan must be accompanied by original letters of opinion from two financial experts, not otherwise employed by the applicant, who have the demonstrated ability to either finance the facility or place the required financing. If the permit action sought involves construction of a new facility or expansion of an existing facility, the opinion letters must certify that financing is obtainable within 180 days of permit approval and include the time schedule contingent upon permit finality for securing the financing as well as certify the financial plan is reasonable. Even if the application does not involve a facility or capacity expansion, the opinion letters must certify that the financial plan is reasonable. Only one opinion letter from a financial

expert, not otherwise employed by the applicant, is required if the letter renders a firm commitment to provide all the necessary financing.

Letters of opinion are usually issued by investment or commercial bankers but there could be additional sources. Applicants are encouraged to verify the adequacy of the credentials of their chosen financial expert with TCEQ's financial assurance unit prior to a formal engagement. Financial experts should describe their qualifications and disclose their independence from the applicant and/or any entity or person affiliated with the applicant.

3. Operating and cash flow statement

   This portion of the requirement calls for a written detail of the annual operating costs of the facility and a projected cash flow statement including the period of construction and first two years of operation. The cash flow statement must demonstrate the financial resources to meet operating costs, debt service, and provide financial assurance for closure, post-closure care, and liability coverage requirements. A list of the assumptions made to forecast cash flow must also be provided.

4. Explanation statement

   This portion of the requirement calls for a statement addressing how the closure, post-closure, corrective action, and liability coverage financial assurance requirements of Chapter 37, Subchapter P will be met (ie. which financial assurance mechanism is or will be used).

5. Construction capital cost estimates

   This portion of the requirement calls for estimates of capital costs for expansion and/or initial construction if the application encompasses facility expansion, capacity expansion, or new construction.

D. Entities with a resolution from a governing body approving or agreeing to approve the issuance of bonds to satisfy financial assurance requirements (e.g. a city or county)

1. Explanation statement

   This portion of the requirement calls for a statement signed by an authorized signatory [as described in 30 TAC30 305.44(a)] explaining in detail how the applicant demonstrates sufficient financial resources to construct, safely operate, properly close, perform post-closure, perform corrective action and provide adequate liability coverage for the facility. This statement must also address how the closure, post-closure, corrective action, and liability coverage

   financial assurance requirements of Chapter 37, Subchapter P will be met (ie. which financial assurance mechanism is or will be used).

2. Certified copy of the resolution from the governing body.

3. Certification by the governing body of passage of the resolution.

II. Permit Renewals

Complete the **Financial Disclosure Letter** letter with applicable information inserted into the parentheses. *Note that additional information must be provided if requested by TCEQ.*

Not Applicable. This application is for a new permit.

Section VIII – Financial Assurance

Appendix VIII – Financial Assurance

This appendix includes information regarding the financial assurance requirements. The information included in this appendix is shown in the table below.

Section VIII.A – Financial Assurance Information Requirements for All Applicants

Type of Financial Assurance	Information Included
Financial Assurance for Closure	Signed Statement: Financial Assurance for Closure
Financial Assurance for Post-Closure Care	Not Applicable
Financial Assurance for Corrective Action	Not Applicable
Liability Requirements	Signed Statement: Liability Requirements

Section VIII.B – Applicant Financial Disclosure Statements for a New Permit

Requirement	Information Included
Provide information required in 30 TAC 305.50(a)(4)	Financial Capability Information
Complete Table VIII.B	Table VIII.B
A written statement signed by an authorized signatory per 30 TAC 305.44 explaining how the applicant intends to provide emergency response financial assurance per 30 TAC 305.50(a)(12)(C) or (D)	Signed Written Statement: Financial Assurance for Emergency Response

FINANCIAL ASSURANCE FOR CLOSURE

Signed Statement: Financial Assurance for Closure

ESD intends to establish financial assurance for the closure of the facility no later than 60 days prior to the first receipt of RCRA hazardous waste. 60 days prior to the first receipt of RCRA hazardous waste, one of the required mechanisms specified in Texas Administrative Code, Title 30, Part 1, Chapter 37, Subchapter C will be in place. The chosen mechanism will be decided at a later date. The financial assurance for closure coverage amount is based on the Closure Cost Estimate submitted with this permit application in Appendix VII.

Signature of Responsible Official

12/3/2024
Date

Michael Wentz
Printed Name

President, EnviroSafe Demil, LLC
Title

LIABILITY REQUIREMENTS

Signed Statement: Liability Requirements

ESD intends to establish financial assurance for third party sudden liability coverage of the facility no later than 60 days prior to the first receipt of RCRA hazardous waste. The financial assurance will be in the amount of $1 million per occurrence with an annual aggregate of at least $2 million, exclusive of legal defense costs. 60 days prior to the first receipt of RCRA hazardous waste, one of the required mechanisms specified in Texas Administrative Code, Title 30, Part 1, Chapter 37, Subchapter F will be in place. The chosen mechanism will be decided at a later date.

Signature of Responsible Official

12/3/2024
Date

Michael Wentz
Printed Name

President, EnviroSafe Demil, LLC
Title

FINANCIAL CAPABILITY INFORMATION

EnviroSafe Demil LLC
401 N. Montague St
Hooks, TX 75561
430-200-2292

Financial Capability

Executive Summary

EnviroSafe Demil LLC (ESD) is the *clean alternative to open burning* that solves the problem of disposing of explosives, energetic materials, military munitions, and almost any combustible material in an environmentally-friendly manner. ESD is located at a former ~175 acre U.S. Army ammunition manufacturing facility located in Hooks, TX that was once a RCRA site and has since been through closure and is now being used for similar commercial/industrial purposes. ESD is owned and managed by a team that is highly experienced in demilitarization, explosives handling, safety, security, government contracts, and business leadership.

Between 2021 and 2022, ESD was awarded multiple contracts from the U.S. Government as well as the Canadian Military for the demilitarization of munition items up to rocket motors totaling **~$363MM** in contract values. ESD is also in the strongest position for the award of a further **~$100MM+** from both the US Government and the Canadian Military for additional demilitarization of conventional ammunition demilitarization. ESD is also situated perfectly to perform commercial workload as the process of open burning is sun downed across the country, which will add significant additional revenues to ESD in the future.

ESD is on-track for rapid explosive growth and is poised to be the future of the industry.

ESD's Solution

ESD's contained demilitarization systems eliminate the need for open burning by employing state-of-the-art pollution abatement systems (PAS) that reduce and eliminate polluting and harmful toxins. ESD is deploying two state-of-the-art systems for different types of needs. The first system is ESD's non-RCRA system called the Energetic Activation Unit (EAU) which is a revolutionary, fully transportable demilitarization system that can render a wide range of munitions inert for safe recycling. The EAU was delivered and installed to ESD in early 2023 and became fully operational in June 2023 with U.S. Army approval for full-rate demilitarization operations and prior TCEQ determination approval. Based on current projections, EAU operations account for approximately $10MM in projected annual ESD revenues.

The second state-of-the-art demilitarization system is our Hybrid Burn Chamber (HBC) which is a large, contained burn chamber capable of clean demilitarization of a wide variety of munitions up to and including large rocket motors. The HBC is associated with approximately ~$30MM-$40MM in projected annual ESD revenues.

ESD is deploying both systems at our facility in Hooks, TX. ESD's flagship facility sets the U.S. standard for clean demilitarization and related technologies. ESD has been awarded multiple contracts from the U.S. Government for demilitarizing munitions in these systems.

Assessing the Market for the Financial Plan

The demilitarization, open burning, and combustible disposables market is worth ~$6B annually. The U.S. Army budget is projected to be worth an additional $1-2B over the next 5 years with an additional $500M-$1B in sector growth, resulting in a combined CAGR of ~5.4%. The current ESD annual revenue projections sit at approximately $10MM annually and will grow to ~$40MM with the install of the Hybrid Burn Chamber. Even more growth is possible through other opportunities, commercial growth, and international expansion. Primary customers for ESD includes the U.S. Army, local, state, and federal agencies, international companies and foreign governments, and companies involved in munitions manufacturing and hazardous waste disposal. By providing two options (transportable EAU and fixed-location HBC), ESD is strategically positioned to handle all customer needs.

Financial Snapshot

- **Awarded ~$363MM** in USG and Canadian Military demilitarization contracts
- **Assets** in excess of **~$8MM** with solid and very healthy balance sheet fundamentals
- **~$10MM** projections based on only the EAU and other supporting revenue streams
- **~$30MM-$40MM in additional annual** projections based on the HBC and rocket motor demilitarization
- **Gross margins in excess of ~30-40%** projected and verified by third-party feasibility consultant to ESD's lender
- **Forward Looking Statement:** ESD is capable of unlimited growth potential with valuation poised to reach into the hundreds of millions of dollars

EnviroSafe Demil LLC
401 N. Montague St
Hooks, TX 75561
430-200-2292

Financial Capability Detailed Information

1. **Financial Plan –** Included below is an outline of ESD's current and projected future financial capabilities. Projections are based on current revenue generated through ongoing company operations. Future projections are based on revenue from currently awarded contracts where ESD has guaranteed contract value based on performance of the RCRA permitted equipment (primarily ESD's Hybrid Burn Chamber for rocket motor demilitarization). Capital for construction is a blend of cashflow and debt service from government secured loans which ESD has secured and is in the process of closing via USDA B&I Loan from West Town Bank.
    a. **Current Balance Sheet –** Combined balance sheet of the assets of EnviroSafe Demil LLC and F Line Holdings LLC (holding company for the property assets of EnviroSafe Demil LLC)
        i. **Explanation:** ESD current balance sheet reflects a very healthy company that is currently holding in excess of ~$8M in assets, only ~$4M in liabilities, and ~$2M in accounts.
    b. **12-Months Post-Construction Balance Sheet**
        i. **Explanation:** ESD projects its 12-month post-construction balance sheet to increase the company holdings substantially up to ~$47M in assets, ~$29M in liabilities, and ~$15M in accounts. This substantial increase over 12-months is a result of ESD operating its rocket motor demilitarization chamber at a full-rate for the currently awarded contracts and realizing awarded values.
    c. **24-Months Post-Construction Balance Sheet**
        i. **Explanation:** ESD projects its 24-month post-construction balance sheet to increase the company holdings even more substantially up to ~$63M in assets, ~$14M in liabilities, and ~$35M in accounts. This substantial increase over 24-months is a result of ESD operating its rocket motor demilitarization chamber at a full-rate for the currently awarded contracts and realizing awarded values. The decrease in liabilities is a direct result of ESD using substantial revenues to pay down existing loans.

EnviroSafe Demil LLC
401 N. Montague St
Hooks, TX 75561
430-200-2292

a. Current Balance Sheet

EnviroSafe Demil LLC					Oct 4, 23
ASSETS					
	Current Assets				
		Checking/Savings			
			CNB Checking		19,330.21
			CNB Money Market		856,142.32
			ESD Checking		822,413.03
		Total Checking/Savings			1,697,885.56
		Accounts Receivable			
			Accounts Receivable		325,487.14
		Total Accounts Receivable			325,487.14
		Other Current Assets			
			*Inventory Asset		2,966.92
		Total Other Current Assets			2,966.92
	Total Current Assets				2,026,339.62
	Fixed Assets				
		Equipment			
			Accumulated Depreciation		-137,235.44
			Air Compressor		2,493.75
			Equipment Engineering/Design		557,925.74
			Forklift		56,420.28
			Infrastructure		1,273,321.61
			Equipment - Other		4,264,070.56
		Total Equipment			6,016,996.50
		Land			58,294.80
		Small Decon Burn Chamber			2,570.94
		Startup Costs			
			Accumulated Amortization		-29,179.50
			Inventory Control Software		28,277.45
			Land Permitting		176,127.89
			Loan Fees		127,300.00
			Texas Land Permitting		248,785.24
			Startup Costs - Other		553.55
		Total Startup Costs			551,864.63
	Total Fixed Assets				6,629,726.87
	Other Assets				
		Construction Costs			8,297.72
	Total Other Assets				8,297.72
TOTAL ASSETS					8,664,364.21
LIABILITIES & EQUITY					
	Liabilities				
		Current Liabilities			
			Accounts Payable		
				Accounts Payable	39,802.34
			Total Accounts Payable		39,802.34
			Other Current Liabilities		
				West Town B&T Loan	4,177,732.42
			Total Other Current Liabilities		4,177,732.42
		Total Current Liabilities			4,217,534.76
		Long Term Liabilities			
			MHW Ventures LLC Loan		10,000.00
			Michael Fleck Loan		30,000.00
			N/P - Navitas Credit (Fishbowl)		20,327.65
			N/P - Star Capital Group		37,036.47
			TKO Unlimited LLC Loan		50,100.00
		Total Long Term Liabilities			147,464.12
	Total Liabilities				4,364,998.88
	Equity				
		Alex Bernhard			91,132.87
		Anderson Fam Revocable Trust			123,029.38
		B&J Wentz Trust Owners Equity			42,454.25
		Dan & Brenda Larkin Fam Trust			318,965.04
		Dick Campagni			91,132.87
		FiveK LLC Owner's Equity			56,958.04
		GW Larkin Living Trust			318,965.04
		Jeff Campagni			91,132.87
		Jorge Peralta			91,132.87
		Knotable LLC Owners Equity			60,648.93
		Mark Turner			455,664.35
		Michael Fleck Owners Equity			36,389.35
		Northern Nevada Land LLC			596,920.30
		NV ESD, LLC			524,014.00
		Opening Balance Equity			100.00
		Opening Balance Equity			-100.00
		Retained Earnings			270,247.16
		Sam & Tara Landis Living Trust			223,275.53
		Typhon One Demil LLC Owner's Eq			56,958.04
		V & K Sciarrotta Fam Trust			132,142.66
		William Miles			273,398.61
		Net Income			444,803.17
	Total Equity				4,299,365.33
TOTAL LIABILITIES & EQUITY					8,664,364.21

F Line Holdings LLC			Oct 4, 23
ASSETS			
	Fixed Assets		
		F Line Property	348,750.00
	Total Fixed Assets		348,750.00
TOTAL ASSETS			348,750.00
LIABILITIES & EQUITY			
	Equity		
		Alex Bernhard AV Trust	8,867.13
		Anderson Family Revocable Trust	11,970.62
		B&J Wentz Family Trust	4,130.75
		D&B Larkin Trust	31,034.96
		Dick Campagni	8,867.13
		FiveK LLC	5,541.96
		GL Revocable Living Trust	31,034.96
		Jeff Campagni	8,867.13
		Jorge Peralta	8,867.13
		Knotable LLC	5,901.07
		Mark Turner	44,335.65
		Michael Fleck	3,540.65
		Nevada ESD LLC	50,986.00
		Northern Nevada Land LLC	58,079.70
		Sam and Tara Landis Trust	21,724.47
		Typhon One Demil LLC	5,541.96
		V&K Sciarrotta Trust	12,857.34
		W&A Miles Family Trust	26,601.39
	Total Equity		348,750.00
TOTAL LIABILITIES & EQUITY			348,750.00

EnviroSafe Demil LLC
401 N. Montague St
Hooks, TX 75561
430-200-2292

b. 12 Months Post-Construction Balance Sheet

EnviroSafe Demil LLC					Oct 4, 24
ASSETS					
	Current Assets				
		Checking/Savings			
			CNB Checking		1,019,330.21
			CNB Money Market		14,968,826.57
		Total Checking/Savings			**15,988,156.78**
		Accounts Receivable			
			Accounts Receivable		1,900,000.00
		Total Accounts Receivable			1,900,000.00
		Other Current Assets			
			*Inventory Asset		2,966.92
		Total Other Current Assets			2,966.92
	Total Current Assets				17,891,123.70
	Fixed Assets				
		Equipment			
			Accumulated Depreciation		-548,941.76
			Air Compressor		2,493.75
			Equipment Engineering/Design		2,550,314.74
			Forklift		56,420.28
			Infrastructure		3,539,523.61
			Equipment - Other		13,815,156.56
			HBC Equipment		8,456,981.00
		Total Equipment			27,871,948.18
		Land			58,294.80
		Small Decon Burn Chamber			2,570.94
		Startup Costs			
			Accumulated Amortization		-116,718.00
			Inventory Control Software		28,277.45
			Land Permitting		176,127.89
			Loan Fees		127,300.00
			Texas Land Permitting		660,103.24
			Startup Costs - Other		300,553.55
		Total Startup Costs			1,175,644.13
	Total Fixed Assets				29,108,458.05
	Other Assets				
		Construction Costs			8,297.72
	Total Other Assets				8,297.72
TOTAL ASSETS					**47,007,879.47**
LIABILITIES & EQUITY					
	Liabilities				
		Current Liabilities			
			Accounts Payable		
				Accounts Payable	0.00
			Total Accounts Payable		0.00
			Other Current Liabilities		
				West Town B&T Loan	4,000,000.00
				USDA Loan	19,400,000.00
			Total Other Current Liabilities		23,400,000.00
		Total Current Liabilities			23,400,000.00
		Long Term Liabilities			
			MHW Ventures LLC Loan		0.00
			Michael Fleck Loan		0.00
			N/P - Navitas Credit (Fishbowl)		0.00
			N/P - Star Capital Group		0.00
			TKO Unlimited LLC Loan		0.00
		Total Long Term Liabilities			0.00
	Total Liabilities				23,400,000.00
	Equity				
		Alex Bernhard			65,516.72
		Anderson Fam Revocable Trust			88,447.57
		B&J Wentz Trust Owners Equity			30,520.96
		Dan & Brenda Larkin Fam Trust			229,308.50
		Dick Campagni			65,516.72
		FiveK LLC Owner's Equity			40,947.95
		GW Larkin Living Trust			229,308.50
		Jeff Campagni			65,516.72
		Jorge Peralta			65,516.72
		Knotable LLC Owners Equity			43,601.37
		Mark Turner			327,583.58
		Michael Fleck Owners Equity			26,160.82
		Northern Nevada Land LLC			429,134.49
		NV ESD, LLC			376,721.11
		Sam & Tara Landis Living Trust			160,515.95
		Typhon One Demil LLC Owner's Eq			40,947.95
		V & K Sciarrotta Fam Trust			94,999.24
		William Miles			196,550.15
		Opening Balance Equity			100.00
		Opening Balance Equity			-100.00
		Retained Earnings			3,000,000.00
		Net Income			15,297,791.00
	Total Equity				20,874,606.02
TOTAL LIABILITIES & EQUITY					**44,274,606.02**

F Line Holdings LLC			Oct 4, 24
ASSETS			
	Fixed Assets		
		F Line Property	1,356,269.78
	Total Fixed Assets		1,356,269.78
TOTAL ASSETS			**1,356,269.78**
LIABILITIES & EQUITY			
	Equity		
		Alex Bernhard AV Trust	34,483.28
		Anderson Family Revocable Trust	46,552.43
		B&J Wentz Family Trust	16,064.04
		D&B Larkin Trust	120,691.50
		Dick Campagni	34,483.28
		FiveK LLC	21,552.05
		GL Revocable Living Trust	120,691.50
		Jeff Campagni	34,483.28
		Jorge Peralta	34,483.28
		Knotable LLC	22,968.43
		Mark Turner	172,416.42
		Michael Fleck	13,769.18
		Nevada ESD LLC	198,278.89
		Northern Nevada Land LLC	225,865.51
		Sam and Tara Landis Trust	84,484.05
		Typhon One Demil LLC	21,552.05
		V&K Sciarrotta Trust	50,000.76
		W&A Miles Family Trust	103,449.85
	Total Equity		1,356,269.78
TOTAL LIABILITIES & EQUITY			**1,356,269.78**

EnviroSafe Demil LLC
401 N. Montague St
Hooks, TX 75561
430-200-2292

c. 24 Months Post-Construction Balance Sheet

EnviroSafe Demil LLC					Oct 4, 24
ASSETS					
	Current Assets				
		Checking/Savings			
			CNB Checking		1,019,330.21
			CNB Money Market		32,078,241.57
		Total Checking/Savings			33,097,571.78
		Accounts Receivable			
			Accounts Receivable		1,900,000.00
		Total Accounts Receivable			1,900,000.00
		Other Current Assets			
			*Inventory Asset		2,966.92
		Total Other Current Assets			2,966.92
	Total Current Assets				35,000,538.70
	Fixed Assets				
		Equipment			
			Accumulated Depreciation		-1,097,883.52
			Air Compressor		2,493.75
			Equipment Engineering/Design		2,550,314.74
			Forklift		56,420.28
			Infrastructure		3,539,523.61
			Equipment - Other		13,815,156.56
			HBC Equipment		8,456,981.00
		Total Equipment			27,323,006.42
		Land			58,294.80
		Small Decon Burn Chamber			2,570.94
		Startup Costs			
			Accumulated Amortization		-233,436.00
			Inventory Control Software		28,277.45
			Land Permitting		176,127.89
			Loan Fees		127,300.00
			Texas Land Permitting		660,103.24
			Startup Costs - Other		300,553.55
		Total Startup Costs			1,058,926.13
	Total Fixed Assets				28,442,798.29
	Other Assets				
		Construction Costs			8,297.72
	Total Other Assets				8,297.72
TOTAL ASSETS					63,451,634.71
LIABILITIES & EQUITY					
	Liabilities				
		Current Liabilities			
			Accounts Payable		
				Accounts Payable	0.00
			Total Accounts Payable		0.00
			Other Current Liabilities		
				West Town B&T Loan	0.00
				USDA Loan	14,000,000.00
			Total Other Current Liabilities		14,000,000.00
		Total Current Liabilities			14,000,000.00
		Long Term Liabilities			
			MHW Ventures LLC Loan		0.00
			Michael Fleck Loan		0.00
			N/P - Navitas Credit (Fishbowl)		0.00
			N/P - Star Capital Group		0.00
			TKO Unlimited LLC Loan		0.00
		Total Long Term Liabilities			0.00
	Total Liabilities				14,000,000.00
	Equity				
		Alex Bernhard			65,516.72
		Anderson Fam Revocable Trust			88,447.57
		B&J Wentz Trust Owners Equity			30,520.96
		Dan & Brenda Larkin Fam Trust			229,308.50
		Dick Campagni			65,516.72
		FiveK LLC Owner's Equity			40,947.95
		GW Larkin Living Trust			229,308.50
		Jeff Campagni			65,516.72
		Jorge Peralta			65,516.72
		Knotable LLC Owners Equity			43,601.37
		Mark Turner			327,583.58
		Michael Fleck Owners Equity			26,160.82
		Northern Nevada Land LLC			429,134.49
		NV ESD, LLC			376,721.11
		Sam & Tara Landis Living Trust			160,515.95
		Typhon One Demil LLC Owner's Eq			40,947.95
		V & K Sciarrotta Fam Trust			94,999.24
		William Miles			196,550.15
		Opening Balance Equity			100.00
		Opening Balance Equity			-100.00
		Retained Earnings			3,000,000.00
		Net Income			33,361,020.00
	Total Equity				38,937,835.02
TOTAL LIABILITIES & EQUITY					52,937,835.02

F Line Holdings LLC			Oct 4, 24
ASSETS			
	Fixed Assets		
		F Line Property	1,356,269.78
	Total Fixed Assets		1,356,269.78
TOTAL ASSETS			1,356,269.78
LIABILITIES & EQUITY			
	Equity		
		Alex Bernhard AV Trust	34,483.28
		Anderson Family Revocable Trust	46,552.43
		B&J Wentz Family Trust	16,064.04
		D&B Larkin Trust	120,691.50
		Dick Campagni	34,483.28
		FiveK LLC	21,552.05
		GL Revocable Living Trust	120,691.50
		Jeff Campagni	34,483.28
		Jorge Peralta	34,483.28
		Knotable LLC	22,968.43
		Mark Turner	172,416.42
		Michael Fleck	13,769.18
		Nevada ESD LLC	198,278.89
		Northern Nevada Land LLC	225,865.51
		Sam and Tara Landis Trust	84,484.05
		Typhon One Demil LLC	21,552.05
		V&K Sciarrotta Trust	50,000.76
		W&A Miles Family Trust	103,449.85
	Total Equity		1,356,269.78
TOTAL LIABILITIES & EQUITY			1,356,269.78

2. **Letters of Opinion –** ESD has obtained a Letter of Opinion from ESD's lender (West Town Bank) via the 3rd-Party responsible for ESD's USDA Feasibility Study. This study was commissioned by the bank and provided to the USDA to justify ESD's loan for this project. The Feasibility Study was extremely comprehensive and reviewed all aspects of ESD's business. The result was positive with the following conclusion: "*Based on the resulting findings, ESD met the requirements for financial feasibility."* The author of the study was Mike Levine, Principal Financial Consultant of the firm. ESD also has an executed commitment letter/term sheet for the loan with West Town Bank that can additionally be provided, if required.

3. **Operating and cash flow statement**
   EnviroSafe Demil LLC conducted a cashflow analysis based on historic cashflow numbers and future cashflow predictions based on current contracts with the US Government and Canadian Government for demilitarization of munitions. ESD has signed contracts in the following amounts:

   USG Demilitarization:
   - ~$25M - 20mm, Fuzes, and Flares
   - ~$315M - Rocket Motors (sole source contract and RCRA required)
   - ~$1M - US Dept. of Justice

   Canadian Demilitarization:
   - ~$20M - CRV-7 Rocket motors

   Based on these contracts and several long-term commercial contracts that ESD is working on securing, a conservative estimate of $30-40M annual revenue is not only achievable but expected. ESD secured debt financing via ~$4M SBA loan for the initial build out and completed phase 1 of facility construction in mid-2023. Phase 2 will begin with further financing by the USDA shown in the cashflow worksheet below. Based on previous operating figures ESD is operating on an average 40-50% gross margin. Cash will be held in reserve for unexpected operating costs, closure costs, and liabilities.

   Assumptions in the cashflow statement:

- ESD will continue operating current contractual workload for the contractual timeline of 5 years
- After building the next phase of equipment ESD will begin earning revenues of $1.5-2.5MM monthly from contracted workload
- Current and future quoted liability rates will be honored by ESD's insurance providers

EnviroSafe Demil LLC
401 N. Montague St
Hooks, TX 75561
430-200-2292

Current Operating and cash flow statement

					Oct 1 2024
		OPERATING ACTIVITIES			
			Net Income		15,297,791.00
			Adjustments to reconcile Net Income		
			to net cash provided by operations:		
				Accounts Receivable	-1,900,729.00
				*Inventory Asset	-2,966.92
				Uncategorized Asset	0.02
				Accounts Payable	453,591.00
				USDA Loan	19,400,000.00
		Net cash provided by Operating Activities			33,247,686.10
		INVESTING ACTIVITIES			
			Equipment		-2,855,273.72
			Burn Chamber Process and Control Equip		-8,456,981.00
			Auxiliary Equipment		-9,436,340.00
			Equipment:Accumulated Depreciation		89,507.37
			Equipment:Air Compressor		-2,493.75
			Equipment:Equipment Engineering/Design		-2,027,925.00
			Equipment:Forklift		-56,420.28
			Equipment:Infrastructure		-1,178,796.54
			Startup Costs:Accumulated Amortization		10,721.67
			Startup Costs:Inventory Control Software		-28,277.45
			Startup Costs:Land Permitting		-3,570.00
			Startup Costs:Texas Land Permitting		-157,342.74
			Construction Costs		-419,615.72
		Net cash provided by Investing Activities			-24,522,807.16
		FINANCING ACTIVITIES			
			Alex Bernhard		91,132.87
			Anderson Fam Revocable Trust		123,029.38
			B&J Wentz Trust Owners Equity		-4,130.75
			Dan & Brenda Larkin Fam Trust		318,965.04
			Dick Campagni		91,132.87
			FiveK LLC Owner's Equity		-5,541.96
			GW Larkin Living Trust		318,965.04
			Jeff Campagni		91,132.87
			Jorge Peralta		91,132.87
			Knotable LLC Owners Equity		-5,901.07
			Mark Turner		455,664.35
			Michael Fleck Owners Equity		-3,540.65
			Northern Nevada Land LLC		-58,079.70
			NV ESD, LLC		524,014.00
			Sam & Tara Landis Living Trust		223,275.53
			Typhon One Demil LLC Owner's Eq		-5,541.96
			V & K Sciarrotta Fam Trust		132,142.66
			William Miles		273,398.61
		Net cash provided by Financing Activities			2,651,250.00
	Net cash increase for period				11,376,128.94
	Cash at beginning of period				221,213.31
Cash at end of period					**11,597,342.25**

EnviroSafe Demil LLC
401 N. Montague St
Hooks, TX 75561
430-200-2292

12 Months Post-Construction Operating and cash flow statement

			Oct 1 2025
OPERATING ACTIVITIES			
	Net Income		15,297,791.00
	Adjustments to reconcile Net Income		
	to net cash provided by operations:		
		Accounts Receivable	-1,900,729.00
		*Inventory Asset	-2,966.92
		Uncategorized Asset	0.02
		Accounts Payable	453,591.00
		USDA Loan	19,400,000.00
Net cash provided by Operating Activities			33,247,686.10
INVESTING ACTIVITIES			
	Equipment		-2,855,273.72
	Burn Chamber Process and Control Equip		-8,456,981.00
	Auxiliary Equipment		-9,436,340.00
	Equipment:Accumulated Depreciation		89,507.37
	Equipment:Air Compressor		-2,493.75
	Equipment:Equipment Engineering/Design		-2,027,925.00
	Equipment:Forklift		-56,420.28
	Equipment:Infrastructure		-1,178,796.54
	Startup Costs:Accumulated Amortization		10,721.67
	Startup Costs:Inventory Control Software		-28,277.45
	Startup Costs:Land Permitting		-3,570.00
	Startup Costs:Texas Land Permitting		-157,342.74
	Construction Costs		-419,615.72
Net cash provided by Investing Activities			-24,522,807.16
FINANCING ACTIVITIES			
Net cash provided by Financing Activities			0.00
		Net cash increase for period	8,724,878.94
		Cash at beginning of period	221,213.31
		Cash at end of period	8,946,092.25

EnviroSafe Demil LLC
401 N. Montague St
Hooks, TX 75561
430-200-2292

24 Months Post-Construction Operating and cash flow statement

			Oct 1 2026
OPERATING ACTIVITIES			
	Net Income		38,010,450.00
	Adjustments to reconcile Net Income		
	to net cash provided by operations:		
		Accounts Receivable	-3,801,045.00
		*Inventory Asset	-2,966.92
		Uncategorized Asset	0.02
		Accounts Payable	453,591.00
		USDA Loan	0.00
Net cash provided by Operating Activities			34,660,029.10
INVESTING ACTIVITIES			
	Equipment		-250,000.00
	Burn Chamber Process and Control Equip Wear Parts		-350,000.00
	Auxiliary Equipment		-100,000.00
	Equipment:Accumulated Depreciation		89,507.37
	Equipment:Infrastructure		-200,000.00
	Startup Costs:Accumulated Amortization		10,721.67
	Startup Costs:Land Permitting		-3,570.00
	Startup Costs:Texas Land Permitting		-20,000.00
	Construction Costs		-220,000.00
Net cash provided by Investing Activities			-1,043,340.96
FINANCING ACTIVITIES			
Net cash provided by Financing Activities			0.00
		Net cash increase for period	33,616,688.14
		Cash at beginning of period	221,213.31
		Cash at end of period	**33,837,901.45**

4. **Explanation Statement**

This portion of the requirement calls for a statement addressing how the closure, post-closure, corrective action, and liability coverage financial assurance requirements of Chapter 37, Subchapter P will be met. ESD will utilize an insurance policy in order to meet closure financial requirements. ESD intends to establish financial assurance for third party sudden liability coverage of the facility no later than 60 days prior to the first receipt of RCRA hazardous waste. The wording of the Endorsement of Insurance for Liability will be identical to the wording specified in 30 TAC §37.641.

EnviroSafe Demil LLC
401 N. Montague St
Hooks, TX 75561
430-200-2292

5. **Construction Capital Cost Estimates**

This portion of the requirement calls for estimates of capital costs for expansion and/or initial construction if the application encompasses facility expansion, capacity expansion, or new construction.

Task	Cost
Site preparation, fencing, paving, curbing, lighting, roadways	338,303
Foundations, buildings, other structures, utilities and connections, drainage system, HVAC system, electrical system, wastewater system	1,427,899
Process and control equipment	6,956,981
Auxiliary equipment, including but not limited to exhaust hoods, fans, ducting, pumps, piping, conveyors, stacks, storage tanks, process tanks, waste disposal facilities, pollution control equipment, and fire protection system	6,480,196
Process integration and instrumentation	1,456,144
Emergency response equipment	20,000
Transportation equipment	58,830
Office equipment	35,916
Engineering design, supervision, overhead	1,492,389
Construction expenses including permits, insurance, temporary facilities, and clean-up	411,318
Contractor's fees and overhead	300,000
Contingency	1,048,898
Total Cost	20,026,874

The estimates above are from the following sources:

- Previous experience
- Estimation/bids from contractors
- Actual costs already incurred.

October 23, 2023

Mr. Isaac Vela
Manager, Industrial and Hazardous Waste Permits Section
Texas Commission on Environmental Quality
Building F, MC 130
12100 Park 35 Circle
Austin, Texas 78753

Re: Letter of Opinion From Financial Expert for EnviroSafe Demil LLC
RCRA Permit Application
Hazardous Waste EPA ID No. #**TXR000086289**
Industrial Solid Waste Registration (SWR) No. #**98470**

Dear Mr. Vela:

This letter is furnished to you in response to financial disclosure requirements as applicable under Texas Health and Safety Code Section 361.085 and Title 30, Texas Administrative Code (30 TAC), Section 305.50 to provide assurance that EnviroSafe Demil LLC has sufficient financial resources.

The Texas Commission on Environmental Quality (TCEQ) is relying upon my opinion expressed regarding EnviroSafe Demil LLC (ESD) financial plan which includes balance sheets and forward looking proforma financial statements.

In keeping with the above law and rule requirements please allow this letter to serve as my acknowledgment that I have recently reviewed the following documents:

- EnviroSafe Demil LLC current financial statement dated September 2023;
- EnviroSafe Demil LLC proforma business plan;
- The most recent copy of EnviroSafe Demil LLC's two-year projected balance sheet, cash flow as well as income/expense statements September 2023 that was submitted to the TCEQ.

AdvantEdge Resources
2950 North Loop West, Suite 500,
Houston, TX 77092

866-200-6627
www.advantedgeresources.com

Brief Analysis of ESD's Financial Strength: ESD is a fast-growing company with an order book of over $350 million in government contracts from the US and Canada. To complete its expansion and fulfill its large and growing order book, the company is in the process of raising ~$20 million in debt and equity for the completion of its flagship Hybrid Burn Chamber (HBC) system and minor facility improvement for its Hooks, TX property. The company is in the final phases of a USDA Business and Industry (B&I) Guaranteed Loan Program and has secured the Letter of Commitment from West Town Bank.

Brief Explanation of How ESD has Sufficient Financial Resources to Operate Through Closure/Post-Closure Facility Care: As part of the USDA Loan Program, ESD underwent a rigorous financial and business review called a "Feasibility Study". As part of this process, we (AdvantEdge Resources, via West Town Bank) assessed and analyzed ESD financial statements in addition to the following: (1) Project underwriting; (2) Management's assumptions; (3) Funds; (4) Accounting policies and cost accounting system; (5) Dependency on other entities; 6) Market demand and forecast; (7) Peer industry comparison; (8) Availability of short-term credit; (9) Adequacy of raw materials and supplies; (10) Projected financial statements; (11) Sensitivity analysis; (12) Key financial ratios; and (13) Other secured funding. In addition, we analyzed economic impacts, assessed the market, evaluated the technology, and reviewed company management. Based on the resulting findings, ESD met the requirements for financial feasibility.

I conducted a thorough feasibility study at the request of West Town Bank as part of EnviroSafe Demil LLC's USDA guaranteed loan application and have concluded that the projections seem ***reasonable and attainable if the RCRA Permit is granted***.

Sincerely,

Mike Levine
Principal Consultant
Mike Levine
Office: 866-200-6627
Mobile: 980-777-9787
[redacted]
www.advantedgeresources.com

Enclosures: **Feasibility Study Abstract**

Mike Levine

[redacted] 9807779787

Summary

Management Consultant professional with extensive executive, start-up, and business development experience.

Experience

Principal Consultant

AdvantEdge Resources

Mar 2023 - Present (10 months)

Assistance in fundraising for SME and startups. Business Plan and Strategy Development. Feasibility Studies for SBA and USDA-guaranteed loans. Financial Modeling. CRE Feasibility Studies.

Partner

August Brown

Jan 2022 - Mar 2023 (1 year 3 months)

Business Development, Project Lead for Industrial Sector and Materials Consulting, Financial Analysis, Coaching, Strategy Development, Private Equity

Chief Executive Officer

Mafic SA

Nov 2016 - Dec 2021 (5 years 2 months)

Negotiated and successfully closed over $100 million in multiple equity and debt funding rounds;
Managed construction of the largest basalt fiber reinforcement manufacturing facility in the Western World;
Built a lean and highly functional organization transforming the company from an early-stage startup to a fast-growing advanced material manufacturer;
Established and developed banking relationships, corporate finance strategy;

Chief Operating Officer

Mafic SA

Jan 2013 - Oct 2016 (3 years 10 months)

Negotiated and secured IP rights for advanced materials manufacturing technologies;
Built North American and European operations from the ground up;
Led product and business development for new product and new product category.

Business Development Manager - US

Windowmaker Software Ltd

Aug 2011 - Feb 2012 (7 months)

Led business development efforts for a specialty international software developer into the US market;

Director of International Sales

Inline Fiberglass Ltd.
1996 - 2009 (13 years)
Successfully negotiated establishment of two joint ventures in China;
Managed IP transfers and construction of multi-million dollar greenfield manufacturing facilities in Asia and Europe;
Built a dealer network in the United States for a Canadian building materials manufacturer;

Education

University of Toronto - Rotman School of Management
Master of Business Administration - MBA
1999 - 2001

Seneca Polytechnic
Marketing with Honors

Moscow State Technological University "Stankin"
Mechanical Engineering and Automation
1990 - 1992

Skills

Sales Management • Business Development • Direct Sales • International Sales • Management • Account Management • Fundraising • Startups • Financial Modeling • Leadership

USDA

United States Department of Agriculture

Rural Development

Texas State Office

101 South Main Street
Suite 102
Temple, Texas
76501

Voice 254.742.9780
Fax 844.767.7086

April 16, 2025

Mr. Michael Kirby, SVP/Director of Government Lending
Capital Bank, N.A., Formally Known As (FKA) West Town Bank And Trust
2275 Research Boulevard, Suite 600
Rockville, MD 20850

RE: F Line Holdings LLC and Envirosafe Demil LLC
Business & Industry (B&I) OneRD Guaranteed Loan $19,400,000
1st Amendment to Form RD 5001-3, "Conditional Commitment"

Dear Mr. Kirby,

Thank you for your continued interest in the B&I Guaranteed Loan, administered by USDA Rural Development.

USDA Rural Development, Business & Cooperative Programs has considered your lending institution's March 20, 2025, electronic mail PDF request for an extension of Form RD 5001-3, "Conditional Commitment" dated April 26, 2024.

In accordance with 7 CFR 5001, §5001.451(e), USDA Rural Development, Business & Cooperative Programs, modifies the expiration date on Form RD 5001-3, "Conditional Commitment" dated April 26, 2024, for F Line Holdings LLC and Envirosafe Demil LLC, from April 26, 2025, to April 26, 2026.

All other conditions set forth in the April 26, 2024, Form RD 5001-3, "Conditional Commitment;" for the $19,400,000, B&I Guaranteed Loan, remain unchanged and valid.

If the terms of the 1st Amendment to Form RD 5001-3, "Conditional Commitment" are acceptable to Capital Bank, N.A and F Line Holdings LLC and Envirosafe Demil LLC, please return, the enclosed "Acceptance of 1st Amendment."

Should you have any questions, please contact Business & Cooperative Programs, at (254) 742-9780.

Sincerely,

MICHAEL SELF

Digitally signed by MICHAEL SELF
Date: 2025.04.16 16:58:42 -05'00'

MICHAEL SELF
Business & Cooperative Programs Director

Enclosure

USDA is an equal opportunity provider, employer, and lender.

Acceptance of 1st Amendment to April 26, 2024, Form RD 5001-3, "Conditional Commitment" for F Line Holdings LLC and Envirosafe Demil LLC.

Capital Bank, N.A., FKA West Town Bank And Trust

(Name of Lender)

A. Riddick Skinner

(Name of Lender Representative)

By: _____

(Signature of Lender Representative)

Date: 5/8/25

F Line Holdings LLC

(Name of Borrower)

TJ Ogden

(Name of Borrower's Representative)

By: _____

(Signature of Borrower's Representative)

Date: 4-30-2025

Envirosafe Demil LLC

(Name of Borrower)

TJ Ogden

(Name of Borrower's Representative)

By: _____

(Signature of Borrower's Representative)

Date: 4-30-2025

Form RD 5001- 3
(2-2021)

UNITED STATES DEPARTMENT OF AGRICULTURE

RURAL DEVELOPMENT

FORM APPROVED
OMB NO. 0572-0155

CONDITIONAL COMMITMENT

Lender Name: WEST TOWN BANK AND TRUST	USDA's Borrower Unique Entity Identifier: 49-019-702609127
Lender's Address: 8450 FALLS OF NEUSE RD, SUITE 202 RALEIGH, NC 27615	Borrower: F LINE HOLDINGS LLC AND ENVIROSAFE DEMIL LLC
Borrower's Tax ID: 931576197 AND 352618751	Principal Amount of Loan: $19,400,000.00

Type of Loan:
☐ Community Facilities (7 CFR 5001.1(a)(1))
☐ Water and Waste Disposal (7 CFR 5001.1(a)(2))
☒ Business and Industry (7 CFR 5001.1(a)(3))
☐ Rural Energy for America Program (7 CFR 5001.1(a)(4))

Interest Rate Information Fixed: 9.7000% Variable: _____ Both: _____
If both, projected effective rate: _____
At close, rate will be based on 10-year United States Treasury plus 5.00%, fixed for the entire term of loan.

FIXED: Guaranteed Rate: 9.7000%
Unguaranteed Rate: 9.7000%

Variable: Source of Base Rate Publication : _____

Guaranteed Rate: _____ Current Base Rate: _____ +Incremental Difference: _____
Rate Change Period: _____ Rate Cap: _____ Rate Floor: _____

Unguaranteed Rate: _____ Current Base Rate: _____ +Incremental Difference: _____
Rate Change Period: _____ Rate Cap: _____ Rate Floor: _____

The United States of America acting through the United States Department of Agriculture (USDA) hereby agrees that, in accordance with applicable provisions of 7 CFR 5001, it will execute Form RD 5001-4, "Loan Note Guarantee," subject to the conditions and requirements specified in the regulations and herein. The Lender shall not represent this Conditional Commitment as a **guarantee.**

The Guarantee fees payable by the Lender to USDA will be the amount as specified in 7 CFR 5001 and the applicable Federal Register register notice as determined by the date of this Conditional Commitment.

If the loan note guarantee is issued prior to completion of the project's construction an additional guarantee fee will be added.

A Loan Note Guarantee will not be issued until the Lender certifies that there has been no material adverse change in the Borrower's financial condition, nor any other material adverse change in the Borrower's condition, for any reason, during the period of time from USDA's issuance of this Conditional Commitment for Guarantee to issuance of the Loan Note Guarantee regardless of the cause or causes of the change and whether the cause or causes of the change were within the Lender's or Borrower's control.

This Conditional Commitment becomes null and void unless the conditions are accepted by the Lender and Borrower within 60 days from the date of issuance by USDA, at which time the USDA reserves the right to discontinue further processing of the application and terminate its commitment. If USDA decides to terminate this commitment, USDA will provide the lender a written notice of at least 14 days prior to the termination.

This Conditional Commitment is effective until 04-26-2025. All conditions for the issuance of a Loan Note Guarantee must be met during this period. The Lender must submit a written request to extend the Conditional Commitment thirty (30) days prior to its expiration and obtain Agency written approval in accordance with 7 CFR 5001.451(e).

Except as set out below, the purposes for which the loan funds will be used and the amounts to be used for such purposes are set out in the Application for Loan Guarantee. Once this instrument is executed and returned to USDA, no change of conditions or approved loan purpose will be considered, unless requested in writing by the Lender and approved, in writing, by the Agency.

Additional Conditions and Requirements are in Attachment A of this form.

UNITED STATES OF AMERICA

Date: 04-26-2024

By: MICHAEL SELF Digitally signed by MICHAEL SELF Date: 2024.04.26 15:44:37 -05'00'

Title: BUSINESS & COOPERATIVE PROGRAMS DIRECTOR

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a currently valid OMB Control Number. The OMB Control Number for this information collection is 0572-0155 Public reporting for this collection of information is estimated to be approximately 3.42 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, completing and reviewing the collection of information.
All responses to this collection of information are voluntary, however in order to obtain or retain a benefit the information in this form is required (citing authority). Rural Development has no plans to publish information collected under the provisions of this program. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, Rural Development Innovation Center, Regulations Management

ACCEPTANCE OF CONDITIONS

To: USDA

Address: RURAL DEVELOPMENT
101 SOUTH MAIN STREET
SUITE 102
TEMPLE, TEXAS 76501

The conditions of this Conditional Commitment for Guarantee including attachments are acceptable and the undersigned intends to proceed with the loan transaction.

WEST TOWN BANK AND TRUST
(Name of Lender)

Date: _____

By: _____
(Signature for Lender)

Date: 09-30-2024

_____
(Signature for Borrower)

Attachment A to Conditional Commitment - Loan Conditions

Date: April 26, 2024
Lender: West Town Bank & Trust
Borrower: F Line Holdings, LLC and EnviroSafe Demil, LLC
Loan Amount: $19,400,000
USDA, Rural Development Guarantee: 80%

No provision stated herein shall be changed without the prior written consent of the lender and USDA Rural Development, which is referred to throughout this document as "the Agency." Language contained in 7 CFR 5001 and Form RD 5001-2, "Lender's Agreement," or Form RD 5001-2a, "Lender's Agreement," will apply as appropriate.

1. PURPOSE

The purpose of the loan is to provide long-term financing to design, construct and install a turnkey-rocket motor burn chamber and related equipment totaling $23,270,000. The project is located at 401 Montague Road, Hooks, Bowie County, TX 75567. Guaranteed loan funds will be used for machinery & equipment (approximately $19,400,000). Funds may also be used to payoff interim financing provided for this purpose. These funds are to be matched by contributions from the borrower of approximately $5,191,000. Upon final disbursement of loan funds, a copy of the lender's detailed loan settlement must be provided to the Agency as evidence that all funds were disbursed in amounts and for purposes outlined above. No activity that is in violation of Federal law shall be permitted on the borrower's premises nor shall any equipment or other assets funded by the USDA guaranteed loan be used for activities that are in violation of Federal law.

Any change in the loan amount or source and use of funds between the date of this Conditional Commitment and the issuance of the Loan Note Guarantee must be approved by the Agency and be documented as an amendment to this Conditional Commitment.

2. PERCENTAGE OF GUARANTEE

An 80% guarantee will be issued after the terms of this Conditional Commitment have been met.

3. INTEREST RATE AND TERM

The term of the loan is to be 10 years. The interest rate is to be fixed and established with interest rate formula 10-year United States Treasury plus 5.00% per annum. The loan is to be fully amortized with monthly payments over the life of the loan with no balloon payments. Reasonable and customary prepayment penalties, provisions for default or penalty interest, or late payment fees will not be prohibited. However, any penalties, fees or default interest will not be covered by the guarantee.

4. SECURITY AND LIEN POSITION

The lender is responsible for obtaining and maintaining proper and adequate collateral to protect the interests of the lender, the Agency, and any holder. The entire loan will be secured by the same collateral with equal lien priority for the guaranteed and non-guaranteed portions of the loan. The lender will not take separate security to secure only the unguaranteed portion of the loan nor will the lender require compensating balances as a means of eliminating the lender's exposure on the unguaranteed portion of the loan. The non-guaranteed portion of the loan will not be paid first nor given any preference or priority over the guaranteed portion of the loan.

Collateral value must provide at least a **1 to 1** value after discounting.

This loan is to be secured by**:**

a. A first mortgage or deed of trust (including assignment of rents) on the borrower's real estate located on a 175-acre commercial property at 401 Montague Road in Hooks, Texas 75567. All taxes and assessments are to be current at loan closing. The lender must certify that the borrower has obtained a title opinion by its attorney showing ownership of real estate and any mortgages, restrictions, lien defects or encumbrances.
b. A first lien on all business assets, including machinery and equipment, inventory, and accounts receivable of F Line Holdings, LLC.
c. A second lien on all business assets, including machinery and equipment, inventory, and accounts receivable of Envirosafe Demil, LLC.
d. A first lien on all furnishings, fixtures, and equipment associated with the facility, including the items listed in the appraisal by COLLIERS INTERNATIONAL VALUATION & ADVISORY SERVICES dated July 6, 2023. A final list of all equipment financed with this loan, with a matching cost breakdown, will be provided with the loan settlement statement.
e. Pledge of all revenues of the Borrowers.
f. Pledge of US Army contract for rocket motor demilitarization, as allowable by law.
g. Assignment of contracts (as allowable)
h. Assignment of Lease, Rents, and Profits.

Prior to the issuance of the Loan Note Guarantee, the lender must certify that the collateral interest described above has been obtained and is perfected. This will be accomplished with the certification found in Attachment B to the Conditional Commitment.

5. APPRAISALS

A current (less than 12 months old) appraisal acceptable to the Agency and completed in accordance with USPAP and FIRREA indicating that the fair market value of the real estate security is not less than $3,576,461, excluding any value attributed to business valuation, and the fair market value of the furniture, fixtures, and equipment is not less than $29,913,539 excluding any value attributed to business valuation. Lenders will be responsible for ensuring that appraisal values adequately reflect the actual value of the collateral based on an arm's length transaction. Collateral must have documented value sufficient to protect the interest of the lender and the Agency. The discounted collateral value must be at least equal to the loan amount.

A qualified appraiser must determine the appraised market value in accordance with 7 CFR §5001.203 prior to issuance of the Loan Note Guarantee.

The lender must obtain the "As Is" market value and the "As-Completed" market value as of the date of construction completion to determine the value of the real estate property or obtain an income-based appraisal as of the date of completion to determine the value of revenues that will be generated by the collateral.

6. SYSTEM FOR AWARD MANAGEMENT

The lender will be required to maintain a Unique Entity ID (UEI) and maintain an active registration in the System for Award Management (SAM) database. Renewal can be completed online at: http://sam.gov. This registration must be renewed and revalidated every 12 months for as long as there is an active loan, grant, or guaranteed loan with the Agency.

To ensure the information is current, accurate and complete, and to prevent the SAM account expiration, the review and updates must be performed within 365 days of the activation date, commonly referred to as the expiration date. The registration process may take up to 10 business days. (See 2 CFR Part 25 and the "Help" section at http://sam.gov).

7. OTHER FEDERAL, STATE, AND LOCAL REQUIREMENTS

Beginning on the date of issuance of the Loan Note Guarantee, for proposals where facilities are financed in whole or in part with a loan guarantee by the Agency, borrowers and lenders will be required to comply with any Federal, State, or local laws or regulatory commission rules that are in existence and that affect the project including, but not limited to:

(a) Organization and authority to design, construct, develop, operate, and maintain the proposed facilities;
(b) Borrowing money, giving security, and raising revenues for the repayment;
(c) Land use zoning;
(d) Health, safety, and sanitation standards; and
(e) Protection of the environment and consumer affairs.

8. ESTABLISHMENT OF LINC ACCOUNT

Lender will become an approved participant in the Agency's Lender Interactive Network Connection (LINC). The LINC system allows the lender to conduct official business transactions such as submitting borrower account status reports and the payment of all fees, including the guarantee fee at closing and the retention fees. In order to participate in the LINC, the lender must have Level 2 eAuthentication credentials. The USDA eAuthentication is the system used by USDA agencies to enable customers to obtain accounts that will allow them to access USDA Web applications and services via the Internet. Please access and follow the instructions to obtain a Level 2 eAuthentication account and obtain access to LINC: https://www.rd.usda.gov/sites/default/files/OneRD_eAuth_LINC_Instructions.pdf

9. GUARANTEE FEE

The lender will be charged a one-time, nonrefundable guarantee fee of **3**%, payable to USDA Rural Development, in the amount of **$465,600.** The fee is calculated by taking the amount of the loan multiplied by the guarantee fee (**3**%) then multiplied by the percentage of guarantee. This fee is due and payable upon loan closing and prior to Agency issuance of the Loan Note Guarantee. The fee will be submitted via the Pre-Authorized Debit account set up within the LINC system, prior to closing, for faster processing of the Loan Note Guarantee.

10. RETENTION FEE

This loan guarantee is subject to a periodic retention fee of .55% of the guaranteed portion of the outstanding principal as of December 31 of each year. It is calculated by multiplying the outstanding principal balance of the loan by the percentage of guarantee and then multiply that result by .55%. Payments are due to the Agency by January 31 of each year. For loans where the Loan Note Guarantee is issued between October 1 and December 31, the first retention fee will be due January 31 of the second year following the date the Loan Note Guarantee is issued. Payments not received by April 1 are considered delinquent and may result in cancellation of the guarantee to the lender. Holder's rights will continue in effect as specified in the Loan Note Guarantee and Assignment Guarantee Agreement. Until the Loan Note Guarantee is terminated by the Agency, any delinquent periodic guarantee retention fees will bear interest at the note rate and are due upon notice by the Agency. Should the lender fail to pay any delinquent periodic guarantee retention fees, including any interest due thereon, the amount will be deducted from any loss payment due the lender.

11. ASSIGNMENT OF GUARANTEED LOAN

Any assignment by the lender of the guaranteed portion of the loan must be accomplished in accordance with the conditions in the Lender's Agreement and Agency program regulations and must be documented on Form RD 5001-6, "Assignment Guarantee Agreement." Subsequent assignments require notice to the lender and the Agency using any format, including that used by the Securities Industry and Financial Markets Association, together with the transfer of the original Assignment Guarantee Agreement.

The lender is required to hold in its own portfolio, or retain, a minimum of 7.5 percent of the total loan amount. This amount must be of the non-guaranteed portion of the loan and cannot be participated to another. The lender may sell the remaining amount of the non-guaranteed portion of the loan only through participation. The lender will be responsible for servicing the entire loan for the term of the loan in accordance with the Lender's Agreement, Loan Note Guarantee, and Agency Program regulations.

12. FINANCIAL REPORTING

For all borrowers with a guaranteed loan balance in excess of $600,000, the lender is responsible for obtaining annual financial statements. The borrower must submit financial statements to the lender within 90 days of the business' fiscal yearend. The lender will submit the borrower's annual financial statements to the Agency within 120 days of the end of the borrower's fiscal year. The lender will analyze the financial statements and provide the Agency with a written summary of the lender's analysis and conclusions, including trends, strengths, weaknesses, extraordinary transactions, and other indications of the financial condition of the borrower.

All personal and corporate guarantors of this loan must provide annual financial statements to the lender within 90 days of guarantor's fiscal or calendar yearend.

The loan agreement must require the borrower to submit borrower to submit financial statements to the lender. The borrower must obtain audited, financial statements annually, prepared and submitted in accordance with accounting practices acceptable to the Agency. Such practices include, but are not limited to, Generally Accepted Accounting Principles (GAAP) and the industry's standard accounting practice. Financial statements will contain, at a minimum, a balance sheet and a profit and loss statement reflecting the financial condition of the borrower as of its yearend.

13. STATUS REPORTING

For the life of each guaranteed loan, the lender must submit to the Agency, through the LINC system, semi-annual reports on the outstanding principal and interest balance of the loan(s) as of June 30 and December 31.

For each guaranteed loan that is in monetary default, the lender is required to report monthly to the Agency regarding the status of each loan, including any curative actions under consideration or undertaken to resolve the monetary default. Reports are due on the 15th working day of each month.

14. GUARANTOR(S)

In addition to the full liability of F Line Holdings, LLC and EnviroSafe Demil, LLC, a full personal guarantee for the loan is to be pledged by Michael Wentz and Thomas J. Ogden. MHW Ventures, LLC and TKO Unlimited, LLC is to pledge a full corporate guarantee for the loan.

Each guarantor must execute Form RD 5001-5, "Unconditional Guarantee." Personal and/or corporate guarantees are unsecured unless secured with specific collateral detailed in Item Number 7 of the Unconditional Guarantee form.

15. INSURANCE

The lender must ensure the borrower obtains and maintains borrower and project insurance in substance, amount, and duration similar to that ordinarily required by lenders in the industry.

Hazard insurance naming the lender as mortgagee or loss payee, as applicable, will be maintained in an amount at least equal to the outstanding loan balance or the replacement value (whichever is greater) of the collateral. Hazard insurance includes fire, windstorm, lightning, hail, explosion, riot, civil commotion, aircraft, vehicle, marine, smoke, builder's risk during construction, and property damage. Worker's Compensation must be carried in accordance with State law.

Key person life insurance is not required.

16. CAPITAL EQUITY REQUIREMENTS

A minimum of 20 percent balance sheet equity will be required at loan closing. Balance sheet equity must be met in the form of either cash or earning assets contributed to the business and reflected on the business' balance sheet. Balance sheet equity will be determined using a balance sheet prepared in accordance with Generally Accepted Accounting Principles and will not include appraisal surplus or bargain purchase gains. Subordinated debt may be included when the subordinated debt is in exchange for cash injected into the business and is subject to a standstill agreement for the life of the loan. The note or other form of evidence must be submitted to the Agency in order for subordinated debt to count towards meeting the balance sheet equity requirement.

Prior to issuance of the Loan Note Guarantee, the lender must provide the Agency with a balance sheet as of loan closing that reflects the business' post-closing status and demonstrates the required balance sheet equity, borrower investment of equity or other funds, or owner contributed capital as a part of the lender certification. This balance sheet must take into account any new assets, the guaranteed loan amount, and any non-guaranteed debt as liabilities of the borrower, regardless of whether the loan(s) has/have been fully disbursed or remain(s) to be disbursed.

17. LOAN AGREEMENT

Appropriate conditions or covenants of this Conditional Commitment and any other conditions that the lender has determined are warranted to protect the interests of the lender and the Agency must be incorporated in the lender's loan agreement with the borrower. To expedite issuance of an Agency guarantee, a copy of the final proposed loan agreement should be provided for the Agency's review and concurrence prior to loan closing.

The lender is responsible for loan servicing and for notifying the Agency of any violations of the lender's loan agreement. The lender will arrange with the borrower and the Agency for field visits. The lender will be responsible for obtaining all required financial statements from the borrower, analyzing them and submitting the financial statements with the analysis to the Agency.

At a minimum, the loan agreement must contain the following requirements:

a. Repayment and amortization provisions of the loan;
b. Description of real property collateral, list of other collateral and identification of the lender's lien priority in the collateral;
c. A list of persons and entities guaranteeing payment of the guaranteed loan and the percentage of guarantee;
d. Type and frequency of borrower and guarantor financial statements to be required for the duration of the guaranteed loan. Guarantor statements must be updated at least annually;
e. Prohibition against borrower assuming liabilities or obligations of others. Outside investment and loans/advances to stockholders, owners, officers, or affiliates require the prior written consent of the lender. Loans from stockholders, owners, officers or affiliates must be subordinated to the guaranteed loan or converted to stock. No payments are to be made on these debts unless the loan is current and in good standing;
f. Limitations on borrower dividend payments and compensation of officers, owners and members of borrower. Dividend payments and compensation of officers, owners, and members will be limited to an amount that, when taken, will not adversely affect the repayment ability of the borrower. This amount may not be increased year-to-year unless (1) an after-tax profit was made in the preceding fiscal year, (2) the borrower is and will remain in compliance with covenants of the Loan Agreement and Conditional Commitment, and (3) all borrower debts are paid to a current status. This is not intended to apply to dividend payments to cover personal tax liability resulting from profitability of the business;
g. Limitations on the purchase and sale of equipment and other fixed assets. The borrower must not acquire additional fixed assets (including assignments, transfers and leases) that would result in borrower not being in compliance with required ratios without the lender's written consent. Borrower will not lease, sell, transfer, or otherwise encumber fixed assets without the concurrence of the lender. Disposition of fixed assets serving as collateral for this loan must also have the concurrence of the Agency;
h. Restrictions concerning mergers, consolidations, or other circumstances, including significant management changes, and a limitation on selling the business or project without the concurrence of the lender;
i. Maximum debt-to-net worth ratio of 9 to 1, required by the lender;
j. Minimum debt service coverage ratio of 1.25 to 1, required by the lender;
k. A reserved section for any requirements, including environmental requirements, imposed by the Agency in its Conditional Commitment; and
l. A provision for the lender and the Agency to have reasonable access to the project and its performance information during the term of the guaranteed loan, including the periodic inspection of the project by a representative of the lender or the Agency.

If necessary, the borrower is to take all necessary actions to remain in good standing with all licensing and/or regulatory authorities to maintain operations. The borrower is to notify the lender of any adverse findings made by licensing authorities if these cannot be corrected within 30 days. The lender must notify the Agency of this notification of adverse findings within 15 days.

18. ENVIRONMENTAL

The lender will take action to ensure that the continuing operations of the business and all construction associated with this credit facility are completed in accordance with applicable Federal, State, and local laws, regulations, and ordinances, with any adverse impact the project/operations may potentially have on the environment being identified and mitigated.

If the Phase I Environmental Site Assessment (ESA) that was completed in accordance with ASTM E1527-13 and included as part of the Agency's environmental review becomes more than 180 days old prior to loan closing, an updated Phase I ESA is required.

19. LENDER'S CERTIFICATION

Prior to issuance of the Loan Note Guarantee, the lender will certify that all requirements of the Conditional Commitment have been met and will certify to each condition as stated in Section 5001.452(b)(8)(iii). These certifications are furnished on Attachment B to the Conditional Commitment.

20. LOAN CLOSING DOCUMENTATION

Coincident with, or immediately after, loan closing and prior to issuance of the guarantee, the lender will provide the Agency with the following in the request for issuance of the guarantee:

a. The lender will prepare and deliver Form RD 5001-9, "Guaranteed Loan Closing Report," for each loan to be guaranteed.
b. The lender will pay the guarantee fee of **$465,600** (= **$19,400,000** x 80% x 3%). The Agency encourages lenders to pay the guarantee fee electronically. If lender has not already established an account with the Agency, please furnish the routing and account number as soon as possible to ensure timely payment of the guarantee fee. The fee will be withdrawn from the account prior to issuance of the Loan Note Guarantee. If electronic payment is not successful, checks made payable to the U.S. Treasury should be submitted.
c. An executed Form RD 5001-2, "Lender's Agreement," or RD 5001-2a, "Lender's Agreement," if one has not previously been executed.
d. A copy of the executed Loan Agreement that contains any continuing loan conditions as set forth by the Agency in this Conditional Commitment.
e. A copy of the executed Promissory Note(s).
f. A copy of the executed Settlement Statement, which shows the specific use and disbursement of all loan funds for the project.
g. Original, executed Forms RD 5001-5, "Unconditional Guarantee," as required;
h. A copy of the borrower's balance sheet as of the date the loan was closed.
i. Written lender certification in accordance with 7 CFR 5001.452(b)(8).

A Loan Note Guarantee may only be issued upon receipt of the Loan Closing Documentation items and the Agency's satisfactory review for compliance with the Conditional Commitment and program requirements.

21. ACCESS TO PROJECT AND LENDERS RECORDS

Agency personnel and any person(s) accompanying Agency personnel shall be authorized to enter upon the premises and into any building thereon, whether permanent or temporary, jointly or separately, with personnel of the lender to carry out the functions involving its interests. Scheduled inspections may be conducted by these personnel to determine the effectiveness of the loan program.

Upon request by the Agency, the lender will permit representatives of the Agency to inspect and make copies of any of the records of the lender pertaining to the guaranteed loans. Such inspection and copying may be made during regular office hours of the lender or at any other time agree upon by the lender and the Agency.

The lender will always retain responsibility for servicing the entire loan and for notifying the Agency of any violations of the terms of the Loan Agreement or Conditional Commitment.

22. LENDER AND BORROWER CERTIFICATION

West Town Bank & Trust (lender) certifies by accepting this Conditional Commitment for a guarantee of its $19,400,000 loan to the borrower that the lender understands that no adverse change may occur during the period of time from Agency issuance of the Conditional Commitment to issuance of the Loan Note Guarantee relating to **F Line Holdings, LLC and EnviroSafe Demil, LLC** (borrower(s)) regardless of the cause or causes of the change and whether the change or cause(s) of the change were within the lender's or borrower's control. Prior to each disbursement, lender shall be in receipt of satisfactory evidence that there has been no unremedied adverse change in the financial or any other condition of the borrower since the date of the application or since any preceding disbursements that would warrant withholding or not making further disbursements. The lender will immediately notify the Agency of any material adverse change in the project or the borrower's financial condition.

By accepting Form RD 5001-3, "Conditional Commitment," and this attachment, **F Line Holdings, LLC and EnviroSafe Demil, LLC** certifies that each is not delinquent on any Federal debt, including tax debt.

By signing this Conditional Commitment, the lender and borrower certify that they understand and accept the conditions outlined herein. No provision stated herein shall be amended or waived without the prior written consent of the lender and the Agency. Any loans or advances made to the borrower by the lender after issuance of the Loan Note Guarantee will not be covered by the guarantee, except authorized protective advances. Regulations contained in 7 CFR 5001 and Form RD 5001-2, "Lender's Agreement," or RD 5001-2a, "Lender's Agreement," will apply.

Any request for an extension of the expiration date of this Conditional Commitment must be made in writing and received by the Agency prior to the expiration date. This request must be accompanied by a full explanation as to why the extension is needed.

Attachment B to Form RD 5001-3, "Conditional Commitment"
Loan Note Guarantee Certifications

Prior to issuance of the Loan Note Guarantee, the lender will certify to the following conditions as outlined in 7 CFR 5001.452(b)(8)(iii). This certification, **on lender letterhead**, is intended to meet the requirements of 7 CFR 5001.452(b)(8)(iii) as it relates to a loan between the lender and borrower listed below.

REQUEST FOR LOAN NOTE GUARANTEE AND LENDER CERTIFICATION

USDA RURAL DEVELOPMENT		**DATE OF PROMISSORY NOTE:**
Type of Loan: **REAP ☐ B&I ☒ CF ☐ WWD ☐**	**Amount of Loan:** $19,400,000	**State:** Texas
Name and Address of Borrower: F Line Holdings, LLC EnviroSafe Demil, LLC 401 Montague Road Hooks, Texas 75567	**Name of Lender:** West Town Bank & Trust	

LENDER CERTIFICATIONS

The undersigned lender hereby requests issuance of a Loan Note Guarantee in the subject case.

West Town Bank & Trust hereby certifies:

A. All requirements of the Conditional Commitment have been met.

B. The financial criteria specified in §5001.303(b)(4) of the OneRD Guaranteed Loans regulation and any financial criteria contained in the Conditional Commitment were:

(1) Determined in accordance with any applicable requirements in § 5001.9, and

(2) Have been maintained through the issuance of the Loan Note Guarantee. Failure to maintain or attain the minimum financial criteria will result in the Agency not issuing a Loan Note Guarantee.

C. No major changes have been made in the applicant, project or lender's loan conditions and requirements since the issuance of the Conditional Commitment, unless such changes have been approved by the Agency.

D. There has been neither any material adverse change in the borrower's financial condition nor any other material adverse change in the borrower during the period of time from the Agency's issuance of the Conditional Commitment to issuance of the Loan Note Guarantee regardless of the cause or causes of the change and whether or not the change or causes of the change were within the lender's or borrower's control.

(1) The borrower is a legal entity in good standing with its regulator (as applicable) and is operating in accordance with the laws of the State(s) or Tribe where the borrower was organized or has a place of business.

(2) The borrower meets the eligibility requirements as outlined in § 5001.126(a) through (e), as applicable.

E. There is a reasonable prospect that the guaranteed loan and other project debt will be repaid on time and in full (including interest) from project cash flow according to the terms proposed in the application.

F. The guaranteed loan has been properly closed, the required security instruments have been properly executed, and all security interests obtained by the lender have been or will be properly perfected in accordance with applicable law.

G. All planned property acquisition has been or will be completed; all development has been or will be substantially completed in accordance with plans and specifications and conforms to applicable Federal, State, and local codes; all equipment required for the project is available, can be procured and delivered within the project development schedule and will be installed in conformance with manufacturer's specifications and design requirements; and costs have not exceeded the amount approved by the lender and the Agency.

H. The proposed project complies with all current Federal, State, and local laws and regulatory rules that affect the project, the borrower, and the lender activities, including, but not limited to, equal opportunity and Fair Housing Act requirements and design and construction requirements.

I. Lender-required insurances are in effect.

J. All truth-in-lending and equal credit opportunity requirements have been met.

K. The borrower has marketable title to the collateral then owned by the borrower, subject to the rights of the guaranteed loan and to any other exceptions approved in writing by the Agency.

L. Where required, necessary or prudent, the borrower has obtained:

(1) A legal opinion relative to the title and accessibility to any rights-of-way and easements; and

(2) A title opinion or title insurance showing the borrower has good and marketable title to the real property and other collateral and fully addressing all existing mortgages or other lien defects, restrictions or encumbrances. In those cases where there is adequate gap coverage, a title commitment may be acceptable.

M. All project funds have been or will be disbursed for purposes and in amounts consistent with the Conditional Commitment (or Agency-approved amendment thereof) and the application submitted to the Agency. Appropriate lender controls were used to ensure that all funds were properly disbursed, including funds for working capital. A copy of the settlement statement by the lender detailing the use of loan and matching/equity funds is attached to support this certification.

N. When applicable, the entire amount of the loan for working capital or initial operating expenses have been disbursed to the borrower, except in cases where the Agency has approved disbursement over an extended period of time and funds are escrowed so that the settlement statement reflects the full amount to be disbursed.

O. When required, personal and/or corporate guarantees have been obtained in accordance with § 5001.204 of the OneRD Guaranteed Loans regulation.

P. Lien priorities are consistent with the requirements of the Conditional Commitment. No claims or liens of laborers, subcontractors, suppliers of machinery and equipment, materialmen, or other parties have been filed against the collateral, and no suits are pending or threatened that would adversely affect the collateral.

Q. Neither the lender nor any of the lender's officers has an ownership interest in the borrower or is an officer or director of the borrower, and neither the borrower nor its officers, directors, stockholders, or other owners have more than a 5 percent ownership interest in the lender.

R. The loan agreement includes all borrower compliance measures identified in the Agency's environmental review for avoiding or reducing adverse environmental impacts of the project's construction or operation.

S. The lender will comply with the requirements of the Debt Collection Improvement Act.

T. The lender has executed and delivered the Lender's Agreement, completed registration in the Agency's electronic reporting system, and electronically submitted the guaranteed closing report for the guaranteed loan along with the appropriate guarantee fee.

_____
Lender Representative

_____
Title

_____
Date

February 7, 2024

EnviroSafe Demil, LLC
F-Line Holdings, LLC
Mr. Thomas J Ogden
12763 Lovelock Hwy
Fallon, NV 89406

Re: Conditional Letter of Intent ("LOI")

Dear Mr. Ogden:

West Town Bank & Trust (the "Bank" or "WTBT") has reviewed your company's financing opportunity and based upon our review of the project and the request for funding under the USDA Business & Industry program, we are pleased to let you know that the project meets preliminary guidelines for the loan program and submittal of a full USDA guaranteed loan application.

At this time, a full USDA application has been submitted and is currently under final reviews by the USDA national office. As presented in our preliminary term sheet and executed by you, it is our intent to continue toward a project funding and loan closing utilizing the preliminary terms outlined. While we intend to move forward to a financial closing, this conditional LOI does not constitute full project and loan approval by USDA. We anticipate such approvals to be forthcoming but cannot guarantee that approval. In addition, our Bank will make its final credit approval decision upon approval by USDA.

Please note that some final project approvals can come with additional, and in some cases, modified terms required by USDA and potentially our Bank's full approval. Once we receive formal notification from USDA on the status of the guaranteed loan, we will let you know. If approved by USDA, we will go through the terms of their approval and detail any modifications or changes from the anticipated scope of the financing, if any. From there, we will start the process to close and fund the loan as soon as possible. We feel that a decision is being made on the loan application at the national office any day now and would hope to hear back from USDA in the next 7-10 business days; however, USDA never relays any potential approval until a formal decision is made.

If you have any questions, please do not hesitate to contact me. Again, once we hear back from USDA, I will be in touch.

Many thanks,

Michael Kirby
Senior Vice President &
Director of Government Lending
West Town Bank & Trust

February 15, 2023

EnviroSafe Demil, LLC
Mr. Michael Wentz
Mr. Thomas J Ogden
12763 Lovelock Hwy
Fallon, NV 89406

Re: USDA Business & Industry Guaranteed Loan Program Proposal

Dear Mr. Wentz & Mr. Ogden:

Thank you for allowing West Town Bank & Trust (the "Bank" or "WTBT") to review your company's financing opportunity. Based on our review of the project and the request for funding under the USDA Business & Industry program, we are pleased to present this preliminary financing proposal to you ("Proposal"). This Proposal is not inclusive of all terms and conditions and is subject to our formal credit approval. It is, however, a strong indication of our interest and willingness to provide credit. This Proposal is contingent upon receipt of additional documentation necessary to complete our analysis as well as the USDA loan application. Please find below the preliminary terms and requirements.

Lender: West Town Bank & Trust

Program: USDA Business & Industry Guaranteed Loan Program

Borrower(s): ESD New Entity, LLC ("Borrower") to be established
EnviroSafe Demil, LLC ("Co-Borrower")

Guarantor(s): Any individual or entity owning 20% or more of the borrowing entity(ies)

Loan Amount: Estimated at $19,400,000 (estimated based upon final firm price, turn-key rocket motor burn chamber and equipment contract, along with the real estate and improvements of +/-175 acre site) advanced at an aggregate loan-to-value/loan-to-cost not to exceed 75%.

Funds for the turn-key burn chamber system will be drawn based upon the design, engineering, manufacturing, delivery and installation schedules proposed in the burn chamber procurement contract.

Amortization: 16 years total, with 12 months interest only, then 15 years fully amortizing.

Interest Rate: Chamber Manufacture Period: 10-year United States Treasury yield plus 5.00% per annum (current rate of 8.53% as of 02/03/2023) variable, resetting quarterly until funds have been fully drawn and equipment is delivered and installed. Loan rate will be set based upon the 10-year US Treasury yield settled the business day prior to closing.

Post Chamber Delivery & Installation: 10-year United States Treasury yield plus 5.00% per annum (current rate of 8.53% as of 02/03/2023) fixed for the remaining term of the loan. Loan rate will be set based upon the 10-year US Treasury yield once loan funds are fully drawn and equipment is delivered and installed (rate conversion). Rate floor of 6.50%.

Repayment Terms: Interest only, paid monthly, for the first twelve (12) months, then converting to monthly principal and interest payments for the remaining fifteen (15) years.

Loan Fees: 1.00% origination fee of the total USDA Guaranteed loan amount.

3.00% of the guaranteed portion payable to USDA upon issuance of the guarantee.

Purpose of Loan / Use of Proceeds

Proceeds will be used to acquire new turn-key rocket motor burn chamber and equipment, fund capitalized interest and pay costs associated with the financing and loan closing. The estimated sources and uses table is presented below.

EnviroSafe LLC - Rocket Motor Burn Chamber Project				
Sources of Funds			**Uses of Funds**	
USDA Guaranteed Loan	$	19,400,000	El Dorado Burn Chamber - Turnkey System	$ 23,270,000
Other Source of Funds / Borrower Injection	$	5,191,000	Capitalized Interest (12 months)	$ 450,000
			Closing Costs (estimated)	$ 150,000
			USDA Guarantee Fee	$ 465,600
			Banking Fees	$ 194,000
			Third-Party Reports (Appr, Env, Feasibility, est.)	$ 60,000
	$	-	Misc	$ 1,400
Total Sources	**$**	**24,591,000**	**Total Uses**	**$ 24,591,000**

Capitalized interest was calculated based on a simple draw scehdule over a 12 month period. Once final details of the turn-key burn chamber are procured, the draw schedule may be refined to match the anticipated draw schedule. If the amount of capitalized interest should change, an updated sources and uses of funds chart will be developed by the Bank and Borrower.

Prepayment Penalty: In the event of loan prepayment, **in whole or in part**, a prepayment penalty shall be assessed as follows:

- If the prepayment occurs on or before the sixth anniversary date of the loan, the prepayment penalty will equal five percent (5%) of the principal amount prepaid.
- If the prepayment occurs on or before the seventh anniversary date of the loan, the prepayment penalty will equal four percent (4%) of the principal amount prepaid.
- If the prepayment occurs on or before the eighth anniversary date of the loan, the prepayment penalty will equal three percent (3%) of the principal amount prepaid.
- If the prepayment occurs on or before the ninth anniversary date of the loan, the prepayment penalty will equal two percent (2%) of the principal amount prepaid.
- If the prepayment occurs on or before the tenth anniversary date of the loan, the prepayment penalty will equal one percent (1%) of the principal amount prepaid.
- There is no prepayment penalty after the conclusion of the tenth year of the loan term.

Expenses: Origination fee, Bank's Attorney fees and out-of-pocket costs for filing fees, recording fees, searches, tax service, appraisals, feasibility study, title work, lien searches, closing fees, 3rd-party construction inspection fees, etc. The Borrower will be responsible for all the Bank's normal and customary costs related to, and expenses associated with, closing this transaction. All out of pocket expenses of the Bank shall be paid by the Borrower whether or not the transaction closes.

Good Faith Deposit: A check or wire in the amount of $20,000 to be deposited (the "Good Faith Deposit") is required upon return of this letter of intent and payable to West Town Bank and Trust. The Good Faith Deposit is to be paid to the Bank to cover expenses for the transaction. If the Bank or the USDA does not approve the request, the unused portion of the Good Faith Deposit will be refunded less any portion used by Bank for items such as appraisals, environmental reports, feasibility reports, credit reports, loan underwriting, loan packaging and any other third-party expenses.

Should the costs of third-party required reports costs in excess of the Good Faith Deposit, Borrower agrees to pay or deposit additional funds to cover the full costs of such reports in advance of the execution of the report proposal.

Collateral: Collateral will include, but not limited to the following:

1) First priority lien & deed of trust on the +/-130 acre parcel and all improvements
2) First priority lien & deed of trust on the +/-45 acre parcel and all improvements owned by EnviroSafe Demil, LLC
3) First priority lien on the new rocket motor burn chamber and equipment secured by UCC-1 filing or other such required filing documentation.
4) First priority lien on all business assets of the Borrower owned, acquired or acquired in the future.

5) Pledge of all revenues of the Borrower.
6) Pledge of US Army contract for rocket motor demilitarization, as allowable by law.
7) Assignment of contracts (as allowable).
8) Assignment of any Lease, Rents and Profits.
9) First priority lien on the capitalized interest account, held at the Bank.
10) Any other collateral deemed necessary by the Bank to fully secure the loan.

Appraisal Requirements: Independent 3rd party appraisal to be performed, ordered by the bank, on all real estate and improvements showing an appraised value acceptable to the Bank. The Bank must follow all Federal Banking guidelines for requesting a completed appraisal. Collateral value must ensure the loan is fully secured and meets the requirements of USDA, including their review and approval. New equipment value is normally valued based upon the turn-key equipment invoice.

Financial Covenants: Any financial covenants required of USDA and Bank at levels to be determined and typically include debt service coverage, equity ratios, among others.

Financial Reporting: Requirements for financial reporting will include, but not limited to the following:

- Annual financial audit for all Borrowers due within 120 days of fiscal year end.
- Annual financial statements within 120 days of year end for any corporate guarantors.
- Annual financial statements within 30 days of year end for any personal Guarantors.
- Annual tax returns for any personal Guarantors within 30 days of filing, including any extension filed (extension documentation delivered upon filing).
- Any additional required reporting from the USDA.

Other Conditions: Depository banking relationship with the Bank.

Expiration: This Proposal expires five (5) business days from the date listed above.

Upon receipt by Bank of (i) the signed Proposal, (ii) the necessary application information, (iii) the necessary USDA loan package and other information, the Bank will submit the Proposed Loan for credit consideration.

Please understand this letter is not a commitment by Bank to make the Proposed Loan or provide other financing to you. It is intended to provide the general parameters by which the Bank will consider your application for financing. Any future commitment by Bank to make the Proposed Loan is subject to final approval of the USDA and Bank, in their sole and absolute discretion, plus full compliance with any and all conditions that Bank and the USDA may require in connection with the Proposed Loan.

Confidentiality:

This Proposal is provided for your information and is delivered to you with the understanding that neither it nor its substance shall be disclosed to any third person, except those who are in a confidential relationship with you, or where the same is required by law.

This Proposal shall expire five (5) business days from the date hereof if it has not been acknowledged and returned. Any and all extensions to this Proposal may be granted by Bank at its absolute and sole discretion. After execution of this Proposal, the Proposed Loan application must be submitted to Bank within thirty (30) days hereof or this Proposal shall be null and void and of no further force or effect, unless otherwise extended by West Town Bank & Trust.

Sincerely,

Michael Kirby
Senior Vice President &
Director of Government Lending
West Town Bank & Trust

Acknowledgement:

If you agree to these terms and conditions, please so indicate by signing and returning an original copy of this letter to the Bank at the address below within **5** days of the date of this letter with a check or wire transfer in the amount of $20,000 for the aforementioned Good Faith. A check should be made payable to West Town Bank & Trust.

CHECK:
West Town Bank & Trust
Attn: USDA/SBA Department – ESD Rocket Motor Demil
8450 Fall of Neuse Road Suite 202
Raleigh, NC 27615

WIRE:

Receiving Financial Institution:	**West Town Bank & Trust Receiving**
ABA#	**271971599**
Beneficiary Financial Institution:	**West Town Bank & Trust Account**
Number:	**110106409**
Department/Reference:	**USDA – ESD Rocket Motor Demil**

I have reviewed this Proposal and fully understand the contents and conditions of it and agree to proceed with the proposed financing as outlined herein.

EnviroSafe Demil, LLC, for ~~itself~~ and the new entity to be established

By: TJ Ogden Acceptance Date: February 17, 2023

Its: CEO

Additional Financial Assurance information is included in Section XIII – CONFIDENITAL Material.

TABLE VIII.B.

ESTIMATED CAPITAL COSTS

Table VIII.B. – Estimated Capital Costs

Task	Cost
Site preparation, fencing, paving, curbing, lighting, roadways	$338,303
Foundations, buildings, other structures, utilities and connections, drainage system, HVAC system, electrical system, wastewater system	$1,427,899
Process and control equipment	$6,956,981
Auxiliary equipment, including but not limited to exhaust hoods, fans, ducting, pumps, piping, conveyors, stacks, storage tanks, process tanks, waste disposal facilities, pollution control equipment, and fire protection system	$6,480,196
Process integration and instrumentation	$1,456,144
Emergency response equipment	$20,000
Transportation equipment	$58,830
Office equipment	$35,916
Engineering design, supervision, overhead	$1,492,389
Construction expenses including permits, insurance, temporary facilities, and clean-up	$411,318
Contractor's fees and overhead	$300,000
Contingency	$1,048,898
Total Cost	$20,026,874

The estimates above are from the following sources:

- Previous experience
- Estimation/bids from contractors
- Actual costs already incurred

SIGNED WRITTEN STATEMENT:
FINANCIAL ASSURANCE FOR
EMERGENCY RESPONSE

Signed Written Statement: Financial Assurance for Emergency Response:

ESD intends to provide emergency response financial assurance per 30 TAC 305.50(a)(12)(D)(i) by including documentation showing agreements with the local fire department, police department, and hospital. These agreements are located in Section III of the Part B Application, Appendix III.E, *Attachment III.E.1 – Agreement Letters*.

Signature of Responsible Official

12/3/2021
Date

Michael Wentz
Printed Name

President, EnviroSafe Demil, LLC
Title

IX. Releases from Solid Waste Units and Corrective Action

Provide all Part B responsive information in Appendix IX. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

Appendix IX – Releases from Solid Waste Units and Corrective Action includes the Preliminary Review Facility Checklist and the Preliminary Review Unit Checklist.

The Texas Solid Waste Disposal Act, 30 TAC 335.167, 40 CFR 270.14(d) and Section 3004(u) of the Hazardous and Solid Waste Amendments of 1984 (HSWA) *require that each hazardous waste management permit application review shall address corrective action for all releases of hazardous waste and hazardous constituents* listed in 40 CFR 261, Appendix VIII, 40 CFR Part 264, Appendix IX, and/or other constituents of concern from any solid waste management unit (SWMU) and/ or Areas of Concern (AOCs) at a facility, regardless of the time at which waste was placed in such unit[2]. For the purposes of HSWA Corrective Action, a SWMU may include, but is not limited to, any landfill, surface impoundment, land treatment unit, waste pile, underground injection well, incinerator, boiler, industrial furnace, tank, container storage area, drip pad, containment building, miscellaneous unit; any units exempt from hazardous waste permitting requirements, such as wastewater treatment units, elementary neutralization units, totally enclosed treatment units, waste recycle/reuse units, and 90-day accumulation time units; or process units or areas which may have routine and/or systematic releases to the environment (e.g., process drainage ditches or product storage tanks). Current EPA interpretation of this requirement has resulted in a Corrective Action process that begins with a RCRA Facility Assessment (RFA) to determine if corrective action is necessary.

[2]For the purposes of HSWA Corrective Action, a SWMU may include, but is not limited to, any landfill, surface impoundment, land treatment unit, waste pile, underground injection well, incinerator, boiler, industrial furnace, tank, container storage area, drip pad, containment building, miscellaneous unit; any units exempt from hazardous waste permitting requirements, such as wastewater treatment units, elementary neutralization units, totally enclosed treatment units, waste recycle/reuse units, and 90-day accumulation time units; or process units or areas which may have routine and/or systematic releases to the environment (e.g., process drainage ditches or product storage tanks).

The first step in the RFA is the development of a Preliminary Review (PR) from all available documentation for a facility (including but not limited to all facility documents, Part A, and Part B of the permit application, TCEQ correspondence files and inspection reports, etc.). The PR compiles available information on every SWMU and/or AOC that has ever existed at the facility. A unit checklist is completed for each SWMU and/ or AOC. On a unit-by-unit basis, the PR may recommend no further action for:

- well-designed and well-managed units
- units that have not managed hazardous wastes or wastes containing hazardous constituents;
- units already under corrective action by enforcement order; or
- units scheduled to be addressed in a compliance plan.

In addition, the unit checklists are summarized in a *Facility Checklist*. If there is a known release or potential for a release of hazardous waste or hazardous constituents from a unit/area, the PR may recommend a *RCRA Facility Investigation* (RFI), or an *Affected Property Assessment* (APA), if 30 TAC Chapter 350, Texas Risk Reduction Program (TRRP) applies, to determine the extent of the release for future corrective action, or stabilization as an appropriate and immediate corrective action.

The second step is a *Visual Site Inspection* (VSI) of the entire facility. The RFA is the combination of the PR and VSI documentation and any sample results. The RFA process should be scheduled so as to be completed during the latter stages of the Technical Review process or no later than one month in advance of the preparation of an initial draft permit for the facility. The RFA includes recommendations for whether further investigation or corrective action is warranted.

The requirements for an RFI or any other corrective action will be included in the permit, in the associated compliance plan which is mandatory for facilities with known groundwater contamination, or pursuant to 40 CFR 270.14(d)(3), the applicant may be required to start the RFI or other corrective action before the permit is issued. The RFI shall comply with all the applicable items contained in the U.S. EPA publication EPA/520-R-94-004, OSWER Directive 9902.3-2A, RCRA Corrective Action Plan (Final), May 1994, unless an alternate investigation approach is approved by the Executive Director. An RFI workplan may typically include a soil boring program, installation of monitoring wells, and sampling and analysis for 40 CFR 261 Appendix VIII and 40 CFR 264 Appendix IX hazardous constituents for surface soils, subsurface strata, surface water, groundwater, and/or air.

The permittee shall perform the RFI or APA and report the results. Corrective Action under 30 TAC Chapter 350 consists of an APA, determination of protective concentration levels, selection of a remedy standard (if necessary), development and implementation of a response action (if necessary), and submittal of required report according to 30 TAC Chapter 350.

If the RFI report indicates releases of hazardous waste or hazardous constituents for SWMUs and/or AOCs that have been grandfathered under 30 TAC Chapter 335 Subchapters A and S, Corrective Action shall consists of, if necessary, Interim Corrective Measures, *Baseline Risk Assessment* (BLRA)/*Corrective Measures Study* (CMS) Report, and *Corrective Measures Implementation* (CMI).

For grandfathered SWMUs and/or AOCs, the permittee may continue to complete the Corrective Action requirements under 30 TAC Chapter 335, Subchapter A and S, provided the permittee complies with the notification and schedule requirements pursuant to 30 TAC 335.8 and 350.(2)(m).

This report shall evaluate the risk, identify and evaluate corrective measure alternatives, and recommend appropriate corrective measure(s) to protect human health and the environment. The BLRA/CMS Report shall address all of the applicable items in 30 TAC 350, 30 TAC 335 Subchapter S, and the U.S. EPA publication EPA/520-R-94-004, OSWER Directive 9902.3-2A, RCRA Corrective Action Plan (Final), May 1994.

Upon approval of the BLRA/CMS Report by the TCEQ, the permittee shall submit a CMI Workplan to address all of the items for CMI Workplan contained in the U.S. EPA publication EPA/520-R-94-004, OSWER Directive 9902.3-2A, RCRA Corrective Action Plan (Final), May 1994. For projects conducted under TRRP, the risk assessment process shall be addressed in the *Affected Property Assessment Report* (APAR), and the evaluation of corrective measures shall be

conducted as part of the remedy standard selection process provided in the *Response Action Plan* (RAP). If the CMI or RAP does not propose a permanent remedy, then a CMI Workplan or RAP shall be submitted as part of a new compliance plan application or as a modification/ amendment application to an existing compliance plan. The workplan or RAP shall contain detailed final engineering design, monitoring plans, and schedules necessary to implement the selected remedy. Implementation of the corrective measures shall be addressed through a new and/or a modified/amended compliance plan. Upon installation of a corrective action system based upon the approved CMI Workplan or RAP, the permittee shall submit a CMI Report or RAP which includes as-built drawings of the corrective action system. To report the progress of the corrective measures, the permittee shall submit periodic CMI Progress Reports or Response Action Effectiveness Reports to the TCEQ in accordance with the schedule specified in the compliance plan. Upon completion of the corrective action requirements, the permittee shall submit CMI Report or Response Action Completion Reports for review and approval.

Please note that the applicant/permittee may perform voluntary corrective action, stabilization, or "interim measures" at any time prior to or during the RFA/RFI/CMS/CMI or the APAR/RAP process without prior TCEQ approval. The TCEQ strongly supports these actions when undertaken to mitigate releases or reduce or minimize exposure and releases to human health and the environment.

A. Preliminary Review Checklists

For Applications for a New Hazardous Waste Permit:

- For all facility Solid Waste Management Units (SWMUs) and/or Areas of Concern (AOCs), complete the accompanying forms entitled "Preliminary Review Facility Checklist" and "Preliminary Review Unit Checklist". Make additional copies as necessary.

Appendix IX – Releases from Solid Waste Units and Corrective Action includes the Preliminary Review Facility Checklist and the Preliminary Review Unit Checklist.

For Applications for a Renewal/Amendment/Modification of an Existing Hazardous Waste Permit:

Not Applicable

- Update the Preliminary Review Facility Checklist to include any newly identified SWMUs and/or AOCs that were not incorporated into the previous permit issuance (new, amendment, modification, or renewal), and to update the status of all previously identified SWMUs or AOCs which are incorporated into the existing permit under either Section IX - Corrective Action for Solid Waste Management Units, or Section XI - Compliance Plan. Status updates should include notes regarding whether the SWMU or AOC has been incorporated into a compliance plan, has received approval of no further action (NFA), has had changes in its corrective action status, or has had other determinations issued by the TCEQ. Include the date of the status change in the updated checklist;
- Complete the Preliminary Review Unit Checklists for any newly identified SWMUs or AOCs that were not incorporated into the previous permit issuance (new, amendment, modification, or renewal);
- Update the status on the Preliminary Review Unit Checklists for all previously

identified SWMUs or AOCs that had not yet received TCEQ approval of NFA at the time of the previous permit issuance;

- Provide copies of the letters from the TCEQ approving NFA or other determinations that were issued since the previous permit issuance;
- For previously identified SWMUs and/or AOCs which are incorporated into the existing permit and are included in Section XI - Compliance Plan of this application, you may forego filling out the Preliminary Review Unit Checklists for these units. Briefly note on the Preliminary Review Facility Checklist that the SWMUs or AOCs are addressed in

  Section XI. Provide the location where the SWMU's and addressed in Section XI. ; or
- If all previously identified SWMUs and/or AOCs reached NFA status at or before the last permit issuance you may forego filling out the Preliminary Review Unit Checklists, indicate Not Applicable, and provide a brief explanation of the facts.

Complete Preliminary Review Facility Checklist (located in attachments)

Instructions for Preliminary Review Unit Checklist

Preliminary Review Facility Checklist

Preliminary Review Unit Checklist

Appendix IX –
Releases from Solid Waste Units and Corrective Action

This appendix includes the following information:

- Preliminary Review Facility Checklist
- Texas Commission on Environmental Quality, *Response Action Completion Report*, March 22, 2016
- Preliminary Review Unit Checklist

Preliminary Review Facility Checklist

Facility:	EnviroSafe Demil, LLC	City	Hooks, Texas
ISW Reg. No:	98470	Date	
Permit No.	50424	Reviewer:	
EPA ID No.	TXR000086289		

A. Waste Management Units:

RCRA Regulated Units:

NOR. No.	Description	Status
100	Rocket Motor Ops Building	Proposed
101	Hybrid Burn Chamber (HBC)	Proposed
300	Above Ground Magazine (AGM)	Proposed
301	Earth Covered Magazine (ECM) (V-13-1)	Proposed
302	Earth Covered Magazine (ECM) (V-13-2)	Proposed
	Remove Last Row	Add Row

Solid Waste Management Units:

NOR. No.	Description	Status
	Remove Last Row	Add Row

B. Reviewed Documents

RCRA:

Part A ☐

Part B ☐

Permit ☐

CERCLA:

Inspection Reports:	
Enforcement Actions	
Exposure Infomation	
Other Infomation:	Texas Commission on Environmental Quality, Response Action Completion Report, March 22, 2016

C. Summary:

Other than the storage magazines, the proposed units have not handled hazardous waste previously. The storage magazines previously held explosives. There is no evidence of any hazardous waste releases in the area of the proposed units from previous operations.

The attached report "Response Action Completion Report" dated March 22, 2016 covers asbestos removal from the property as part of a corrective action program. All of the asbestos was successfully removed from the areas of concern and was properly disposed. The report states that "exposure to and cross-contamination from the deteriorated ACM on the ground surface and in the surface soil is no further concern at Load Line F."

D. Recommended Action::

No further action.

Preliminary Review Unit Checklist

Facility:	EnviroSafe Demil, LLC	City	Hooks, Texas
ISW Reg. No:	98470	Date	
Permit No.	50424	Reviewer:	
EPA ID No.	TXR000086289		

Waste Management Unit(s):

A. NOR No.:	100
B. Description:	Miscellaneous Unit - Subpart X (X99) - Rocket Motor Ops Building
C. Dates of Operation:	Future
Wastes Managed:	Texas Waste Codes: 5001315H, 5002315H EPA Waste Codes: D001, D003, D004, D005, D006, D007, D008, D009, D010, D011, D030
Evidence of Release:	None
Pollutant Dispersal Pathways:	Not applicable
Summary:	See information provided in Appendix V.K - Rocket Motor Ops Building
Recommended Action:	No further action
A. NOR No.:	101
B. Description:	Miscellaneous Unit - Subpart X (X03) - Hybrid Burn Chamber
C. Dates of Operation:	Future
Wastes Managed:	Texas Waste Codes: 5001315H, 5002315H EPA Waste Codes: D001, D003, D004, D005, D006, D007, D008, D009, D010, D011, D030
Evidence of Release:	None
Pollutant Dispersal Pathways:	Not applicable
Summary:	See information provided in Appendix V.K - Hybrid Burn Chamber
Recommended Action:	No further action
A. NOR No.:	300
B. Description:	Other Storage (S99) Above Ground Magazine

C. Dates of Operation:	Future
Wastes Managed:	Texas Waste Codes: 5001315H, 5002315H EPA Waste Codes: D001, D003, D004, D005, D006, D007, D008, D009, D010, D011, D030
Evidence of Release:	None
Pollutant Dispersal Pathways:	Not applicable
Summary:	See information provided in Appendix V.B - Container Storage Areas
Recommended Action:	No further action
A. NOR No.:	301
B. Description:	Other Storage (S99) Earth Covered Magazine (V-13-1)
C. Dates of Operation:	Future
Wastes Managed:	Texas Waste Codes: 5001315H, 5002315H EPA Waste Codes: D001, D003, D004, D005, D006, D007, D008, D009, D010, D011, D030
Evidence of Release:	None
Pollutant Dispersal Pathways:	Not applicable
Summary:	See information provided in Appendix V.B - Container Storage Areas
Recommended Action:	No further action
A. NOR No.:	302
B. Description:	Other Storage (S99) Earth Covered Magazine (V-13-2)
C. Dates of Operation:	Future
Wastes Managed:	Texas Waste Codes: 5001315H, 5002315H EPA Waste Codes: D001, D003, D004, D005, D006, D007, D008, D009, D010, D011, D030
Evidence of Release:	None
Pollutant Dispersal Pathways:	Not applicable
Summary:	See information provided in Appendix V.B - Container Storage Areas
Recommended Action:	No further action

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
Response Action Completion Report

Cover Page

Regulatory ID number (Solid waste registration number, VCP ID number, etc) TCEQ SWR 30991
check one: X Initial RACR submittal for this on-site property ___ Subsequent RACR submittal
Report date: _____ TCEQ Region No.: 5 - Tyler

TCEQ Program (check one)

X Corrective Action (Mail Code 127)
___ Voluntary Cleanup Program (Mail Code 221)
___ Petroleum Storage Tank Program (Mail Code 137)
___ Superfund PRP Lead (Mail Code 143)
___ Municipal Solid Waste Permits (Mail Code 124)

On-Site Property Information

On-Site Property Name: Load Line F of the former Lone Star Army Ammunition Plant
Street no. _____ Pre dir: _____ Street name: _____ Street type: _____ Post dir: ___
City: Hooks County: Bowie County Code: 19 Zip: 75505-9101
Nearest street intersection or location description: Site entrance is on an unnamed service road 0.09-mile east of Madison Avenue. The unnamed service road starts 0.71-mile south of the intersection of Madison Avenue & Oak Street (formerly Fourth Street).

Latitude: ~~Degrees, Minutes, Seconds~~ OR Decimal Degrees (circle one) North 33°27'3.24"
Longitude: ~~Degrees, Minutes, Seconds~~ OR Decimal Degrees (circle one) West 94°15'14.65"

Off-Site Affected Property Information

Off-Site Affected Property Name: _____
Street no. _____ Pre dir: ___ Street name: _____ Street type: _____ Post dir: ___
City: _____ County: _____ County Code: _____ Zip: _____

√ Check if there are no off-site properties affected

Contact Person Information and Acknowledgement

Person (or company) Name: U.S. Army
Contact Person: John Medlock Title: Commander's Representative
Mailing Address: Highway 82 West
City: Texarkana State: TX Zip: 75505 E-mail address [redacted]
Phone: (903)-255-2857 Fax: _____

By my signature below, I acknowledge the requirement of §350.2(a) that no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. Violation of this rule may subject a person to the imposition of civil, criminal, or administrative penalties.

Signature of Person _____ Name, print: _____ Date: _____

Check the reports/forms submitted:

Remedy Standard A

___ Self-Implementation Notice Submittal date: _____

√ Response Action Plan - Approval date: July 2, 2015 (via email correspondence)

Remedy Standard B

___ Response Action Plan - Approval date: _____

List all media (surface soil, subsurface soil, groundwater, sediment, surface water, air) that contained or contains a PCLE zone and specify the response action taken for each media. Indicate the type of removal, decontamination, physical control, or institutional control action that was used in the response action. If a media with a PCLE zone was not addressed in the response action, provide an explanation below.

Media	COCs[1]	Removal	Decontamination	Physical Control	Institutional Control	Modified Response Objective[2]		
						PMZ	WCU	TI
Surface Soil	Asbestos	Hand removal & Offsite Disposal	Worker Decontamination	NA	NA	NA	NA	NA

Is there a media that contains a PCLE zone that was not addressed in the response action? yes ___ √ no ___

If yes, provide justification for not addressing the PCLE zone in the response action.

Current land use of the on-site affected property: ___ Residential X Commercial/industrial

Projected future land use of the on-site property (if known): ___ Residential X Commercial/industrial

Explain why you believe the response action to be complete.

The response action removed all visible asbestos containing materials (ACM) from the surface soil around the perimeter of production area buildings at Load Line F within the former Lone Star Army Ammunition Plant (LSAAP). The response action included the surface removal of ACM by trained ACM workers and offsite disposal of the ACM waste at the New Boston Waste Management Landfill. In accordance with the Texas Commission on Environmental Quality (TCEQ)-approved ACM Work Plan, dated May 2015, all activities were conducted in accordance with the regulations contained in 30 Texas Administrative Code (TAC) §355.8 and 30 TAC §350 and all applicable Federal, State, and local regulations.

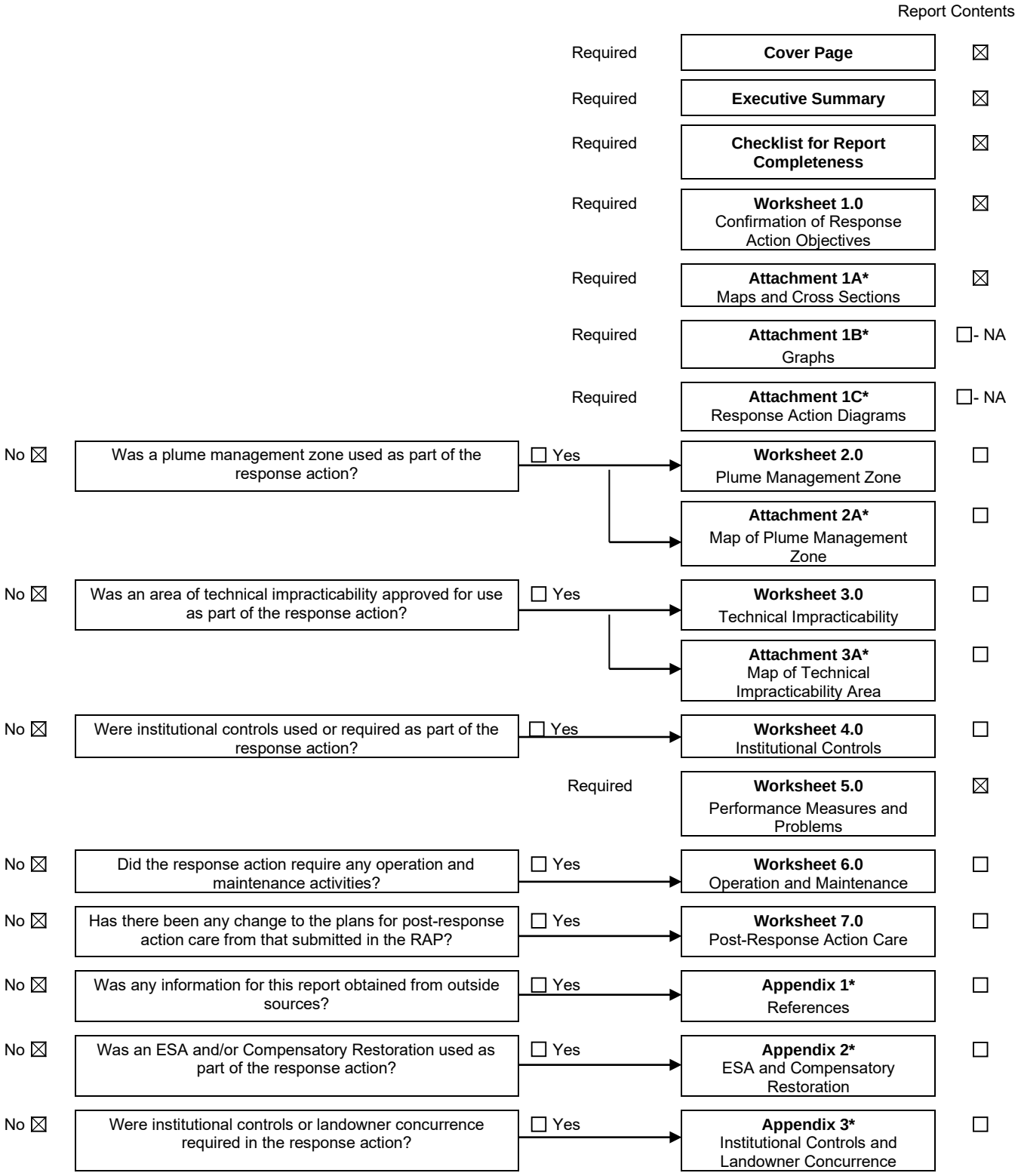
On January 7, 2016, iSi Environmental (iSi), a nationally-certified asbestos abatement contractor, visually inspected all buildings previously identified with Transite siding and/or roofing and ACM insulated steam lines and identified the location of all broken-off pieces of ACM, which was determined in the field to be limited to Transite, on the ground surface surrounding the buildings. The area of concern included the ground surface adjacent to approximately 2,200 linear feet of Transite-sided buildings with deteriorated Transite siding, specifically, buildings F-46, F-47, F-54, F-68, and ramps RF-1, RF-2, RF-3, RF-4, and RF-5. iSi hand removed all pieces of Transite from the ground surface and collected the pieces of ACM in the appropriate disposal containers, which consisted of double layered 6-millimeter polyethylene bags. The sealed bags of ACM waste were then temporary stored in a roll-off container at the LSAAP until all approved ACM abatement activities were complete, and transportation to the appropriate landfill was arranged. Subsequently, on January 11, 2016, the bags of collected ACM waste, which were collected in a roll-off container, were transported by Waste Management to the New Boston Waste Management Landfill in New Boston, TX (Permit No. MSW 576B).

[1] Specify either a specific COC or, if the response action is the same for all COCs in one type, specify the type of COC (for example, VOCs, SVOCs, metals).

[2] If a modified groundwater response objective was used, check the type(s) of modifications.

Checklist for Report Completeness

Use this checklist to determine the portions of the form that must be submitted for this report. Answer all questions by checking Yes or No. If the answer is Yes include that portion of the report. If the answer is No, do not complete or submit that portion of the report. All form contents that are marked "Required" must be submitted. Form contents marked with an asterisk (*) are not included in the blank form and are to be provided by the person.



			Report Contents
No ☐	Is there data or boring/monitor well information not previously submitted?	☒ Yes → **Appendix 4*** Data Tables, Boring Logs, and Well Completions	☒-Photo Log
No ☒	Did sampling procedures differ from those described in the RAP?	☐ Yes → **Appendix 5*** Sampling Procedures	☐
No ☒	Has any sampling been conducted for which the analytical results were not previously submitted?	☐ Yes → **Appendix 6*** Laboratory Data Packages	☐
No ☒	Were statistics or geostatistics used in the response action?	☐ Yes → **Appendix 7*** Statistical Methodology	☐
No ☐	Were any wastes generated that were not reported through STEERS?	☒ Yes → **Appendix 8*** Waste Disposition	☒

Use this worksheet to describe the attainment of the response action objectives in each media.

Response Action Objectives

What was the selected remedy standard for this affected property? √ A ___ B

List the environmental media to which this applies Surface Soil
Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), physical or institutional control actions, and any actions for ecological considerations (ecological services analysis and compensatory restoration plans) that were conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

The TCEQ-approved response action for the Site included removal of all visible ACM from the surface soil, photo documentation, and disposal of the ACM waste material at a TCEQ-approved facility, New Boston Waste Management Landfill.

On January 7, 2016, two asbestos workers, Luiz Guzman and Elvin Serrano, of iSi Environmental (iSi), a nationally-certified asbestos abatement contractor, mobilized to the Site to complete the ACM removal from the ground surface. All response activities were completed on January 7, 2016, with the exception of transportation and disposal, which occurred on January 11, 2016. The area requiring response action included the surface soil, top 2-3 inches, adjacent to approximately 2,200 linear feet of former production buildings, including buildings F-46, F-47, F-54, and F-68 and ramps RF-1, RF-2, RF-3, RF-4, and RF-5, constructed with Transite siding and roofing panels.

All of the removal activities were conducted by iSi's nationally-certified asbestos workers using wet methods and hand removal. The pieces of ACM were first wetted down and then carefully removed from the surface soil to minimize breakage. The collected ACM was then immediately placed into a 6-millimeter polyethylene (poly) bag. When the ACM waste bags were approximately half full, the iSi workers removed excess air from the bag and twisted the top of the bag closed. The base of the twisted top was then wrapped in duct tape and the top of the twist was folded down before being sealed again with duct tape. The sealed bags were then placed in a second 6-mil poly bag and labeled with the OSHA-required asbestos warning label. The remediated areas were supervised and inspected by Matrix's competent person, Mr. Patrick Saveall. Mr. Saveall visually inspected the area of concern and verified that all visible ACM had been removed from the surface soil. Upon visually confirming completion of the removal activities, Mr. Saveall collected photo documentation of the remediated areas. The sealed bags of ACM waste were then placed in a lined 20-yard roll-off container stored at the High Explosives Burning Grounds located within the LSAAP, which was secured by the site's security fencing. On January 11, 2016, Waste Management (License No. 400023) transported the lined roll-off container to New Boston Waste Management Landfill (Permit No. MSW 576B) for final deposition.

Decontamination activities consisted of worker decontamination. Workers donned personal protective equipment (PPE) including disposable full-body outer protective suits with foot and head coverings, gloves, and half-face, HEPA-filtered respirators prior to commencing removal activities. Upon completing the removal activities and/or prior to exiting the work area, worker decontamination consisted of HEPA vacuuming a worker's outer layer of clothing, removing the outer protective suit and gloves, disposing of the suit, gloves, and respirator cartridges as asbestos-containing waste in double-bagged 6-mil poly, and wet wiping face, hands, and respirator prior to leaving the work area.

Describe how the response action achieved the property-specific response objectives for the PCLE zone in each media in the context of the response objectives set forth in §350.32 or §350.33, as applicable. Explain how the response action was appropriate based on the hydrogeologic and COC characteristics.

Describe any unprotective conditions that continued or resulted from the remedial actions and the actions taken to mitigate unprotective conditions.

The goals and objectives of the response action at Load Line F as identified in the TCEQ-approved ACM Work Plan and the U.S. Department of the Army-approved Technical Specifications and Requirements Statement (TSRS) were achieved. Specifically, the goals and objectives of the response action at Load Line F consisted of the removal and offsite disposal of ACM present on the ground surface or in the surface soil and photo documentation of the completed ACM removal. The response action achieved these objectives by utilizing trained ACM workers, ensuring the use of wet methods and careful handling of ACM pieces to minimize incidental exposure and/or breakage of ACM during the removal process, and performing safety and quality control inspections prior, during, and subsequent to the removal activities to verify the successful implementation of the TCEQ-approved ACM Work Plan. Furthermore, the QC inspections conducted by Matrix's competent person, Mr. Patrick Saveall, confirmed the removal of all ACM from the ground surface and surface soil in the Load Line F area, which was the stated and approved objective for the response action at the Site.

If different from the information provided in the RAP, explain how the COCs were handled, treated, disposed, or transferred to another media and document that the response action did not result in any additional exposure conditions due to response action activities.

N/A- COCs were handled and disposed in accordance with the TCEQ-approved RAP (ACM Work Plan).

Explain how the response action achieved the objectives within the reasonable time frame.

The response action removed all visible ACM from the ground surface and surface soil in the areas of concern and properly disposed of the ACM waste materials at a permitted landfill; therefore, exposure to and cross-contamination from the deteriorated ACM on the ground surface and in the surface soil is no further concern at Load Line F.

The response action was completed on schedule. The removal and transportation activities were each completed in less than a day. From mobilization to the Site to final deposition, the duration of the response action was five (5) days.

Were physical controls used as part of the response action? ___ Yes _X_ No
If yes, describe the type and purpose of the physical control and discuss how the physical control has proved effective.

Soil Response Action Objectives

When using removal and/or decontamination with controls or controls only, demonstrate that the physical control or combination of measures reliably contained COCs within and/or derived from the surface soil and subsurface soil PCLE zone materials over time.

NA- Physical controls were not used to contain COCs. Removal of all COCs in the surface soil was conducted at the Site.

Explain how the removal or decontamination action reduced the concentration of COCs to the critical surface soil and subsurface soil PCL throughout the soil PCLE zone and prevented COC concentrations above the critical soil PCLs from migrating beyond the original boundary of the soil PCLE zone.

The removal of the visible ACM from the surface soil effectively removed the COC. The successful reduction of the COC concentration was verified by a post-abatement inspection, which confirmed that all visible ACM in the surface soil was removed. Migration beyond the original boundary of the soil PCLE zone was prevented by implementation of work practices approved for Class II asbestos work as described in EPA 40 CFR Part 763, Subpart E and OSHA 1926-1101(g) including respiratory protection, protective clothing, worker decontamination, isolation of work areas, wet methods, and proper packing

and disposal of ACM waste materials.

Groundwater Response Action Objectives

Name of groundwater-bearing unit to which this information applies: NA – Non-friable ACM in the surface soil was the COC at the Site – Groundwater impact was not a concern.

Repeat this section for each groundwater-bearing unit for which a different response action was conducted.

Groundwater classification	1	2	3
	___	___	___

Was a modified groundwater response action used for any part of the groundwater PCLE zone (§350.33(f)(2), (3), or (4))? ___ Yes X **No**
If yes, complete the appropriate portions of this report.

Explain how the removal or decontamination actions reduced the concentration of COCs to the critical groundwater PCL throughout the groundwater PCLE zone and prevented COC concentrations above the critical groundwater PCL from migrating beyond the original boundary of the groundwater PCLE zone. If COC concentrations above the critical groundwater PCL ever migrated beyond the original boundary of the groundwater PCLE zone, explain the actions taken to address the increase in the PCLE zone.

NA

Explain how the response action prevented COCs from migrating to air at concentrations above the PCLs for air if the groundwater-to-air PCLs ($^{Air}GW_{Inh\text{-}V}$) were exceeded.

NA

Explain how the response action prevented COCs from migrating to surface water at concentrations above the PCLs for groundwater discharges to surface water if surface water was a factor.

NA

Explain how the response action prevented human and ecological receptor exposure to the groundwater PCLE zone.

NA

Waste Management

Describe the volume and final disposition or reuse location of waste or environmental media that was removed from the affected property during the response action, if not previously reported under STEERS. Provide copies of all manifests, other documentation of disposition, and landowner consent for reuse of soil in Appendix 8.

In total, approximately 2.2 tons of ACM were collected from five sites within the former LSAAP. These sites included Load Line F as well as Area A and Load Lines B, C, and G. All collected ACM waste materials were transported to and disposed at New Boston Waste Management Landfill (Permit No. MSW 576B) located at 1030 Hwy 82 West, New Boston, TX 75570.

Performance Measures

List and describe the performance measures for each environmental medium containing a PCLE zone that were used to determine if reasonable progress is being made by the response action in a timely manner. Provide documentation that these performance measures were met. Attach additional information if necessary.

The performance measure for the removal of ACM from the ground surface and surface soil involved the results of the visual inspection of the areas of concern. This visual inspection of the areas of concern was conducted by Matrix's competent person, Mr. Patrick Saveall. The visual inspection was conducted on January 7, 2016, and did not result in the notation of areas requiring additional removal efforts; therefore, the removal effort was deemed complete. Once the ground surface and surface soil in the area of concern was verified to be devoid of all visible ACM, Mr. Saveall documented the successful ACM removal effort with photographs of the areas of concern. The photo documentation of the implemented response action is included in Appendix 4, Photographic Log.

The second performance measure included the lawful and documented disposal of the ACM waste materials at a landfill permitted for asbestos waste. This was completed on January 11, 2016, when Waste Management transported the collected ACM waste material to New Boston Waste Management Landfill for final deposition. The fulfillment of this second performance measure is documented through the waste manifest, which is included in Appendix 8, Waste Disposition.

Problems

Complete the table for the response action. When the response action consisted of several components or multiple actions, complete one table for each major component or action.

Response Action Name/Designation: N/A – No problems encountered during response action

List the problems that were encountered during the response action, describe the impact of each problem, and the response to the problem.

Description of the Problem	Impact	Did this cause a response action failure?		Corrective Response
		Yes	No	

Photo 1: Perimeter of ramp RF-5 south of Building F-23 prior to response action activities. Photo taken in July 2013.

Photo 2: Perimeter of Building F-47 following successful ACM removal from the ground surface.

Photo 3: Perimeter of Building F-54 following successful ACM removal from the ground surface.

Photo 4: Perimeter of Building F-68 following successful ACM removal from the ground surface.

Photo 5: Perimeter of ramp RF-2 south of Building F-2 (east side of ramp) following successful ACM removal from the ground surface.

Photo 6: Perimeter of ramp RF-4 south of Building F-18 following successful ACM removal from the ground surface.

Photo 7: Perimeter of ramp RF-1 south of Building F-1 (east side of ramp) following successful ACM removal from the ground surface.

Photo 8: Perimeter of ramp RF-3 south of Building F-15 following successful ACM removal from the ground surface.

Photo 9: Perimeter of ramp RF-5 south of Building F-23 following successful ACM removal from the ground surface.

Photo 10: Perimeter of Building F-46 following successful ACM removal from the ground surface.

WASTE MANAGEMENT

NON-HAZARDOUS MANIFEST

NON-HAZARDOUS MANIFEST	1. Generator's US EPA ID No. NA	Manifest Doc No.	2. Page 1 of	

3. Generator's Mailing Address:	Generator's Site Address (If different than mailing):	A. Manifest Number	
TEXAMERICA CENTER 107 CHAPAL LANE NEW BOSTON, TX 75570		WMNA	4412901
4. Generator's Phone 832-528-9979		B. State Generator's ID NA	

5. Transporter 1 Company Name	6. US EPA ID Number	C. State Transporter's ID
		D. Transporter's Phone 903-794-4111
7. Transporter 2 Company Name	8. US EPA ID Number	E. State Transporter's ID
		F. Transporter's Phone
9. Designated Facility Name and Site Address NEW BOSTON RDF 1030 HWY 82 WEST NEW BOSTON, TX 75570	10. US EPA ID Number 576B	G. State Facility ID H. State Facility 903-628-6595

GENERATOR

11. Description of Waste Materials	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt./Vol.	I. Misc. / Waste Code
a. NON FRIABLE ASBESTOS WM Profile # 972549TX				Y	NA
b. WM Profile #					
c. WM Profile #					
d. WM Profile #					

J. Additional Descriptions for Materials Listed Above	K. Disposal Location			
	Cell		Level	
	Grid			

15. Special Handling Instructions and Additional Information

Purchase Order # EMERGENCY CONTACT / PHONE NO.:

16. GENERATOR'S CERTIFICATE:

I hereby certify that the above-described materials are not hazardous wastes as defined by CFR Part 261 or any applicable state law, have been fully and accurately described, classified and packaged and are in proper condition for transportation according to applicable regulations.

Printed Name	Signature	Month	Day	Year

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed Name	Signature	Month	Day	Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed Name	Signature	Month	Day	Year

FACILITY

19. Certificate of Final Treatment/Disposal

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste was managed in compliance with all applicable laws, regulations, permits and licenses on the dates listed above.

20. Facility Owner or Operator: Certification of receipt of non-hazardous materials covered by this manifest.

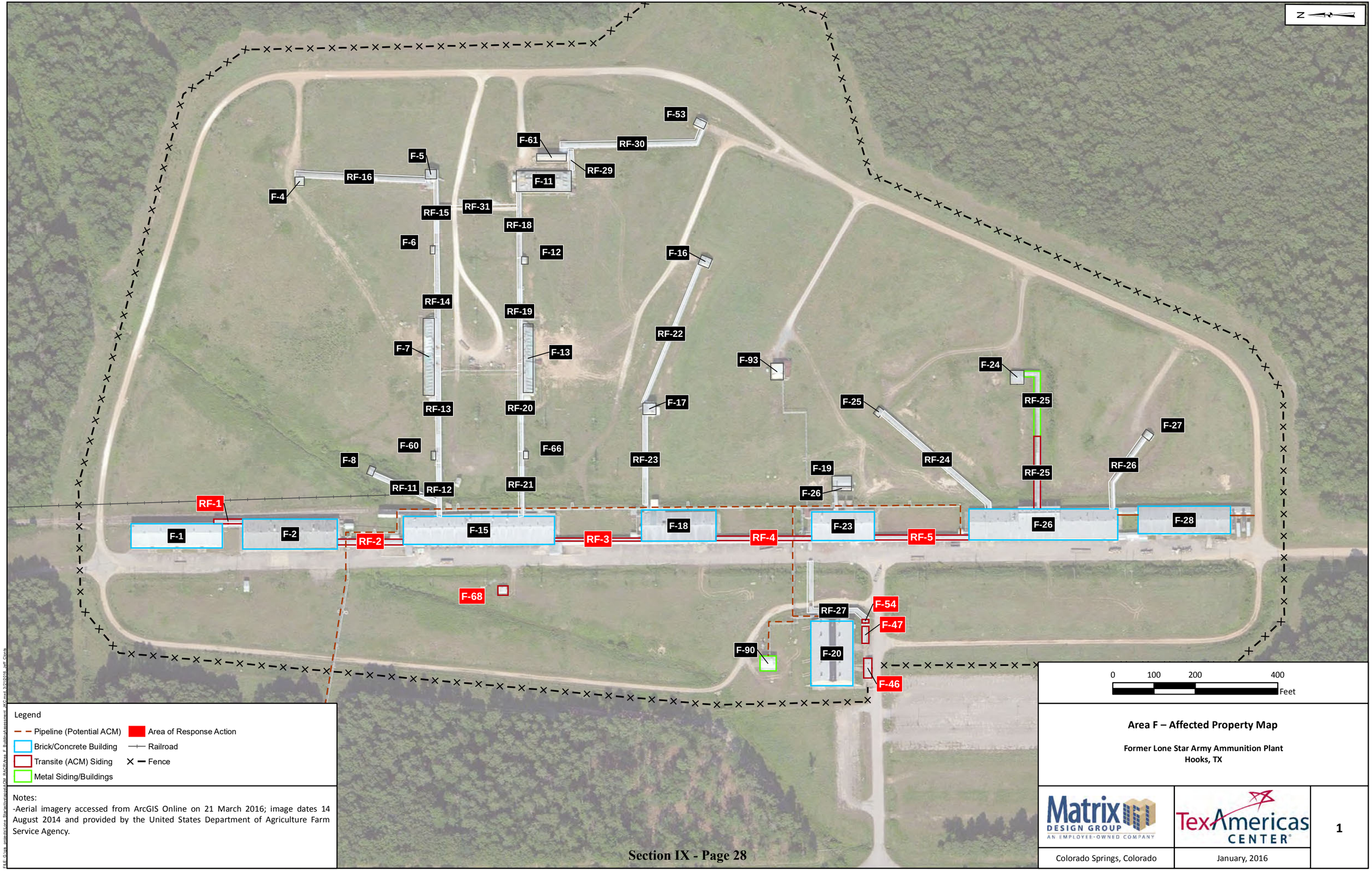
Printed Name	Signature	Month	Day	Year

White- ORIGINAL Blue- TREATMENT, STORAGE, DISPOSAL FACILITY COPY Yellow- TRANSPORTER #2 COPY

Pink- TRANSPORTER #1 COPY Gold- GENERATOR #1 COPY

Chronology of Load Line F

Date	Activity/Report
January 11, 2016	Offsite Disposal to New Boston Waste Management Landfill
January 7, 2016	Removal of ACM from ground surface soil around the perimeter of production area buildings in Load Line F
December 2014	Submittal of Draft Final Affected Property Assessment Report (APAR) for Load Line F
May 2013	Assessment of damaged ACM building materials (including Transite roofing and siding) in the soil or on the ground surface adjacent to the production area building by a professional engineer and a licensed asbestos inspector. Approximately 2,200 linear feet of Transite-sided buildings were identified with ACM on the ground.
June 2011	Submittal of Final Work Plan for Affected Property Assessment
September 1, 2010	Transfer of site ownership to TexAmericas Center-East (formerly Red River Redevelopment Authority)
2009	Deactivation of LSAAP
November 20, 2006	Submittal of Environmental Condition of Property Report for the LSAAP. Non-friable ACM including Transite roofing and siding and friable ACM including pipe insulation and joints were found throughout LSAAP. Additional ACM is also present at LSAAP including vinyl floor tiles, fire doors, linoleum flooring, tar roofing, and ceiling tiles.
2005	LSAAP selected for closure by Base Realignment and Closure (BRAC)
December 2003	Submittal of Draft Final Affected Property Assessment Report (APAR) for Load Line F
December 2, 1991	Plant Wide Asbestos Assessment Report completed by Pollution Management, Inc.
Mid-1941 to 1942	Construction of Lone Star Army Ammunition Plant (LSAAP)
Pre-1941	Various saw mills were present in the footprint of the future LSAAP



Legend

- Pipeline (Potential ACM)
- Area of Response Action
- Brick/Concrete Building
- Railroad
- Transite (ACM) Siding
- Fence
- Metal Siding/Buildings

Notes:
-Aerial imagery accessed from ArcGIS Online on 21 March 2016; image dates 14 August 2014 and provided by the United States Department of Agriculture Farm Service Agency.

Area F – Affected Property Map

Former Lone Star Army Ammunition Plant
Hooks, TX

Matrix Design Group, An Employee-Owned Company — Colorado Springs, Colorado

TexAmericas Center — January, 2016

1

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X. Air Emission Standards

Provide all Part B responsive information in Appendix X. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

Section X.D. applies to Permittees with "one- stop" permits applying for an amendment, modification, or renewal of the Air Permits Division portions of their combined "one-stop" permit.

Appendix X.A – Process Vents, Appendix X.B – Equipment Leaks, and Appendix X.C – Tanks, Surface Impoundments, and Containers address the requirements in this section.

A. Process Vents

Does the facility have process vents and equipment subject to the requirements of 40 CFR Part 264, Subpart AA?

No. 40 CFR Part 264 Subpart AA applies to process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations that manage hazardous wastes with organic concentrations of at least 10 ppmw. This does not apply to ESD's facility.

If Yes: please provide a report that includes all of the information required by 40 CFR §270.24. Indicate on a facility plot plan the approximate location of process vents.

1. For incorporation into the permit, complete Table X.A - Process Vents for all vents on waste management units that manage hazardous waste with an annual average total organics concentration of 10 ppmw or greater ("process vents"). Specifically include:

   a. process vents on distillation, fractionation, thin-film evaporation, solvent extraction, air or steam stripping operations, and vents on condensers serving these operations; and

   b. process vents on tanks (e.g., distillate receivers, bottom receivers, surge control tanks, separator tanks, and hot wells) associated with distillation, fractionation, thin-film evaporation, solvent extraction, and air or steam stripping processes if emissions from these process operations are vented through the tanks.

      Emissions caused by natural means such as daily temperature changes or by tank loading and unloading are not subject to control.

2. For process vents, include the following certification as part of the air emissions report:

   I,_____*[owner or operator]*___, certify that the operating parameters used in the design analysis reasonably represent the conditions that exist when the hazardous waste management unit is or would be operating at the highest load or capacity level reasonably expected to occur.

I further certify that the control device is designed to operate at an efficiency of 95 weight percent or greater.

OR

I further certify that the total organic emission limits of 40 CFR §264.1032(a) for affected process vents at the facility can be attained by a control device involving vapor recovery at an efficiency less than 95 weight percent.

*[Signature]*_____*[Date]*_____.

B. Equipment Leaks

Does the facility have equipment subject to the requirements of 40 CFR Part 264, Subpart BB?

If No: please provide the regulatory exclusion/exemption(s):

No. 40 CFR Part 264 Subpart BB applies to equipment that contains or contacts hazardous wastes with organic concentrations of at least 10 percent by weight. ESD's energetic materials do not contain organic concentrations of at least 10 percent by weight, so this does not apply.

If Yes: please provide a report that includes all of the information required by 40 CFR §270.25.

1. For incorporation into the permit, complete Table X.B. - Equipment Leaks for all valves, pumps, compressors, pressure relief devices, sampling connection systems, and open-ended valves or lines that contain or contacts hazardous waste streams with organic concentrations of 10% by weight or greater. Equipment in vacuum service is not subject to control if identified in the facility operating record.

2. For equipment, include the following statement as part of the air emissions report:

   I,_____*[owner or operator]*___, certify that the operating parameters used in the design analysis reasonably represent the conditions that exist when the hazardous waste management unit is operating at the highest load or capacity level reasonably expected to occur.

   I further certify that the control device is designed to operate at an efficiency of 95 weight percent or greater.

   *[Signature]*_____*[Date]*_____.

C. Tanks, Surface Impoundments, and Containers

Does the facility have tanks subject to the requirements of 40 CFR Part 264, Subpart CC?

☐ Yes ☐ No **X Not Applicable (no permitted tanks)**

If No: provide the regulatory exception/exemption(s) for each tank subject to regulation under 40 CFR Part 264, Subpart J:

No. Not Applicable. 40 CFR Part 264 Subpart J applies to owners or operations of facilities that use tank systems for storing or treating hazardous waste. ESD does not use tank systems for storing or treating hazardous waste.

Does the facility have surface impoundments subject to the requirements of 40 CFR Part 264, Subpart CC?

☐ Yes ☐ No **X Not Applicable (no permitted surface impoundments)**

If No: provide the regulatory exception/exemption(s) for each permitted surface impoundment subject to regulation under 40 CFR Part 264, Subpart K:

No. Not Applicable. 40 CFR Part 264 Subpart K applies to owners and operations of facilities that use surface impoundments to treat, store, or dispose of hazardous waste. ESD has no surface impoundments.

Does the facility have containers subject to the requirements of 40 CFR Part 264, Subpart CC?

☐ Yes **X No** ☐ Not Applicable (no permitted container storage areas)

If No: provide the regulatory exception/exemption(s) applicable to the authorized containers subject to regulation under 40 CFR Part 264, Subpart I:

No. 40 CFR 264.1082(c)(1) says that if the container has an average volatile organic concentration of less than 500 ppmw, then it is exempt from the standards in §264.1084-§264.1087. The materials that will be stored in containers are solid energetic materials. No volatile organics are present in these materials.

If the facility contains tanks, surface impoundments, and containers subject to the requirements of 40 CFR Part 264 Subpart CC, please provide a report that includes all of the information required by 40 CFR §270.27.

1. For incorporation into the permit, complete Table X.C.

2. As applicable, include the following floating roof cover certification as part of the air emissions report for tanks:

   I,_____*[owner or operator]*___, certify that the floating roof cover meets the applicable design specifications as listed in 40 CFR §264.1084(e)(1) or 40 CFR §264.1084(f)(1).

   *[Signature]*_____*[Date]*_____.

3. As applicable, include the following floating membrane cover certification as part of the air emissions report for surface impoundments:

   I,_____*[owner or operator]*___, certify that the floating membrane cover meets the applicable design specifications listed in 40 CFR §264.1085(c)(1).

   *[Signature]*_____*[Date]*_____.

4. As applicable, include the following container certification as part of the air emissions report for containers:

   I,_____*[owner or operator]*___, certify that the requirements of 40 CFR Part §264, Subpart CC, are met for all containers subject to control.

*[Signature]*_____*[Date]*_____.

5. As applicable, include the following control device certification as part of the air emissions report:

   I,_____*[owner or operator]*___, certify that the control device is designed to operate at the performance level documented by a design analysis as specified in 40 CFR 264.1089 (e)(1)(ii) or by performance tests as specified in 40 CFR §264.1089(e)(1)(iii) when the tank, surface impoundment, or container is or would be operating at capacity or the highest level reasonably expected to occur.

   *[Signature]*_____*[Date]*_____.

D. "One-Stop" Permits: - RESERVED

Section X – Air Emission Standards

Appendix X.A – Process Vents

40 CFR Part 264 Subpart AA

Does the facility have process vents and equipment subject to the requirements of 40 CFR Part 264, Subpart AA?

No. 40 CFR Part 264 Subpart AA applies to process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations that manage hazardous wastes with organic concentrations of at least 10 ppmw. This does not apply to ESD's facility.

Section X – Air Emission Standards

Appendix X.B – Equipment Leaks

40 CFR Part 264 Subpart BB

Does the facility have equipment subject to the requirements of 40 CFR Part 264, Subpart BB?

No. 40 CFR Part 264 Subpart BB applies to equipment that contains or contacts hazardous wastes with organic concentrations of at least 10 percent by weight. ESD's energetic materials do not contain organic concentrations of at least 10 percent by weight, so this does not apply.

Section X – Air Emission Standards

Appendix X.C – Tanks, Surface Impoundments, and Containers

40 CFR Part 264 Subpart CC

Does the facility have tanks subject to the requirements of 40 CFR Part 264, Subpart CC?

No. Not Applicable. 40 CFR Part 264 Subpart J applies to owners or operations of facilities that use tank systems for storing or treating hazardous waste. ESD does not use tank systems for storing or treating hazardous waste.

Does the facility have surface impoundments subject to the requirements of 40 CFR Part 264, Subpart CC?

No. Not Applicable. 40 CFR Part 264 Subpart K applies to owners and operations of facilities that use surface impoundments to treat, store, or dispose of hazardous waste. ESD has no surface impoundments.

Does the facility have containers subject to the requirements of 40 CFR Part 264, Subpart CC?

No. 40 CFR 264.1082(c)(1) says that if the container has an average volatile organic concentration of less than 500 ppmw, then it is exempt from the standards in §264.1084-§264.1087. The materials that will be stored in containers are solid energetic materials. No volatile organics are present in these materials.

XI. Compliance Plan - RESERVED

XII. Hazardous Waste Permit Application Fee

Provide all Part B responsive information in Appendix XII. When preparing the physical format organize your submittal using the Format of Hazardous Waste permit Application and Instructions.

In accordance with 30 TAC 305.53, complete Tables XII.A. - Hazardous Waste Units (For Application Fee Calculations) and XII.B. - Hazardous Waste Permit Application Fee Worksheet. Use the following information in calculating your fee. The application fee will be non- refundable once an initial review of the application has been completed. The applicant's fees are subject to evaluation by the technical staff of the Texas Commission on Environmental Quality (TCEQ). However, the TCEQ reserves the right to assess further fees as may be necessary.

Table XII.A. - Hazardous Waste Units (For Application Fee Calculations) and Table XII.B. - Hazardous Waste Permit Application Fee Worksheet are attached.

A. The minimum permit application fee for a permit or a permit renewal for each hazardous waste facility to be used for Storage, Processing, Disposal, or Closure/Post-Closure Care (disposal has already occurred) of hazardous waste shall be $2,000, plus notice fee, and the maximum shall be $50,000, calculated according to these instructions:

1. Process Analysis - $1,000.00.

2. Management/Facility Analysis - $500.00.

3. A facility unit(s) analysis of $500 per unit is charged for the following:

   a. each cell of a landfill (note that multiple cells that are identical in type and use are subject to a single $500 fee);

   b. tanks and container storage areas (note that multiple tanks and container storage areas that are identical in type and use are subject to a single $500 fee)

   c. identical in type and use means the following:

      (1) made of the same material and same design;
      (2) the same size/capacity within + 10%;
      (3) store the same waste (as identified by USEPA hazardous waste number - 40 CFR 261 Subparts C & D); and
      (4) have the same management characteristics (e.g., storage only).

   d. Each incinerator, boiler/industrial furnace unit, surface impoundment, waste pile, land treatment unit, drip pad, miscellaneous unit, or containment building.

4. Site Evaluation - $100 per acre of surface used for hazardous waste management up to 300 acres. No additional fee thereafter. This shall be calculated as any acreage which will be permitted to manage hazardous waste. This shall include, for example, the entire area within the secondary containment of a tank farm, the area within a fence that surrounds individual units (other than the facility fence), or the area defined by the toe of the dike surrounding a landfill or impoundment, etc.

5. An applicant shall also include with each initial application a fee of $50 to be applied toward the cost of providing the required notice. An additional

notice
fee of $15 is required with each application for renewal.

B. The application fee for a major amendment or a Class 2 or 3 modification to a hazardous waste permit for operation, closure, or post-closure care is subject to the fees listed below:

1. A management/facility analysis fee of $500.

2. The notice fee is $50.

3. If a unit is added or a unit area is expanded for any purpose, $100 per additional acre is assessed, until the total additional acreage reaches 300 acres.

4. If one or more of the following reports are added or are significantly revised, the process analysis fee of $1000 is assessed:
   a. waste analysis plan;
   b. site-specific or regional geology report;
   c. site-specific or regional geohydrology report;
   d. groundwater and/or unsaturated zone monitoring;
   e. closure and/or post-closure care plan; or
   f. RCRA Facility Assessments (RFAs), or corrective action reports;
   g. Alternate Concentration Limit (ACL) demonstration or Development of Protective Concentration Limits (PCLs);
   h. Regulated Unit Facility Assessment, Corrective Action (CA) work plans or reports for Regulated Units; and/or
   i. RCRA Facility Investigation (RFI)/Affected Property Assessment (APA), Remedy Selection, Corrective Measure Implementation (CMI)/Remedial Action Plan for solid waste management units, and/or areas of concern;
   j. Facility Operations Area (FOA).

5. A unit analysis fee of $500 per unit is assessed if any of the following occur:
   a. if a unit is added (even if identical to units already in place, using the criteria discussed in A.3 above);
   b. if there are design changes in an existing unit; or
   c. if a unit status changes from closure to post-closure care;
   d. Changes in the number, location, depth, or design of wells approved in compliance plan or a permit (unless it is a replacement well);
   e. Changes in point of compliance and compliance monitoring program;
   f. Changes in Groundwater Protection Standards, indicator parameters, Alternate Concentration Limits or Protective Concentration Limits; and/or
   g. Changes in corrective action program.

C. The application fee for a minor amendment, a Class 1, or a Class 1^1 modification of a hazardous waste permit is $100 plus the notice fee of $50.

Table XII.A. - Hazardous Waste Units (For Application Fee Calculations)

Verbal Description of Unit	Rated Capacity	Surface Acreage[1]	# of Unit Types[2]	Identical Unit Justification[3]
Rocket Motor Ops Building	80 lbs HD 1.1 NEW 1,500 lbs HD 1.2.2 NEW 10,000 lbs HD 1.3 NEW 10,000 lbs HD 1.4 33,333 lbs Total Weight	0.65	1	
Hybrid Burn Chamber	250 lbs HD 1.3 NEW per batch 250 lbs HD 1.4 NEW per batch 833 lbs Total Weight per batch	0.12	1	
Above Ground Magazine	100,000 lbs HD 1.3 NEW 100,000 lbs HD 1.4 333,333 lbs Total Weight	0.31	1	
Earth Covered Magazines	V-13-1: 300,000 lbs HD 1.3 NEW 300,000 lbs HD 1.4 1,000,000 lbs Total Weight V-13-2: 200,000 lbs HD 1.1 NEW 150,000 lbs HD 1.2.1 NEW 200,000 lbs HD 1.2.2 NEW 200,000 lbs HD 1.3 NEW 200,000 lbs HD 1.4 666,667 lbs Total Weight	0.04	2	Identical storage magazines
		Total[4] 1.16	Total[4] 4	

1. Number of calculated acres.
2. Enter number of units except for units identical in type and use which only count toward a single $500.00 fee.
3. Explain justification for any units claimed as identical in type and use.
4. Enter these totals on the worksheet.

Table XII.B. - Hazardous Waste Permit Application Fee Worksheet

Name of Facility: EnviroSafe Demil, LLC

Solid Waste Registration Number: 98470

1. Process Analysis - $1,000..... $ 1,000

2. Facility Management Analysis - $500..... $ 500

3. Unit Analysis - _____4_____ units @ $500 per unit..... $ 2,000

4. Site Evaluation - _____1.16_____ acres @ $100 per acre..... $ 116

(Maximum of 300 acres)

5. Minor amendment, Class 1, or Class 1[1] modification - $100..... $ 0

6. Cost of Providing Notice - $50 (+ $15 for a renewal) ..... $ 50

Pay This Amount **Total** $ $3,666.00

Make Checks Payable To:

Texas Commission on Environmental Quality - Fund
549 *(your canceled check will be your receipt)*

Complete And Return With Payment To:

Texas Commission on Environmental
Quality Financial Administration Division -
MC 214 P.O. BOX 13088
Austin, Texas 78711-3088

The applicant's fees are subject to evaluation by the technical staff of the Texas Commission on Environmental Quality (TCEQ). However, the TCEQ reserves the right to assess further fees as may be necessitated.

Please do not submit a photocopy of the check (or equivalent transaction submittal) with your application packet but provide only the following account information:

Check No.	Date of Check	Check Amount
1097	05/23/2024	$3,666

ADDITIONAL INFORMATION SUBMITTED WITH THE PART B APPLICATION

PRE-APPLICATION PUBLIC MEETING

Pre-Application Public Meeting

Per 40 CFR §124.31(b) and 40 CFR §124.31(d)(1)(iv) (adopted under 30 TAC Section 39.503(b)(2)), EnviroSafe Demil, LLC conducted their RCRA pre-application public meeting on August 21, 2023 in order to solicit questions from the community and inform the community of proposed hazardous waste management activities. Public notice of the RCRA pre-application meeting was made at least 30 days prior to the meeting. A visible and accessible sign was placed at the facility. Notice to the permitting agency was made on July 19, 2023. The newspaper advertisement and the broadcast media announcement (radio advertisement) ran on July 20, 2023.

Per 40 CFR §124.31(c), the following information is included with this application:

- A summary of the meeting in agenda format.
- A list of attendees and their addresses (for attendees who volunteered this information).

No written comments or materials were submitted at the meeting.

ENVIROSAFE DEMIL LLC – RCRA PRE-APPLICATION PUBLIC MEETING

Meeting Agenda

ESD Call to Order and Opening Statements
Company Overview and History
ESD Current Activities and Benefits to the Community - Careers - Area Development - Economic Benefits - National Recognition & Leader in Clean Technology
Site Development and Facility Overview
ESD Brief Technology Overview
Current Environmental Permits and Status
RCRA Permit Application Information and Status
Open Discussion with Q/A
Closing Remarks
Adjourn

Public Meeting Roster

Meeting Name: EnviroSafe Demil LLC RCRA Pre-Application Meeting
Meeting Date(s): 08/21/2023
Time: 2:00 PM
Location: New Boston, Texas (Bowie County)

Meeting Content
EnviroSafe Demil LLC RCRA Pre-Application Meeting
Hosted by: Mike Wentz / President EnviroSafe Demil

#	Name	Phone Number	Address	Bowie Resident (Y or N)
1	Debbie Mobley	903-277-1723	738 FM 3378 New Boston TX	Y
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Additional Information - Page 4

New Boston
Property Management
PO Box 806
New Boston, TX 75570

9122

DATE 8/21/23

RECEIVED FROM Envirosafe Demil LLC.

$ 45.00 DOLLARS

FOR Yearly Fee Address Update Community Room 8/21/23. Fee

AMOUNT OF ACCOUNT $ 45.00

AMOUNT PAID $ 45.00

BALANCE DUE $ 0

BY

Thank You!

NEW BOSTON PROPERTY
303 RICE STREET
NEW BOSTON, TX 75570

Ref #: 0001

Sale

XXXXXXXXXXX2009
AMEX Entry Method: Chip

Total: $ 45.00

08/21/23 14:39:21
Inv #: 000001 Appr Code: 823240
Transaction ID: 008899366540067
Apprvd: Online Batch#: 000188
Cust #: 1
Order #: 1
Zip Code: 75570

AMERICAN EXPRESS
AID: A0000000025010801
TSI: E800
TVR: 0000008000

Customer Copy

INFORMATION ON COMPACT DISKS (CDs)

Information on Compact Disks (CDs)

The following information is included on Compact Disks (CDs).

- Electronic mailing list of adjacent landowners.
- RCRA Part B Administrative and Technical Evaluation Electronic Checklist (Form #00136).